Appendix G

Modeling Reports

Part **Page**

G.1 – Air Program Modeling for Ameren Labadie Energy Center..... G-1

G.2 – Ameren Modeling for Ameren Labadie Energy Center G-7

G.3 – Sierra Club Modeling for Ameren Labadie Energy Center..... G-617

G.4 – Sierra Club Modeling for Sibley Generating Station..... G-690

Appendix G: Modeling Reports

G.1 – Air Program Modeling for Ameren Labadie Energy Center

G.1 Air Program Modeling for Ameren Labadie Energy Center

The Air Program performed extensive air dispersion modeling for the area. The Air Program modeled Labadie using the most recent three years of actual emissions data and concurrent representative meteorological data to approximate a monitored design value for the area. The following paragraphs summarize the modeling analysis performed, and the modeling protocol in Appendix A contains more detail on the modeling approach.

The most recent three years (2012-2014) of hourly emissions (CEMS) data was obtained through EPA's CAMD and the downloaded SO_2 hourly mass emissions data was formatted for direct input into AERMOD. Further emissions information including interactive source evaluation is included below.

The representative meteorological stations used in this modeling analysis are shown in Table 1. The memorandum from the Air Program staff meteorologist justifying the selection of these datasets is included in Appendix D. The concurrent three years of meteorological data were paired with the hourly emissions years noted above.

Table 1 – Ameren Labadie Energy Center Meteorological Datasets

Facility of Interest	Surface Data Location	Upper Air Location
Ameren Labadie Energy Center	Jefferson City, MO	Lincoln, IL

The chosen modeling domain and receptor grid along with other modeling conditions are detailed in the modeling protocol contained in Appendix A.

The regional background concentration was established at 9 ppb for rural areas. This was based on an analysis of the East St. Louis monitor. See Appendix A for details of this analysis. The background was added to model predicted concentrations to account for natural sources and sources not included in the modeling inventory. The maximum modeled concentration for the area was 234.5 µg/m^3 or 89 ppb, which is not in compliance with the 1-hour SO_2 standard of 75 ppb.

Emissions Data

The emissions sources surrounding Labadie were evaluated to determine the interactive sources to include in the dispersion modeling exercise. Figure 1 displays a map of Franklin, Warren, St. Charles, St. Louis, and Jefferson Counties along with all sources evaluated during the analysis. All permitted sources within 20 km of Labadie were evaluated for inclusion in the modeling inventory. Table 2 lists all sources included on the map along with their 2012-2014 actual emissions.

Table 2 – Ameren Labadie Energy Center and Interactive Source 2012-2014 SO_x Emissions

Source Name	2012 Emissions (tons/year)	2013 Emissions (tons/year)	2014 Emissions (tons/year)
Ameren Labadie Energy Center	42,236	38,384	33,091
Purina Animal Nutrition Center	1.43	1.43	1.43

N.B. West Contracting Co Inc.	3.58	3.58	5.43*
St. John's Mercy Hospital	0.00	0.00	0.00
Millstone-Weber Portable	0.1787	0.1787	0.1787
U.S. Silica Company Pacific	0.0248	0.0248	0.0248
Route 66 Landscape Supply Center Inc.	0.0318	0.0215	0.0215

*2014 Reported emissions were found to include double counting. See source summary below.

Evaluation of Sources to Model

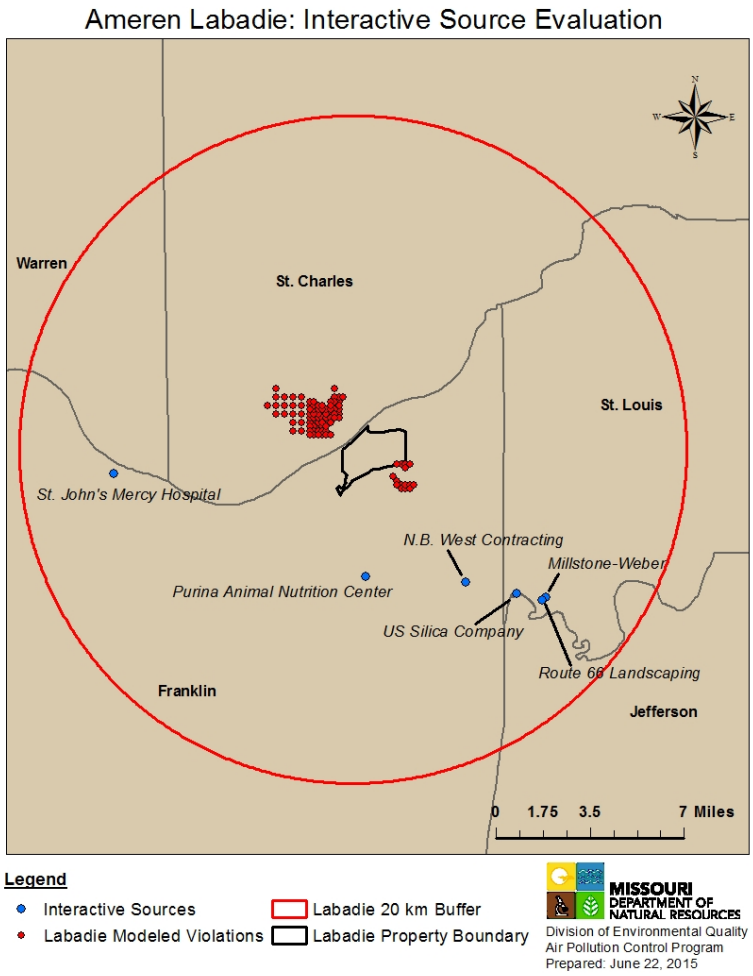


Figure 1. Ameren Labadie Interactive Source Evaluation

All sources included on the map in Figure 1 were evaluated for inclusion in the modeling exercise along with the appropriate emission rates to use in the analysis. The following bullets describe each of the sources listed in Table 2 along with a discussion about the emission rates used for each source in this modeling exercise:

- Ameren Labadie Energy Center – This source is included in the March 2015 federal consent decree. The Ameren Labadie Energy Center includes four (4) coal-fired boilers that generate electricity which is supplied to the grid. The plant is owned by Ameren Missouri. The source is subject to emission limits in 10 CSR 10-6.261; however, the Air Program used actual SO_2 emissions data from the CEMS located at this facility. The modeled years include the most recent three years (2012 – 2014). The use of CEMS data in the model for this facility allows the model to act as a surrogate for monitoring data, which EPA guidance deems appropriate when developing boundary designation recommendations.

- Purina Animal Nutrition Center – This source is located within 20 km of Labadie. This source is a refuse systems hazardous waste treatment and disposal facility. It has two listed SO_2 emission units in MoEIS. One is a 100 hp Boiler that burns Grades 1 and 2 oil with 2014 reported annual emissions of 1.425 tpy SO_2. The other listed source is facility wide propane use that totals less than 0.004 tpy SO_2 in 2014, which was not included in the modeling inventory. The boiler, or EP 10, is listed as stack release but has no release parameters listed; therefore it must be modeled as a volume source. The default volume source parameters for a boiler without parameters were assumed for this unit.

- N.B. West Contracting Co Inc. Pacific Plant – This source is located within 20 km of Labadie. This source is an asphalt, paving, mixture and block manufacturing plant. The facility total SO_2 emissions for 2014 are listed as 9.6 tpy SO_2. There are four listed SO_2 emission units in MoEIS, EP17, EP5, S-2, and S-3. EP17 is a drag slat conveyor for batch hot mix plant with emissions totaling 4.168 tpy with 1,600 average operational hours per year. This unit is a fugitive release. EP5 is an aggregate dryer with burner and rotary mixer that burns #2 fuel oil. Total emissions for EP5 are 0.6550 tpy SO_2. This unit releases to a combined stack (S-3). S-2 is an asphalt heater/burner that burns distillate oil. S-2 total SO_2 emissions are 0.612 tpy. S-2 releases to a stack with minimal parameters provided so supplementary defaults were necessary. S-3 is a baghouse stack for several processes; total emissions are reported as 4.168 tpy in 2014. This was found to be double counting emissions and the Air Quality Analysis Section is working with the company to correct their information. For the purposes of this analysis, 2013 reported emissions for EP17, EP5, and S2 were utilized. In 2013, S3 was not a reported emission point. The 2014 total emissions contained in Table 12 reflect 2014 reported emissions for all SO_2 emitting units except the unit found to be double counting, S3.

- St. John's Mercy Hospital – This source is located within 20 km of Labadie. This source is a hospital with total SO_2 emissions less than 0.1 ton per year. This source primarily burns natural gas or propane. Therefore, this source was not included in the modeling inventory and is accounted for through the regional background concentration.

- Millstone-Weber Portable – This source is located within 20 km of Labadie. This source is a ready-mix concrete manufacturing plant with total SO_2 emissions less than 0.2 ton per year. This source primarily burns natural gas or propane. Therefore, this source was not included in the modeling inventory and is accounted for through the regional background concentration.

- U.S. Silica Company Pacific – This source is located within 20 km of Labadie. This source is an industrial sand mining operation with total SO_2 emissions less than 0.1 ton per year. This source primarily burns natural gas or propane. Therefore, this source was not included in the modeling inventory and is accounted for through the regional background concentration.

- Route 66 Landscape Supply Center Inc. – This source is located within 20 km of Labadie. This source is a recyclable material merchant wholesaler operation with total SO_2 emissions less than 0.1 ton per year. This source primarily burns natural gas or propane. Therefore, this source was not included in the modeling inventory and is accounted for through the regional background concentration.

Table 3 below shows the emission release parameters used for the four boilers at Labadie, and Table 4 includes an excerpt from the hourly emissions file used in the modeling analysis.

Table 3 – Ameren Labadie Energy Center Emission Release Parameters

Facility I.D.	Facility Name	Site Name	Emission Point I.D.	Model ID	Description	Release Type
071-0003	Ameren Missouri	Labadie Plant	1	LABADIE1	Boiler 1	Point
071-0003	Ameren Missouri	Labadie Plant	2	LABADIE2	Boiler 2	Point
071-0003	Ameren Missouri	Labadie Plant	3	LABADIE3	Boiler 3	Point
071-0003	Ameren Missouri	Labadie Plant	4	LABADIE4	Boiler 4	Point

Easting *Meters*	Northing *Meters*	Base Elevation *Meters*	Actual Stack Height *Meters*	Stack Temperature *Kelvin*	Stack Exit Velocity *Meters/Second*	Stack Diameter *Meters*
688352.17	4270445.59	149.66	213.36	443.06	34.72	6.25
688387.01	4270400.40	149.66	213.36	442.49	35.56	6.25
688435.47	4270332.33	149.66	213.36	433.20	34.52	6.25
688439.28	4270327.43	149.66	213.36	441.71	34.95	6.25

Table 4 – Excerpt from 2012-2014 Hourly CEMS Emission File for Ameren Labadie Energy Center

	Year	Month	Day	Hour	Unit ID	SO_2 ER (g/s)	Temp (K)	Velocity (m/s)
SO HOUREMIS	12	1	1	1	LABADIE1	248.3657244	443.06	34.72
SO HOUREMIS	12	1	1	1	LABADIE2	215.9340394	442.49	35.558

SO HOUREMIS	12	1	1	1	LABADIE3	233.14526	433.204	34.52
SO HOUREMIS	12	1	1	1	LABADIE4	269.2560639	441.707	34.95
SO HOUREMIS	12	1	1	2	LABADIE1	249.0713089	443.06	34.72
SO HOUREMIS	12	1	1	2	LABADIE2	222.2087011	442.49	35.558
SO HOUREMIS	12	1	1	2	LABADIE3	229.5795386	433.204	34.52
SO HOUREMIS	12	1	1	2	LABADIE4	292.5151511	441.707	34.95

G.2 – Ameren Modeling for Ameren Labadie Energy Center

Ameren

Ameren Services

September 3, 2015

Ms. Kyra Moore, Director
Air Pollution Control Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

Re: Proposed Options for Area Boundary Recommendation for the 2010 1-Hour Sulfur Dioxide National Ambient Air Quality Standard

Dear Ms. Moore:

On behalf of Ameren Missouri, I appreciate the opportunity to provide these attached written comments, in addition to those presented at the public hearing on August 27, regarding Proposed Options for Area Boundary Recommendation for the 2010 1-Hour Sulfur Dioxide National Ambient Air Quality Standard for the Labadie Energy Center. As you know, Ameren has displayed its continued willingness to work with the MDNR to ensure that that ambient air quality meets EPA standards. Ameren is committed to assist the Air Program in obtaining the best information about actual air quality. Any attainment designations should be based on solid defensible characterizations. Appropriate and accurate ambient air quality monitoring for SO2 is the best and most reliable indication of actual air quality.

Ameren has and will comply with all EPA regulations and guidelines and we want to ensure that the actual air quality meets EPA standards. We believe that the use of monitors to collect actual air quality data is a common sense, orderly approach for characterizing current air quality around the Labadie Energy Center. The weight of the evidence supports a designation of attainment. However, if the Air Program feels there is uncertainty, the unclassifiable designation allows for additional monitoring to demonstrate attainment. Both historical and current monitoring data indicates compliance with the SO2 NAAQS. The continued collection of pertinent source specific ambient air quality data will confirm the area is in attainment with the NAAQS.

Once again, I appreciate the opportunity to present Ameren's perspective on the proposed options for the area boundary recommendation.

Sincerely,

Steven C. Whitworth
Senior Director, Environmental Policy and Analysis

Attachments

1901 Chouteau Avenue
PO Box 66149, MC 602 | St. Louis, MO 63166-6149 | Ameren.com

Ameren Missouri's Comments on Missouri Department of Natural Resources' Proposed Area Boundary and Designation Recommendations for the 2010 1-Hour Sulfur Dioxide National Ambient Air Quality Standard

Ameren Missouri ("Ameren") is the owner of the Labadie Energy Center ("Labadie"), located in Franklin County, Missouri. Ameren appreciates the opportunity to provide comments on the Missouri Department of Natural Resources' ("MDNR") proposed Labadie area boundary and designation recommendations (the "Proposed Recommendation") for the 2010 1-Hour Sulfur Dioxide National Ambient Air Quality Standard ("2010 SO_2 NAAQS").

Ameren has taken significant steps to address concerns that ambient air quality around Labadie may pose a threat to the environment and human health. In recent years Ameren Missouri has spent roughly $1 billion to comply with EPA mandates and beyond. These investments include air pollution control equipment at our energy centers to reduce emission of mercury, particulate matter, nitrogen oxides and sulfur dioxide. Since 1990, Ameren has reduced SO2 emissions by 84% and NOx emissions by 80%. Based on 2014 data, SO2 emissions from the Labadie Energy Center have been reduced by 89% on an emission rate basis and 87% on a mass emission basis (tons) since 1990. These reductions go beyond the level needed to comply with environmental standards. In fact actual SO2 emissions from the Labadie Energy Center are 90% below the current limits in the Missouri regulations.

Recognizing that MDNR intends to recommend a designation for the Labadie area by September 2015, Ameren writes to emphasize that any recommendation must be supported by the best available and relevant, reliable data. The relevant, reliable data, which exists related to the Labadie operations specifically, and Franklin County more generally, supports a recommendation that Franklin County is in **attainment** with the 2010 SO_2 NAAQS.

I. OVERVIEW

A. Ameren's Participation in the Public Hearing.

On August 27, 2015, Ameren participated in the public hearing on the Proposed Recommendation. At that hearing Ameren and its experts presented compelling testimony regarding the designation decision currently before MDNR.[1]

Mr. Bob Paine, a recognized national expert on air modeling with AECOM, clarified for the Commission that air dispersion modeling actually supports both current and historic monitoring data - all of which demonstrates that the Labadie area is in

[1] We believe that EPA's demand that MDNR proceed with designations at this time under the Consent Decree negotiated by Sierra Club and the United States Environmental Protection Agency is improper and unlawful. We address this later in our comments.

attainment of the 2010 SO2 NAAQS. In particular, Mr. Paine detailed how the modeling relied upon by MDNR, when adjusted to correct for meteorological anomalies known to impact the Labadie area, predicts SO2 ambient air concentrations below the 75 ppb limit established by the 2010 SO2 NAAQS.

Further, Dr. Lucy Fraiser, a Board-certified environmental toxicologist with Zephyr Environmental Corporation, provided testimony on the actual health effects associated with concentrations of SO2 emissions in ambient air. Contrary to assertions made by environmental groups during the public hearing, Dr. Fraiser detailed for the Commission the empirical data demonstrating that SO2 emissions from coal-fired power plants are not correlated with the increase in persons afflicted with asthma in Missouri. In fact, Dr. Fraiser's testimony elucidated that areas like Labadie that are attaining the 75 ppb limit established by the 2010 SO2 NAAQS are overwhelmingly protective of human health.

As Steve Whitworth, Senior Director of Environmental Policy and Analysis for Ameren, explained at hearing, Ameren is – and has always been – committed to ensuring that actual air quality around its facilities complies with EPA's stringent standards. To that end, Ameren will continue to comply with all Missouri and EPA air regulations and guidelines. However, Ameren believes that it is crucial that regulatory decisions be based on reliable and defensible data. Both Ameren and Missouri have gone to considerable time and expense developing an air monitoring network to ensure that actual air quality around Labadie complies with EPA's 2010 SO2 NAAQS. Missouri should not now short-circuit the common sense approach of using actual monitored air quality data to characterize air quality around Labadie.

B. Key Points Regarding the Designation of the Labadie Area for the 2010 SO2 NAAQS.

In the Proposed Recommendation, MDNR proposed two options for the recommended designation for the Labadie area – nonattainment (based on MDNR-run modeling) or unclassifiable (based on existing monitoring data). As discussed herein, monitoring and modeling data in fact support a designation of attainment, or, in the alternative, unclassifiable of the 2010 SO2 NAAQS.

In support of an attainment, or, alternatively, unclassifiable designation, MDNR and ultimately the U.S. Environmental Protection Agency ("EPA") cannot ignore the following key points:

1. Available data supports a designation recommendation of *attainment* for the 2010 SO2 NAAQS for the area surrounding Labadie. Both historic and current ambient air quality monitors were and are properly located. These monitors have been and continue to record SO2 concentrations below the 75 parts per billion (ppb) limit established by the 2010 SO2 NAAQS. Further, updated modeling using the latest EPA proposed air dispersion modeling software with available options also provides indisputable results supporting a recommendation of attainment.

2. Should MDNR believe that available data (monitoring compared with modeling) contrasts, a designation recommendation of *unclassifiable* is the only appropriate option based on: (i) initial ambient air quality monitoring data: and (ii) unreliable modeling data used by MDNR in support of the Proposed Recommendation. Monitoring data alone remains the most accurate data source for basing an initial NAAQS designation recommendation. Because 3 years of monitoring data will not be available until mid-2018/2019, an unclassifiable designation over a nonattainment designation is appropriate and, in fact, is mandated by the Clean Air Act.

3. MDNR's proposed nonattainment designation recommendation ("option 1") is not supported by law or the best available data. MDNR's modeling data over-predicts ambient SO2 concentrations and does not utilize EPA's latest AERMOD modeling software. Further, such a designation is premature, in light of the ongoing collection of actual SO2 ambient air quality data around Labadie by monitors approved by MDNR, and ignores state law requiring that MDNR consider monitoring data and best available information before making any designation recommendation.

4. There is no question that a nonattainment designation recommendation could carry significant – and unwarranted – consequences for Ameren, the region and the State of Missouri. For Ameren, the consequences of a nonattainment designation could result in MDNR initiating an attainment planning process that is both time consuming and costly. (The Sierra Club certainly will advocate their view that Ameren should install costly pollution control equipment at the Labadie Energy Center). Such efforts would be both wasteful and unproductive given the historic and current monitoring results. MDNR would face the prospect of unwinding such a process and initiating a re-designation of the boundary area as early as April 2018.[2] For the rest of Franklin County and parts of St. Charles County likely included within the nonattainment area, the nonattainment designation will make the siting of new or expanded industrial plants more difficult because the designation carries with it more restrictive requirements for permitting and operations. Such restrictions impact industry investment decisions within any nonattainment area and hurt economic development.

5. Concerns raised during the public comment period do not justify a designation recommendation of nonattainment for the Labadie area. MDNR's regulatory decisions must be driven by competent evidence and policies, not fearmongering claims. First, claims that SO2 emissions from coal-fired power plants are a driver of adverse health impacts are inaccurate and unsupported. Both EPA's own studies and an independent investigation by Zephyr Environmental Corporation, an environmental and risk science consulting firm, demonstrate that ambient air concentrations of SO2 below 100 ppb are protective of public health. *See* Zephyr

[2] As we note, imposing what may be a needless effort and cost is even more egregious since EPA's ***own*** rule—the Data Requirements Rule—provides for a designation deadline that would allow for Ameren to collect three years' worth of data to demonstrate the area is in attainment consistent with data gathered thus far.

Environmental Corporation, A Toxicologist's Perspective on SO_2 Health Effects (September 2015) (the "Zephyr Report) (**Enclosed** with this comment). Second, contrary to the assertions raised by Sierra Club, the monitors surrounding Labadie are appropriately located to measure peak SO2 concentrations around Labadie based on the areas particular terrain and meteorological conditions.

6. MDNR should not ignore EPA's Data Requirements Rule that allows states until 2020 to recommend designations for areas, like Labadie, that install an ambient air quality monitoring network. EPA's directive to Missouri to issue designation recommendations by September 2015 is based on a Consent Decree entered into by Sierra Club and EPA in a federal district court in California. That decision is currently on appeal before the United States Court of Appeals for the Ninth Circuit. We include with our comments a copy of Ameren's amicus brief filed in the above-mentioned appeal, wherein we describe the fundamental lack of due process afforded to operators of affected facilities like Labadie resulting from EPA and the Sierra Club's "sue and settle" litigation. Such a farcical approach is apparent here where a premature nonattainment designation could impose on Labadie and others in the nonattainment area permanent and unnecessary emission limitations effective *after* 3 years of ambient air quality monitoring data is available to determine that the area is already in compliance with the 2010 SO2 NAAQS.

II. MONITORING AND MODELING DATA SUPPORT AN ATTAINMENT DESIGNATION RECOMMENDATION.

An area designation should "characterize SO2 ambient air quality through…enhanced monitoring" to determine whether an area is in attainment of a NAAQS. *See* EPA, Data Requirements Rule, 80 Fed. Reg. 51,052, 51,058 (August 21, 2015) (the "DRR"). Where there is an "absence of information clearly demonstrating" an attainment designation, a designation of unclassifiable is appropriate. *See* EPA, "Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard, March 20, 2015. Yet, MDNR is not bound to rely purely on monitoring data to determine attainment of the 2010 SO2 NAAQS. Here, where 3 years of monitoring data are not yet available to "clearly demonstrat[e]" attainment around Labadie based on monitoring data alone, MDNR should look to historic monitoring data and updated modeling data *to support* an attainment recommendation based on current monitoring data. *See* DRR, 80 Fed. Reg. at 51,057. This hybrid approach provides a compelling and realistic indication that the ambient air quality in the Labadie area is well-below attainment levels of the 2010 SO2 NAAQS.

A. Current Ambient Air Quality Monitoring Demonstrates Attainment.

As MDNR is aware, Ameren began collecting SO2 ambient air quality monitoring data from two monitoring sites approved by MDNR and included in its June 12, 2015, Monitoring Network Plan in April 2015. The monitoring sites were approved by MDNR based upon locations of expected maximum SO2 concentrations in the Labadie area (as

well as areas with the expected highest frequency of elevated SO2 concentrations based on wind direction). The selection of monitors in areas of highest SO2 concentrations is consistent with EPA guidance that requires SO2 attainment demonstrations based on monitoring information alone to be located in areas of highest concentration. *See* EPA, "Guidance for 1-Hour SO2 Nonattainment Area SIP Submissions, at 58, April 23, 2014.

Monitoring data collected (from April 22, 2015 through August 31, 2015) is consistent and below the 75 ppb limit under the 2010 SO2 NAAQS. This is not surprising. Based on 2014 data, SO2 emissions from Labadie have been reduced by 89% on an emission rate basis and 87% on a mass emission basis (tons) since 1990. These SO2 emission reductions are in large part due to Ameren's compliance strategy for its Labadie, Meramec and Rush Island stations, which rely on the use of low sulfur coal to limit SO2 emissions. Ameren is required to continue burning low sulfur coal through at least 2017, with a three (3) year extension through 2020. **Attached** is a copy of the declaration filed in the Jefferson County Nonattainment Docket which describes Ameren's coal supply commitment with Peabody Energy. The continued use of low sulfur coal will result in monitored SO2 emissions will remain well-below the 2010 SO2 NAAQS limit.

B. The Labadie Ambient Air Quality Monitors Are Properly Sited.

In response to MDNR's proposed Monitoring Network Plan, Sierra Club filed comments on July 20, 2015, and August 11, 2015, challenging both the location of the Labadie air monitors and legitimacy of installing monitors prior to designating the area under the 2010 SO2 NAAQS. Because the Labadie monitoring network currently demonstrates attainment of the 2010 SO2 NAAQS and, Ameren believes will continue to demonstrate attainment, it is necessary to address Sierra Club's claims in these comments.

As a threshold matter, Sierra Club's challenge to the use of air monitors to measure actual ambient air concentrations in the Labadie area represents a fundamental and incongruent shift in position. Sierra Club has long-championed for reliance on actual monitored data and the placement of monitors near power plants. Yet now, clearly dissatisfied with the "attainment" results from those monitors, the Sierra Club disputes the siting of one of the monitors.

Specifically in its comments on the MDNR Monitoring Plan, Sierra Club argues that the modeling and climatology data used to cite the Labadie monitors does not measure peak 1-hour SO2 ambient air concentrations and that additional monitor(s) should be sited. Enclosed with these comments is a report prepared by AECOM which rebuts the Sierra Club's assertions. *See* AECOM, Comments in Rebuttal to Sierra Club Challenges to the Siting of Labadie SO_2 Monitors (September 2015) **(Enclosed** with this comment). AECOMs primary conclusions are summarized as follows:

1. Monitors are correctly sited based on modeling and EPA guidance;

2. While modeling provides only general areas of peak predictions (actual peak locations vary due to factors such as wind direction and the frequency that high SO2 concentrations occur in a particular area), AECOM's modeling indicates that the peak impacts from Labadie occur near the location of the existing monitor to the northwest of Labadie;

3. Monitor locations are impacted by logistical constraints, as recognized by EPA in the DRR (*see* 80 Fed. Reg. at 51,072);

4. Only one monitor located in an area of peak SO2 concentration is needed to determine attainment of a NAAQS, and Sierra Club does not dispute that one of the Labadie monitors is located in an area of peak concentration (*see* July 20, 2015, letter from Washington University in St. Louis to MDNR, re: 2015 Monitoring Network Plan at 5);

5. Historical on-site wind data demonstrate that the selected monitor locations are in areas that have both the most frequent wind directions (*i.e.*, are most likely to frequently contain high SO2 concentrations in the ambient air) and that are most similar to the upper-level wind patterns observed at the top of Labadie's emission stacks; and

6. EPA guidance does not prohibit the use of a constant emission rate in modeling to determine appropriate monitoring locations, and a constant emission rate is more representative of actual conditions where – like Labadie – there is not substantial day-to-day variability in emission rate.

Sierra Club also argues that MDNR's siting of the Labadie monitors prior to designation of the area under the 2010 SO2 NAAQS was premature. In effect, Sierra Club asserts that the Labadie monitors can only be used to determine attainment after the Labadie area is initially designated nonattainment. This is both illogical and plainly contrary to EPA's own regulations. In EPA's recently promulgated DRR, EPA requires that states *first* install and begin operation of any SO2 monitors that the state intends to use to later issue designation recommendations under the 2010 SO2 NAAQS. *See* DRR, 80 Fed. Reg. at 51,063-64. This makes sense in light of the fact that states must have sufficient time to collect 3-years of monitoring data prior to the mandated 2020 designation deadline under the rule. Therefore, MDNR was not in error in siting and allowing the operation of Labadie's monitoring network. The available data will inform, in whole or in part, MDNR's designation recommendation of the Labadie area.

C. Historic Attainment Monitoring Indicates that Current Monitoring is Reliable and Representative.

MDNR is not prohibited from evaluating historic monitoring as indicia of continued compliance for the Labadie area under the 2010 SO2 NAAQS. Current monitoring data is consistent with historic monitoring observed between 1995 and 1998

from the Augusta Quarry monitor formerly located near Labadie.[3] This is expected because the sulfur fuel content has decreased since 1995. The consistency between historic and current monitoring data strongly supports Ameren's expectation that compliance with the 2010 SO2 NAAQS is expected to continue.

Ameren has used Powder River basin (PRB) coal at Labadie since 1995. The switch to low-sulfur coal resulted in a significant reduction in SO2 ambient air concentrations. Since this fuel switch, and including a 3-year period from 1995 through 1998, the Augusta Quarry monitor reported a peak SO2 level below 69 ppb – below the 2010 SO2 NAAQS limit. Ameren's current use of even lower-sulfur content fuel since entering into the coal contract described above has resulted in emissions from 2012 through 2014 at least 1/3 lower than when the Augusta Quarry monitor was operational.

Accordingly, MDNR has 3 years of historic data, confirmed by current monitoring, which together demonstrate ambient SO2 concentrations are **below** the 2010 SO2 NAAQS limit. These consistent, compelling results indicate that the current monitoring data is reliable and accurate and that it will more likely than not continue to demonstrate attainment of the 2010 SO2 NAAQS.

D. Ameren's AERMOD Air Dispersion Modeling Is Representative of SO2 Ambient Air Concentrations Because It Corrects Known Deficiencies in Older AERMOD Modeling Relied upon by MDNR.

As noted above, three years' worth of data from the new monitoring network does not yet exist. In order to support the monitoring that has been collected to date, AECOM, on behalf of Ameren, conducted air dispersion modeling analyses using both the old AERMOD modeling software and the most recent AERMOD modeling software version proposed for use by EPA in July 2015.[4] The AERMOD modeling data relied on by MDNR to support its proposed options for designation overestimates SO2 ambient air emissions and, therefore, is too unreliable to serve as the primary or sole basis for a nonattainment designation recommendation.

In short, both the old modeling software used by MDNR – *when* corrected for over-prediction due to the "penetrated plume" issue – and the new modeling software support a designation of attainment for the Labadie area. MDNR should rely on modeling that most closely represents actual conditions in the Labadie area. Thus, as

---

[3] The monitor was shut down in August 1998 because of the low-monitored SO2 concentrations. *See* MDNR Monitoring Network Plan at 15.

[4] On July 29, 2015, EPA issued a notice of proposed rulemaking to amend Appendix W of 40 CFR Part 51 to adopt the revised AERMOD software. *See* 80 Fed. Reg. 45,340 (July 29, 2015). As explained by EPA, the updated AERMOD addresses "concerns regarding model conservatism" by addressing known "low wind speed issues." *See* DRR, 80 Fed. Reg. at 51,076.

discussed below (and in the enclosed report of Mr. Bob Paine), MDNR should use modeling adjusted to correct for the "penetrated plume," a simulated condition that occurs in the Labadie modeling that is known to result in substantial over-prediction in SO2 ambient air concentrations. Moreover, even if MDNR chooses to ignore the penetrated plume over-prediction, MDNR should use EPA's updated AERMOD modeling software. The current software – which is expected to become effective *prior* to EPA's July 2, 2016, designation deadline under its federal Consent Decree – produces modeling results concluding the Labadie area is attaining the 2010 SO2 NAAQS.

As Ameren previously noted in its modeling submission, AECOM utilized the latest version of the AERMOD software (version 15181) that was released in July 2015. The revised software corrects the tendency of the model to over-predict ambient SO2 concentrations in low wind speed conditions. Mr. Bob Paine of AECOM explained during the public hearing that the corrected modeling results in a 1-hour peak projection of ambient SO2 concentrations of approximately 73.7 ppb, a concentration **below** the 2010 SO2 NAAQS. *See also* AECOM, Characterization of 1-Hour SO2 Concentrations in the Vicinity of the Labadie Energy Center (September 2015), at Section 3 (**Enclosed** with this comment) (the "AECOM Report"). In a cooperative effort to share the results with MDNR prior to the hearing, on August 24, 2015, Ameren submitted to MDNR the AECOM model runs using the EPA proposed new modeling software. We ask that those runs be included as part of the record of its decision in this matter.

Further, as Mr. Paine discussed in his testimony during the August 27th hearing, air dispersion modeling will project even lower concentrations of SO2 emissions if corrected for the "penetrated plume." Studies indicate that AERMOD over-predicts SO2 emissions up to 50% because it improperly assumes that SO2 emissions that elevate ("penetrated") in a plume in the atmosphere will rapidly mix to the ground.[5] When adjusted to eliminate this over-prediction, AECOM predicts that modeled SO2 concentrations will more closely mirror monitored concentrations below the 2010 SO2 NAAQS. Indeed, Ameren does not advocate that MDNR rely solely upon this new modeling data to issue a designation recommendation. Instead, where modeling results can be used to support existing monitoring data, it is reasonable to rely upon the most current available modeling software to inform the decision to be made.

---

[5] *See* Dr. Ken Rayner, Dept. of Environmental Regulation, Western Australia, "AERMOD Questions" (2013) *available at* http://www.casanz.org.au/sigs/ModSIG%20Workshop%20Sydney%20Conference%20%208%20September%20201/Rayner_2013ModSIG_Workshop.pdf; *see also* Bob Paine, AECOM, "AERMOD Issues for Design Concentrations due to Penetrated Plume, presented at EPA's 11th Modeling Conference (August 12, 2015), *available at* http://www.epa.gov/ttn/scram/11thmodconf/presentations/2-4_Penetrated_Plume_Issues.pdf.

III. IN THE ALTERNATIVE, CURRENT MONITORING DATA SUPPORTS AN UNCLASSIFIABLE DESIGNATION RECOMMENDATION.

Sufficient monitoring and modeling data exists to support a MDNR recommendation of attainment for the Labadie area. However, Ameren maintains that monitoring data alone is the appropriate basis for initial NAAQS designations. Indeed, this has been EPA's longstanding practice. As noted above, a full 3 years of monitoring data deemed by EPA to be sufficient to warrant an attainment designation will not be available until mid-2018/2019. As a result, Ameren supports MDNR's proposed "option 2" to recommend designation of the Labadie areas as "unclassifiable" of the 2010 SO2 NAAQS, as the only appropriate alternative other than an attainment designation recommendation.

A. An Unclassifiable Designation is Supported by Law.

The Clean Air Act requires that EPA "make designations 'on the basis of available information.' 42 U.S.C. § 7407(d)(1)(iii)." However, there is "no obligation for the agency to base its designations on data it reasonably considers to be unsound…." *Mississippi Comm'n on Envtl. Quality v. EPA*, 790 F.3d 138, 154-55 (D.C. Cir. 2015). As a result, sufficient and compelling (i.e., complete and conclusive) monitoring data must be available to recommend a designation of attainment or nonattainment. Absent such "compelling data," the Clean Air Act requires that MDNR recommend a designation of unclassifiable. *See also* 2010 SO2 NAAQS, 75 Fed. Reg. 35,520, 35,571 (June 22, 2010) (most states will propose designations of "unclassifiable" because of "the absence of monitoring data" and the "paucity of refined modeling of sources").

B. If MDNR Does Not Designate Labadie as Attainment, an Unclassifiable Designation is the Only Supportable Option because it Would Allow Sufficient Time to Collect Monitoring Data in Accordance With EPA's DRR.

As a result of the short designation recommendation deadline EPA purports to be established by its federal Consent Decree, an unclassifiable designation is the best solution to provide MDNR with the time needed to collect additional monitoring data in the Labadie area. Under the 2010 SO2 NAAQS, EPA explained that compliance with NAAQS should be determined "based on 3 years of complete, quality assured, certified monitoring data." 75 Fed. Reg. at 35,569. When such data is unavailable, an initial designation of unclassifiable is needed to provide states a sufficient additional "period of time" to collect the data needed to make reasoned and supportable designations. *Id.* Indeed, in the 2010 SO2 NAAQS, EPA acknowledged that it would "consider re-designating [unclassifiable] areas from 'unclassifiable'…to 'attainment' once an area had "appropriate monitoring data" *Id.*

This is consistent with EPA's regulatory approach to designating remaining areas under the 2010 SO2 NAAQS. Under the DRR, EPA recognized that states should be allowed sufficient time to collect monitoring data to make reliable designation

recommendations. Thus, EPA deferred designations for areas with ambient air monitoring networks until 2020. *See* EPA, Guidance for 1-hour SO2 Nonattainment Area SIP Submissions at 2 (2014).

As is explained in Ameren's **attached** amicus brief from the Ninth Circuit Court of Appeals, EPA's Consent Decree unlawfully rewrites EPA's directive under the DRR to defer designations for monitored areas until 2020 by requiring that EPA designate the Labadie area by July 2016. However, neither the Consent Decree, nor EPA guidance, requires that MDNR designate the Labadie area as either in attainment or nonattainment of the 2010 SO2 NAAQS. Indeed, the Consent Decree merely requires that *a* designation be made by July 2016.

Given MDNR's two proposed options for designation, unclassifiable is the only supportable option. An unclassifiable designation is justifiable based on the ongoing – but currently incomplete – collection of SO2 ambient monitoring data. Ameren intends to continue collecting monitoring data from the monitoring network outside Labadie. An unclassifiable designation carries with it no obligations under the Clean Air Act other than to re-designate the area as attainment or nonattainment once sufficient data exists. *See* 42 U.S.C. § 7607(d)(3). An unclassifiable designation would satisfy MDNR's obligation to EPA under the federal Consent Decree. Concurrently, it would permit Ameren and the state to continue collecting monitoring data to re-designate the Labadie area no later than 2020, in accordance with EPA's DRR.

IV. MDNR'S PROPOSED NONATTAINMENT DESIGNATION IS BASED ON UNRELIABLE MODELING DATA AND IS CONTRARY TO MISSOURI LAW.

An area may only be designated nonattainment where compelling data exists that the area is not in compliance with the 2010 SO2 NAAQS. The need for compelling data requires that neither MDNR nor EPA rely upon data that is "reasonable consider[ed] to be unsound." *See Mississippi Comm'n*, 790 F.3d at 154-55. The AERMOD modeling relied upon by MDNR substantially over-predicts ambient air quality. As a result, it provides an unrealistic and inconclusive indication of ambient air quality in the Labadie area and should not be the sole basis upon which the state based its recommendation. Further, the Missouri legislature requires that MDNR duly consider monitoring data and all best available information when issuing NAAQS determinations. The Sierra Club simply ignores this legislative directive.

A. MDNR's Modeling Is Unreliable Because it Vastly Over-Predicts Emissions.

As discussed in Section II.B., MDNR's modeling uses the old version of AERMOD that does not accurately predict SO2 ambient air concentrations around Labadie because it: (i) fails to correct for the over-prediction of SO2 emissions in low wind speed hours, and (ii) does not account for the reduced impact of emissions that remain in the penetrated plume.

It is simply bad policy and science to rely on demonstrably unreliable modeling to render a nonattainment designation decision. A regulator's appropriate use of modeling requires a careful analysis of a model's inputs, uncertainties, and potential biases. *E.g.*, *Sierra Club v. Costle*, 657 F.2d 298, 371-73 (D.C. Cir. 1981) ("The safety valves in the use of [modeling] are the requirement of public exposure of the assumptions and data incorporated into the analysis . . . the admission of uncertainties where they exist, and the insistence that the ultimate responsibility for the policy decision remains with the agency rather than these computer. With these precautions, the tools of [modeling] can intelligently broaden rather than constrain the policymaker's options and avoid the 'artificial narrowing of options that (can be) arbitrary and capricious.'") (internal citation omitted).

Accordingly, at a minimum, Ameren respectfully cautions MDNR that if it relies on modeling data as a means to evaluate monitoring data it must use the EPA-recommended low wind options in the revised AERMOD software. The revised software provides more accurate modeling results and, therefore, makes the predictions from the old software relied upon by MDNR not sufficiently reliable or compelling for use in developing a designation recommendation.[6] However, even using EPA's revised AERMOD software will produce results that are overly conservative. The modeling will still over-predict SO2 concentrations attributable to the penetrated plume issues that result from a coding artifact within AERMOD. *See* AECOM Report, Section 4.0 (noting that modeling adjusted to address penetrated plume issue is expected to indicate SO2 99th percentile ambient concentrations between 40-50 ppb).

As a result, MDNR's proposed "option 1" currently lacks the requisite compelling evidence upon which to designate the Labadie area as in nonattainment of the 2010 SO2 NAAQS. This is especially the case where monitoring data exists to demonstrate that the modeling data is not accurate. Indeed, MDNR itself acknowledges in the Proposed Recommendation that its air dispersion modeling "contrasts with the available SO2 monitoring data" based on the "number of uncertainties" inherent in the modeling. *See* Plan Recommendation at 34.

B. MDNR Cannot Ignore Monitoring Data under Missouri Law.

Moreover, as MDNR is aware, Missouri recently passed legislation that precludes designating the Labadie area on modeling data alone. Senate Bill No. 445, Section 643.650 (2015). Specifically, MDNR is required by law to consider best available information and "all ambient air quality *monitoring* network data" where an affected source has "elected to monitor." *See id.* at 653.650(2),(3).

---

[6] The revised AERMOD software (version 15181) was not available to MDNR at the time that it performed its modeling for the Proposed Recommendation. However, now that it is available and with the knowledge that the updated modeling resolves a known cause of over-predicting SO2 emissions, MDNR must rerun its air dispersion modeling. MDNR cannot base a designation recommendation on unreliable or unsound data.

Ameren elected to install a monitoring network around Labadie, which has been subsequently approved by MDNR. The intent of the Missouri legislature is clear – MDNR must consider air monitoring data and all best available information in making any designation recommendation. Mere recognition that available monitoring data "contrasts" with modeling data does not satisfy MDNR's statutory obligations.

V. PUBLIC HEALTH CONCERNS ARE UNSUBSTANTIATED AND DO NOT WARRANT A NONATTAINMENT DESIGNATION.

MDNR should disregard unsubstantiated claims from environmental activists. Public health concerns regarding the release of SO2 emissions from power plants like Labadie are exaggerated and not supported by credible evidence.[7] Public comments based on unfounded health concerns should not drive a regulatory decision and supplant actual, reliable and relevant data.

A wide body of scientific data exists regarding health impacts associated with SO2. Dr. Fraiser describes such research in her report included with these comments. *See* Zephyr Report. Her report establishes that the alleged health impacts are unsupported by facts or evidence. In particular, she concludes that:

1. Health effects associated with SO2 are primarily limited to the exacerbation of respiratory symptoms in a discrete subgroup of individuals – persons who already suffer from asthma that are engaged in physical exercise.

2. There is no compelling evidence to support an allegation that SO2 emissions from coal-fired power plants are responsible for health impacts purported to develop from the secondary formation of particulate matter.[8]

3. There is insufficient evidence or studies to infer a causal relationship between short-term SO2 exposure and cardiovascular effects on humans.

---

[7] In fact, a recent study confirmed that the air quality in the St. Louis, Missouri area has significantly improved in recent years as evidenced by air pollutant levels at nearly all monitoring locations indicating compliance with the health-protective NAAQS. *See* Gradient Corp., "A Case Study: The Public Health Consequences of Air Emissions from Coal-Fired Power Plants in the St. Louis Area" (August 1, 2015) (the "Gradient Study") (**Enclosed** with this comment).

[8] Further, the Gradient Study found that the estimated incremental PM2.5 (particulate matter less than 2.5 micrometers in diameter) air impacts from the four coal-fired power plants operated by Ameren in the St. Louis area (including Labadie) comprised "a very small portion" of the total PM2.5 concentration levels in the St. Louis Area. *See* Gradient Study, at ES-1, and Section 3.0.

Moreover, EPA has agreed that there is inadequate evidence linking long-term SO2 exposure to any type of morbidity or mortality.

4. Reports from the Clean Air Task Force and Environmental Integrity Project grossly oversimplify the impact of coal-fired power plant emissions on ambient air quality and, therefore, may not be relied upon to estimate any impact on human health.

5. There is no correlation between increases in asthma prevalence over the last several decades and SO2 emissions from coal-fired power plants like Labadie. The fact that asthma prevalence has increased while SO2 emissions and ambient air concentrations have decreased, merely evidences that asthma is caused by factors other than power plants including many indoor air conditions.

In addition to the above points, in her report (*see* Zephyr Report, Section 7), Dr. Fraiser corrects a number of misrepresentations made by representatives of environmental groups at the August 27, 2015, public hearing regarding the alleged health effects from Labadie:

1. Sierra Club's allegation that SO2 concentrations can exacerbate asthma symptoms is misleading in an area, such as Labadie, where ambient air quality is well-below limits determined by EPA to be protective of human health, including sensitive individuals such as asthmatics.

2. A citizen's claim that residents of Franklin County living near Labadie are harmed by SO2 emissions from Labadie is unfounded because actual and predicted SO2 ambient air concentrations are below levels deemed by EPA to be protective of human health with a margin of safety. *See* Plot, Labadie 1-Hour SO2 Modeling for 2012-2014 Actual Hourly Emissions (illustrating that school and residential areas surrounding Labadie are well in attainment of the 2010 SO2 NAAQS) (**Enclosed, Exhibit 1,** with this comment).

3. Claims by citizens and Sierra Club that emissions from Labadie are responsible for hundreds of premature deaths each year are unsubstantiated and inflammatory. These claims are based purely on *hypothetical estimates* from interest groups such as the Clean Air Task Force and Environmental Integrity Project that lack any scientific basis upon which to correlate power plant emissions with human mortality. In fact, the reports relied upon use data that is unquestionably unreliable (in some cases the data relied upon is over 25 years old). Moreover, the majority of impacts identified by these studies occur at locations far away from Labadie, and, importantly, far away from the citizens claiming to be harmed by the plant's emissions.

Finally, it is important to keep in mind that promulgation of the 2010 SO2 NAAQS required that EPA determine, conclusively, that the limit of 75 ppb was protective of human health with a margin of safety. In developing the 2010 SO2 NAAQS, EPA reviewed and conducted extensive investigations to establish a SO2 standard protective of public health. EPA concluded that a 1-hour SO2 standard of 100 ppb – 25 ppb greater than currently required, and nearly 3x greater than currently monitored concentrations in the Labadie area – would protect more than 99% of asthmatic children. *See* 2010 SO2 NAAQS, 75 Fed. Reg. at 35,541. Thus, because monitors (as well as corrected modeling data) in the Labadie area indicate SO2 concentrations well-below the 2010 NAAQS standard, concerns about public health effects are unwarranted.

VI. ANY DECISION BY MDNR TO DESIGNATE THE LABADIE AREA AS NONATTAINMENT IS PREMATURE AND WILL RESULT IN UNNECESSARY CONSEQUENCES FOR AMEREN, THE REGION AND THE STATE OF MISSOURI.

Lastly, MDNR's designation recommendation is premature in light of EPA's directive under the DRR and the ongoing collection of ambient monitoring data around Labadie. MDNR should be aware that both the federal Consent Decree (which is the basis for MDNR's premature designation) and EPA's DRR are under challenge and may not be in effect at the time EPA evaluates MDNR's designation recommendation.

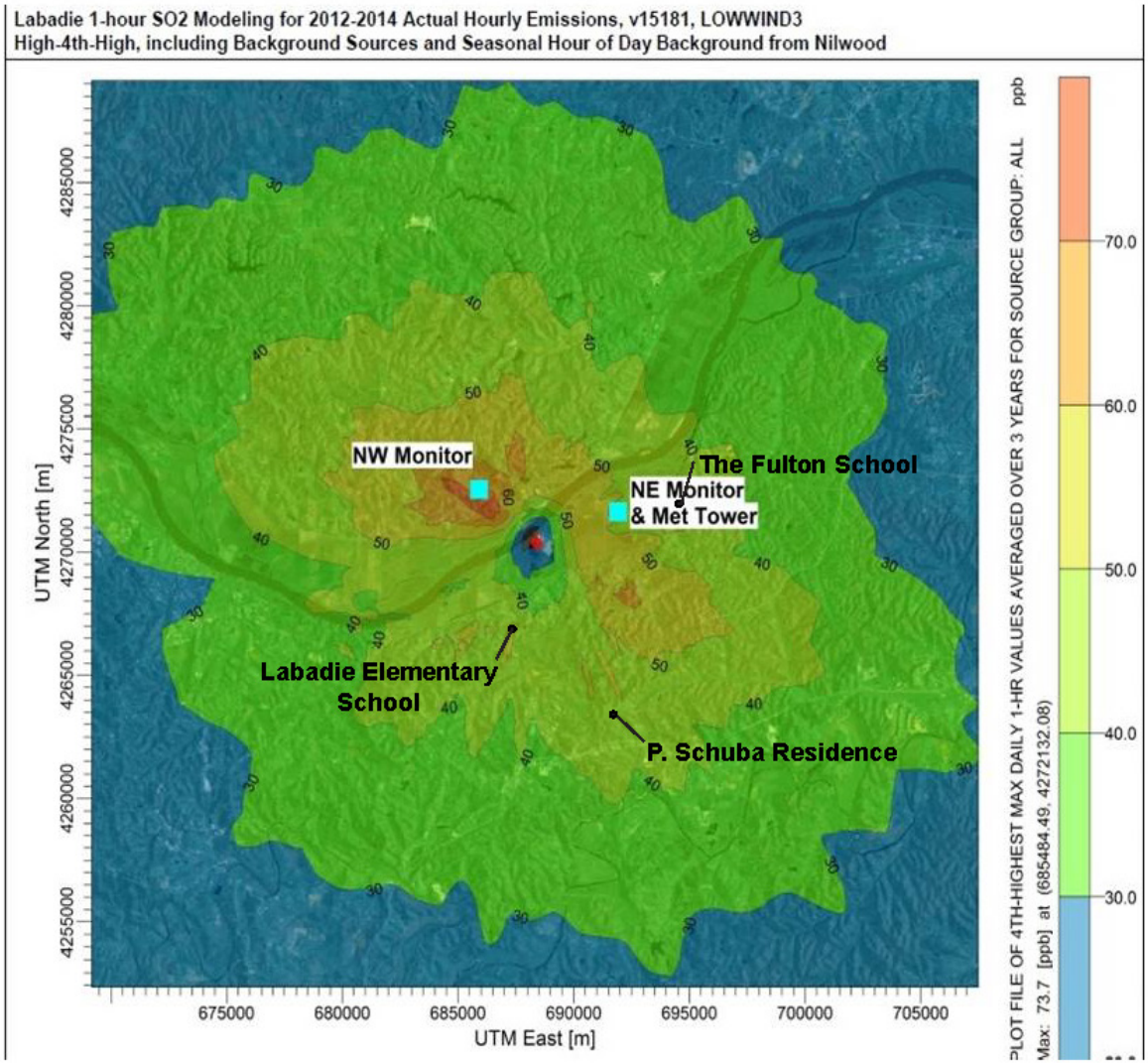
As noted above, Ameren continues to collect ambient air quality data for the Labadie area. Compelling data indicates that the Labadie area is well in attainment of the 2010 SO2 NAAQS. As a result, a designation recommendation of anything other than attainment or unclassifiable would result in unnecessary and potentially absurd consequences for Ameren, the region and the state. As MDNR is well-aware, nonattainment designations could result in EPA imposing through the state implementation approval process permanent and potentially costly emission reductions on Labadie as part of the state's attainment plan. Even if the air quality monitors around Labadie eventually demonstrate attainment of the 2010 SO2 NAAQS, the Clean Air Act requires that emission reductions and controls be maintained in order to ensure that the area does not backslide into nonattainment. *See* 42 U.S.C. § 7478(a).

Further, the cost of compliance is even more unreasonable when timing is taken into consideration. If the Labadie area were to be designated nonattainment, attainment will not be required until July 2021 (*i.e.*, 5 years from July 2016, the nonattainment designation date under the Consent Decree). *See* 42 U.S.C. § 7502(a)(2)(A). However, Ameren will have collected the requisite 3 years of monitoring data by mid-2018/2019, roughly 2 years earlier than attainment of the 2010 SO_2 NAAQS is required. Should the monitoring data demonstrate – as it currently does – *attainment* of the 2010 SO_2 NAAQS, Missouri (and Ameren) will have already incurred completely unnecessary costs to demonstrate attainment of the NAAQS.

VII. CONCLUSION

The current monitoring data in conjunction with historic monitoring data and air dispersion modeling (both the old version corrected to address over-predictions and the new version using low wind option even without correcting for over prediction) provide compelling evidence to support a designation recommendation of attainment of the 2010 SO2 NAAQS for the Labadie area. In the alternative, Ameren supports MDNR's proposed "option 2" to recommend a designation of unclassifiable based upon incomplete, current monitoring data. Put simply, MDNR simply has no legal or factual basis to support a nonattainment designation.

Exhibit 1


Labadie 1-hour SO2 Modeling for 2012-2014 Actual Hourly Emissions, v15181, LOWWIND3
High-4th-High, including Background Sources and Seasonal Hour of Day Background from Nilwood
NW Monitor
The Fulton School
NE Monitor
& Met Tower
Labadie Elementary
School
P. Schuba Residence
UTM North [m]
UTM East [m]
4285000
4280000
4275000
4270000
4265000
4260000
4255000
675000
680000
685000
690000
695000
700000
705000
PLOT FILE OF 4TH-HIGHEST MAX DAILY 1-HR VALUES AVERAGED OVER 3 YEARS FOR SOURCE GROUP: ALL
Max: 73.7 [ppb] at (685484.49, 4272132.08)
ppb
70.0
60.0
50.0
40.0
30.0

Attachments – Ameren Comments on the SO2 Designation Proposals for the Labadie Energy Center

1. Ameren SO2 Designation Comment Transmittal letter

2. SO2 Labadie Station Modeling Report 02Sep15 – *Characterization of 1-Hour SO2 Concentrations in the Vicinity of the Labadie Energy Center* (AECOM)

3. Appendix A – *Alternative Model Justification for Low Wind Speed Options* (AERMET ADJ-U* and AERMOD LOWWIND3, Version 15181) (AECOM)

4. Appendix B – Journal of the Air & Waste Management Association – *Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases* (AECOM)

5. Appendix C – *Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases with AERMET ADJ_U* and AERMOD LOWWIND3 Options* (AECOM)

6. Appendix D – *Comparison of Wind Roses from Jefferson City and Spirit of St. Louis Airports to Historical Tall-Tower Labadie Meteorological Data* (AECOM)

7. Comments in Rebuttal to Sierra Club Challenges to the Siting of Labadie SO2 Monitors (AECOM)

8. Final Frasier Report – *A Toxicologist's Perspective on SO2 Health Effects (*Zephyr Environmental Corporation)

9. Final Gradient Report 090115 – *A Case Study: The Public Health Consequences of Air Emissions from Coal-fired Power Plants in the St. Louis Area* (Gradient Corp)

10. Mueller Declaration – coal supply

11. Sierra Club v. McCarthy –Amicus Brief filed by Ameren Missouri

Appendix A

Alternative Model Justification for Low Wind Speed Options (AERMET ADJ_U* and AERMOD LOWWIND3, Version 15181)

Alternative Model Justification for Low Wind Speed Beta Options:

AERMET and AERMOD

Appendix W, Section 3.2.2 provides an approach for approval of an alternative model to determine whether it is more appropriate for this modeling application. The principle sources involve tall stack buoyant releases.

EPA indicates that for this purpose, an alternative refined model may be used provided that:

1. The model has received a scientific peer review;
2. The model can be demonstrated to be applicable to the problem on a theoretical basis;
3. The data bases which are necessary to perform the analysis are available and adequate;
4. Appropriate performance evaluations of the model have shown that the model is not biased toward underestimates; and
5. A protocol on methods and procedures to be followed has been established.

These five points are discussed below.

The model selected for this modeling application is the EPA-proposed updates to the AERMOD modeling system version 15181, including the AERMET ADJ_U* option, combined with the AERMOD LOWWIND3 option. EPA has indicated support for these changes in the Appendix W proposal and in the Roger Brode presentation made at the 11th Modeling Conference on August 12, 2015 (see presentation at http://www.epa.gov/ttn/scram/11thmodconf/presentations/1-5_Proposed_Updates_AERMOD_System.pdf).

1. The model has received a scientific peer review

The AERMET changes reference a Boundary-Layer Meteorology peer-reviewed paper[1] that is the source of the AERMET formulation for changes in the friction velocity computation for low wind speeds. The combination of the AERMET changes and the AERMOD changes (version 14134 LOWWIND2, similar to version 15181 LOWWIND3) has been evaluated and the study[2] will be published in a forthcoming issue of the Journal of the Air & Waste Management Association (JAWMA). The manuscript associated with the JAWMA article is provided in Appendix B. A supplemental evaluation exercise with AERMET/AERMOD version 15181 is provided in Appendix C that shows consistent evaluation results (with a slight improvement) for the proposed AERMOD modeling application.

2. The model can be demonstrated to be applicable to the problem on a theoretical basis.

There is no theoretical limitation to the application of the AERMET and AERMOD low wind changes – they are generally applicable. The current default algorithm in AERMET has been demonstrated to be

[1] Qian, W., and A. Venkatram. Performance of Steady-State Dispersion Models Under Low Wind-Speed Conditions. Boundary-Layer Meteorology 138:475–491. (2011)

[2] Paine, R., Samani, O., Kaplan, M. Knipping, E., and Kumar, N. Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases. Pending publication (as of August, 2015) in the Journal of Air & Waste Management Association.

faulty and needs to be replaced by the ADJ_U* approach. The improvements due to the LOWWIND3 algorithm are demonstrated with the low wind model evaluations reported by the presentations[3] at the 11th EPA modeling conference

3. **The data bases which are necessary to perform the analysis are available and adequate.**

   Routine meteorological databases that are already available are sufficient for exercising this low wind options. There are no special database requirements for the use of these options.

4. **Appropriate performance evaluations of the model have shown that the model is not biased toward underestimates.**

   The studies cited above by EPA and AECOM provide this demonstration.

5. **A protocol on methods and procedures to be followed has been established.**

   This report documents the methods and procedures to be followed.

[3] http://www.epa.gov/ttn/scram/11thmodconf/presentations/1-5_Proposed_Updates_AERMOD_System.pdf and http://www.epa.gov/ttn/scram/11thmodconf/presentations/2-3_Low_Wind_Speed_Evaluation_Study.pdf.

This article was downloaded by: [Robert Paine]
On: 25 August 2015, At: 04:31
Publisher: Taylor & Francis
Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: 5 Howick Place, London, SW1P 1WG

Click for updates

Journal of the Air & Waste Management Association
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/uawm20

Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases

Robert Paine[a], Olga Samani[a], Mary Kaplan[a], Eladio Knipping[b] & Naresh Kumar[b]
[a] AECOM, 250 Apollo Drive, Chelmsford, MA 01824
[b] Electric Power Research Institute, 3420 Hillview Avenue, Palo Alto, CA 94304
Accepted author version posted online: 24 Aug 2015.

To cite this article: Robert Paine, Olga Samani, Mary Kaplan, Eladio Knipping & Naresh Kumar (2015): Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases, Journal of the Air & Waste Management Association, DOI: 10.1080/10962247.2015.1085924

To link to this article: http://dx.doi.org/10.1080/10962247.2015.1085924

Disclaimer: This is a version of an unedited manuscript that has been accepted for publication. As a service to authors and researchers we are providing this version of the accepted manuscript (AM). Copyediting, typesetting, and review of the resulting proof will be undertaken on this manuscript before final publication of the Version of Record (VoR). During production and pre-press, errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal relate to this version also.

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at http://www.tandfonline.com/page/terms-and-conditions

Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases

Robert Paine, Olga Samani, and Mary Kaplan

AECOM, 250 Apollo Drive, Chelmsford, MA 01824

Eladio Knipping and Naresh Kumar

Electric Power Research Institute, 3420 Hillview Avenue, Palo Alto, CA 94304

Robert Paine, CCM, QEP, is an associate vice president and technical director, **Olga Samani** and **Mary Kaplan** are senior air quality meteorologists with AECOM's Air Quality Modeling group in Chelmsford, MA.

Eladio Knipping is a principal technical leader in the Environment Sector at the Electric Power Research Institute office in Washington, DC.

Naresh Kumar is a senior program manager of air quality in the environment sector at the Electric Power Research Institute office in Palo Alto, CA.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Abstract

The performance of the AERMOD air dispersion model under low wind speed conditions, especially for applications with only one level of meteorological data and no direct turbulence measurements or vertical temperature gradient observations, is the focus of this study. The analysis documented in this paper addresses evaluations for low wind conditions involving tall stack releases for which multiple years of concurrent emissions, meteorological data, and monitoring data are available.

AERMOD was tested on two field study databases involving several SO_2 monitors and hourly emissions data that had sub-hourly meteorological data (e.g., 10-minute averages) available using several technical options: default mode, with various low wind speed beta options, and

using the available sub-hourly meteorological data. These field study databases included: 1) Mercer County, a North Dakota database featuring five SO_2 monitors within 10 kilometers of the Dakota Gasification Company's plant and the Antelope Valley Station power plant in an area of both flat and elevated terrain, and 2) a flat-terrain setting database with four SO_2 monitors within 6 kilometers of the Gibson Generating Station in southwest Indiana. Both sites featured regionally representative 10-meter meteorological databases, with no significant terrain obstacles between the meteorological site and the emission sources.

The low wind beta options show improvement in model performance helping to reduce some of the over-prediction biases currently present in AERMOD when run with regulatory default options. The overall findings with the low wind speed testing on these tall stack field study databases indicate that AERMOD low wind speed options have a minor effect for flat terrain locations, but can have a significant effect for elevated terrain locations. The performance of AERMOD using low wind speed options leads to improved consistency of meteorological conditions associated with the highest observed and predicted concentration events. The available sub-hourly modeling results using the Sub-Hourly AERMOD Run Procedure (SHARP) are relatively unbiased and show that this alternative approach should be seriously considered to address situations dominated by low-wind meander conditions.

Implications

AERMOD was evaluated with two tall stack databases (in North Dakota and Indiana) in areas of both flat and elevated terrain. AERMOD cases included the regulatory default mode, low wind speed beta options, and use of the Sub-Hourly AERMOD Run Procedure (SHARP). The low

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

wind beta options show improvement in model performance (especially in higher terrain areas), helping to reduce some of the over-prediction biases currently present in regulatory default AERMOD. The SHARP results are relatively unbiased and show that this approach should be seriously considered to address situations dominated by low-wind meander conditions.

Introduction

During low wind speed (LWS) conditions, the dispersion of pollutants is limited by diminished fresh air dilution. Both monitoring observations and dispersion modeling results of this study indicate that high ground-level concentrations can occur in these conditions. Wind speeds less than 2 m/sec are generally considered to be "low", with steady-state modeling assumptions compromised at these low speeds (Pasquill et al., 1983). Pasquill and Van der Hoven (1976) recognized that for such low wind speeds, a plume is unlikely to have any definable travel. Wilson et al. (1976) considered this wind speed (2 m/sec) as the upper limit for conducting tracer experiments in low wind speed conditions.

Anfossi et al. (2005) noted that in LWS conditions, dispersion is characterized by meandering horizontal wind oscillations. They reported that as the wind speed decreases, the standard deviation of the wind direction increases, making it more difficult to define a mean plume direction. Sagendorf and Dickson (1974) and Wilson et al. (1976) found that under LWS conditions, horizontal diffusion was enhanced because of this meander and the resulting ground-level concentrations could be much lower than that predicted by steady-state Gaussian plume models that did not account for the meander effect.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

A parameter that is used as part of the computation of the horizontal plume spreading in the United States Environmental Protection Agency's (EPA) preferred model, AERMOD (Cimorelli et al., 2005), is the standard deviation of the crosswind component, σ_v, which can be parameterized as being proportional to the friction velocity, u_* (Smedman, 1988; Mahrt, 1998). These investigators found that there was an elevated minimum value of σ_v that was attributed to meandering. While at higher wind speeds, small-scale turbulence is the main source of variance, lateral meandering motions appear to exist in all conditions. Hanna (1990) found that σ_v maintains a minimum value of about 0.5 m/sec even as the wind speed approaches zero. Chowdhury et al. (2014) noted that a minimum σ_v of 0.5 m/s is a part of the formulation for the SCICHEM model.

Anfossi (2005) noted that meandering exists under all meteorological conditions regardless of the stability or wind speed, and this phenomenon sets a lower limit for the horizontal wind component variances as noted by Hanna (1990) over all types of terrain.

An alternative method to address wind meander was attempted by Sagendorf and Dickson (1974), who used a Gaussian model, but divided each computation period into sub-hourly (2-minute) time intervals and then combined the results to determine the total hourly concentration. This approach directly addresses the wind meander during the course of an hour by using the sub-hourly wind direction for each period modeled. As we discuss below, this approach has some appeal because it attempts to use direct wind measurements to account for sub-hourly wind meander. However, the sub-hourly time interval must not be so small as to distort the basis of the horizontal plume dispersion formulation in the dispersion model (e.g., AERMOD). Since

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

the horizontal dispersion shape function for stable conditions in AERMOD is formulated with parameterizations derived from the 10-minute release and sampling times of the Prairie Grass experiment (Barad,1958), it is appropriate to consider a minimum sub-hourly duration of 10 minutes for such modeling using AERMOD. The Prairie Grass formulation that is part of AERMOD may also result in an underestimate of the lateral plume spread shape function in some cases, as reported by Irwin (2014) for Kincaid SF_6 releases. From analyses of hourly samples of SF_6 taken at Kincaid (a tall stack source), Irwin determined that the lateral dispersion simulated by AERMOD could underestimate the lateral dispersion (by 60%) for near-stable conditions (conditions for which the lateral dispersion formulation that was fitted to the Project Prairie Grass data could affect results).

It is clear from the discussion above that the simulation of pollutant dispersion in LWS conditions is challenging. In the United States, the use of steady-state plume models before the introduction of AERMOD in 2005 was done with the following rule implemented by EPA: "when used in steady-state Gaussian plume models, measured site-specific wind speeds of less than 1 m/sec but higher than the response threshold of the instrument should be input as 1 m/sec" (EPA, 2004).

With EPA's implementation of a new model, AERMOD, in 2005 (EPA, 2005), input wind speeds lower than 1 m/sec were allowed due to the use of a meander algorithm that was designed to account for the LWS effects As noted in the AERMOD formulation document (EPA, 2004), "AERMOD accounts for meander by interpolating between two concentration limits: the coherent plume limit (which assumes that the wind direction is distributed about a well-defined

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

mean direction with variations due solely to lateral turbulence) and the random plume limit, (which assumes an equal probability of any wind direction)."

A key aspect of this interpolation is the assignment of a time scale (= 24 hours) at which mean wind information at the source is no longer correlated with the location of plume material at a downwind receptor (EPA, 2004). The assumption of a full diurnal cycle relating to this time scale tends to minimize the weighting of the random plume component relative to the coherent plume component for 1-hour time travel. The resulting weighting preference for the coherent plume can lead to a heavy reliance on the coherent plume, ineffective consideration of plume meander, and a total concentration overprediction.

For conditions in which the plume is emitted aloft into a stable layer or in areas of inhomogenous terrain, it would be expected the decoupling of the stable boundary layer relative to the surface layer could significantly shorten this time scale. These effects are discussed by Brett and Tuller (1991), where they note that lower wind autocorrelations occur in areas with a variety of roughness and terrain effects. Perez et al. (2004) noted that the autocorrelation is reduced in areas with terrain and in any terrain setting with increasing height in stable conditions when decoupling of vertical motions would result in a "loss of memory" of surface conditions. Therefore, the study reported in this paper has reviewed the treatment of AERMOD in low wind conditions for field data involving terrain effects in stable conditions as well as for flat terrain conditions, for which convective (daytime) conditions are typically associated with peak modeled predictions.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

The computation of the AERMOD coherent plume dispersion and the relative weighting of the coherent and random plumes in stable conditions are strongly related to the magnitude of σ_v, which is directly proportional to the magnitude of the friction velocity. Therefore, the formulation of the friction velocity calculation and the specification of a minimum σ_v value were also considered in this paper. The friction velocity also affects the internally-calculated vertical temperature gradient, which affects plume rise and plume-terrain interactions, which are especially important in elevated terrain situations.

Qian and Venkatram (2011) discuss the challenges of LWS conditions in which the time scale of wind meandering is large, and the horizontal concentration distribution can be non-Gaussian. It is also quite possible that wind instrumentation cannot adequately detect the turbulence levels that would be useful for modeling dispersion. They also noted that an analysis of data from the Cardington tower indicates that Monin-Obukhov similarity theory underestimates the surface friction velocity at low wind speeds. This finding was also noted by Paine et al. (2010) in an independent investigation of Cardington data as well as data from two other research-grade databases. Both Qian and Venkatram and Paine et al. proposed similar adjustments to the calculation of the surface friction velocity by AERMET, the meteorological processor for AERMOD. EPA incorporated the Qian and Venkatram suggested approach as a "beta option" in AERMOD in late 2012 (EPA, 2012). The same version of AERMOD also introduced low wind modeling options affecting the minimum value of σ_v and the weighting of the meander component that were used in the Test Cases 2-4 described below.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

AERMOD's handling of low wind speed conditions, especially for applications with only one level of meteorological data and no direct turbulence measurements or vertical temperature gradient observations, is the focus of this study. Previous evaluations of AERMOD for low wind speed conditions (e.g., Paine et al., 2010) have emphasized low-level tracer release studies conducted in the 1970s and have utilized results of researchers such as Luhar and Rayner (2009). The focus of the study reported here is a further evaluation of AERMOD, but focusing upon tall-stack field databases. One of these databases was previously evaluated (Kaplan et al., 2012) with AERMOD Version 12345, featuring a database in Mercer County, North Dakota. This database features five SO_2 monitors in the vicinity of the Dakota Gasification Company's plant and the Antelope Valley Station power plant in an area of both flat and elevated terrain. In addition to the Mercer County, ND database, this study considers an additional field database for the Gibson Generating Station tall stack in flat terrain in southwest Indiana.

EPA released AERMOD version 14134 with enhanced low wind model features that can be applied in more than one combination. There is one low wind option (beta u_*) applicable to the meteorological pre-processor, AERMET, affecting the friction velocity calculation, and a variety of options available for the dispersion model, AERMOD, that focus upon the minimum σ_v specification. These beta options have the potential to reduce the over-prediction biases currently present in AERMOD when run for neutral to stable conditions with regulatory default options (EPA, 2014 a,b). These new low wind options in AERMET and AERMOD currently require additional justification for each application in order to be considered for use in the United States. While EPA has conducted evaluations on low-level, non-buoyant studies with the AERMET and AERMOD low wind speed beta options, they have not conducted any new

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

evaluations on tall stack releases (U.S. EPA, 2014 a, b). One of the purposes of this study was to augment the evaluation experiences for the low wind model approaches for a variety of settings for tall stack releases.

This study also made use of the availability of sub-hourly meteorological observations to evaluate another modeling approach. This approach employs AERMOD with sub-hourly meteorological data and is known as the "Sub-Hourly AERMOD Run Procedure" or SHARP (EPRI, 2013). Like the procedure developed by Sagendorf and Dickson as described above, SHARP merely subdivides each hour's meteorology (e.g., into six 10-minute periods) and AERMOD is run multiple times with the meteorological input data (e.g., minutes 1-10, 11-20, etc.) treated as "hourly" averages for each run. Then, the results of these runs are combined (averaged). In our SHARP runs, we did not employ any observed turbulence data as input. This alternative modeling approach (our Test Case 5 as discussed below) has been compared to the standard hourly AERMOD modeling approach for default and low wind modeling options (Test Cases 1-4 described below, using hourly averaged meteorological data) to determine whether it should be further considered as a viable technique. This study provides a discussion of the various low wind speed modeling options and the field study databases that were tested, as well as the modeling results.

Modeling Options and Databases for Testing

Five AERMET/AERMOD model configurations were tested for the two field study databases, as listed below. All model applications used one wind level, a minimum wind speed of 0.5 m/sec,

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

and also used hourly average meteorological data with the exception of SHARP applications. As noted above, Test Cases 1-4 used options available in the current AERMOD code. The selections for Test Cases 1-4 exercised these low wind speed options over a range of reasonable choices extended from no low wind enhancements to a full treatment that incorporates the Qian and Venkatram (2011) u_* recommendations as well as the Hanna (1990) and Chowdhury (2014) minimum σ_v recommendations (0.5 m/sec). Test Case 5 used sub-hourly meteorological data processed with AERMET using the beta u_* option for SHARP applications. We discuss later in this document our recommendations for SHARP modeling without the AERMOD meander component included.

Test Case 1: AERMET and AERMOD in default mode.

Test Case 2: Low wind beta option for AERMET and default options for AERMOD (minimum σ_v value of 0.2 m/sec).

Test Case 3: Low wind beta option for AERMET and the LOWWIND2 option for AERMOD (minimum σ_v value of 0.3 m/sec).

Test Case 4: Low wind beta option for AERMET and the LOWWIND2 option for AERMOD (minimum σ_v value of 0.5 m/sec).

Test Case 5: Low wind beta option for AERMET and AERMOD run in sub-hourly mode (SHARP) with beta u*option.

The databases that were selected for the low wind model evaluation are listed in Table 1 and described below. They were selected due to the following attributes:

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

- They feature multiple years of hourly SO_2 monitoring at several sites.

- Emissions are dominated by tall stack sources that are available from continuous emission monitors.

- They include sub-hourly meteorological data so that the SHARP modeling approach could be tested as well.

- There is representative meteorological data from a single-level station typical of (or obtained from) airport-type data.

Table 1 here.

1) Mercer County, North Dakota

An available 4-year period of 2007-2010 was used for the Mercer County, ND database with five SO_2 monitors within 10 km of two nearby emission facilities (Antelope Valley and Dakota Gasification Company), site-specific meteorological data at the DGC#12 site (10-m level data in a low-cut grassy field in the location shown in Figure 1), and hourly emissions data from 15 point sources. The terrain in the area is rolling and features three of the monitors (Beulah, DGC#16, and especially DGC#17) being above or close to stack top for some of the nearby emission sources; see Figure 2 for more close-up terrain details. Figure 1 shows a layout of the sources, monitors, and the meteorological station. Tables 2 and 3 provide details about the emission sources and the monitors. Although this modeling application employed sources as far away as 50 km, the proximity of the monitors to the two nearby emission facilities meant that

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

emissions from those facilities dominated the impacts. However, to avoid criticism from reviewers that other regional sources that should have been modeled were omitted, other regional lignite-fired power plants were included in the modeling.

2) Gibson Generating Station, Indiana

An available 3-year period of 2008-2010 was used for the Gibson Generating Station in southwest Indiana with four SO_2 monitors within 6 km of the plant, airport hourly meteorological data (from Evansville, Indiana 1-minute data, located about 40 km SSE of the plant), and hourly emissions data from one electrical generating station (Gibson). The terrain in the area is quite flat and the stacks are tall. Figure 3 depicts the locations of the emission source and the four SO_2 monitors. Although the plant had an on-site meteorological tower, EPA (EPA, 2013a) noted that the tower's location next to a large lake resulted in non-representative boundary-layer conditions for the area, and that the use of airport data would be preferred. Tables 2 and 3 provide details about the emission sources and the monitors. Due to the fact that there are no major SO_2 sources within at least 30 km of Gibson, we modeled emissions from only that plant.

Figure 1 here.

Figure 2 here.

Figure 3 here.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Meteorological Data Processing

For the North Dakota and Gibson database evaluations, the hourly surface meteorological data were processed with AERMET, the meteorological preprocessor for AERMOD. The boundary layer parameters were developed according to the guidance provided by EPA in the current AERMOD Implementation Guide (EPA, 2009). For the first modeling evaluation option, Test Case 1, AERMET was run using the default options. For the other four model evaluation options, Test Case 2 to 5, AERMET was run with the beta u_* low wind speed option.

North Dakota Meteorological Processing

Four years (2007-2010) of the 10-meter meteorological data collected at the DGC#12 monitoring station (located about 7 km SSE of the central emission sources) were processed with AERMET. The data measured at this monitoring station were wind direction, wind speed, and temperature. Hourly cloud cover data from the Dickinson Theodore Roosevelt Regional Airport, North Dakota (KDIK) ASOS station (85 km to the SW) were used in conjunction with the monitoring station data. Upper air data were obtained from the Bismarck Airport, North Dakota (KBIS; about 100 km to the SE), twice-daily soundings.

In addition, the sub-hourly (10-minute average) 10-meter meteorological data collected at the DGC#12 monitoring station were also processed with AERMET. AERMET was set up to read six 10-minute average files with the tower data and output six 10-minute average surface and profile files for use in SHARP. SHARP then used the sub-hourly output of AERMET to

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

calculate hourly modeled concentrations, without changing the internal computations of AERMOD. The SHARP user's manual (EPRI, 2013) provides detailed instructions on processing sub-hourly meteorological data and executing SHARP.

Gibson Meteorological Processing

Three years (2008-2010) of hourly surface data from the Evansville Airport, Indiana (KEVV) ASOS station (about 40 km SSE of Gibson) were used in conjunction with the twice-daily soundings upper air data from the Lincoln Airport, Illinois (KILX, about 240 km NW of Gibson). The 10-minute sub-hourly data for SHARP were generated from the 1-minute meteorological data collected at Evansville Airport.

Emission Source Characteristics

Table 2 summarizes the stack parameters and locations of the modeled sources for the North Dakota and Gibson databases. Actual hourly emission rates, stack temperatures, and stack gas exit velocities were used for both databases.

Table 2 here.

Model Runs and Processing

For each evaluation database, the candidate model configurations were run with hourly emission rates provided by the plant operators. In the case of rapidly-varying emissions (startup and

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

shutdown), the hourly averages may average intermittent conditions occurring during the course of the hour. Actual stack heights were used, along with building dimensions used as input to the models tested. Receptors were placed only at the location of each monitor to match the number of observed and predicted concentrations.

The monitor (receptor) locations and elevations are listed in Table 3. For the North Dakota database, the DGC#17 monitor is located in the most elevated terrain of all monitors. The monitors for the Gibson database were located at elevations at or near stack base, with stack heights ranging from 152 to 189 meters.

Table 3 here.

Tolerance Range for Modeling Results

One issue to be aware of regarding SO_2 monitored observations is that they can exhibit over- or under-prediction tendencies up to 10% and still be acceptable. This is related to the tolerance in the EPA procedures (EPA, 2013b) associated with quality control checks and span checks of ambient measurements. Therefore, even ignoring uncertainties in model input parameters and other contributions (e.g., model science errors and random variations) that can also lead to modeling uncertainties, just the uncertainty in measurements indicate that modeled-to-monitored ratios between 0.9 and 1.1 can be considered as "unbiased". In the discussion below, we consider model performance to be "relatively unbiased" if its predicted model to monitor ratio is between 0.75 and 1.25.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Model Evaluation Metrics

The model evaluation employed metrics that address three basic areas, as described below.

1) 1-hour SO_2 NAAQS Design Concentration

An operational metric that is tied to the form of the 1-hour SO_2 NAAQS is the "design concentration" (99th percentile of the peak daily 1-hour maximum values). This tabulated statistic was developed for each modeled case and for each individual monitor for each database evaluated.

2) Quantile-Quantile Plots

Operational performance of models for predicting compliance with air quality regulations, especially those involving a peak or near-peak value at some unspecified time and location, can be assessed with quantile-quantile (Q-Q) plots (Chambers et al., 1983), which are widely used in AERMOD evaluations. Q-Q plots are created by independently ranking (from largest to smallest) the predicted and the observed concentrations from a set of predictions initially paired in time and space. A robust model would have all points on the diagonal (45-degree) line. Such plots are useful for answering the question, "Over a period of time evaluated, does the distribution of the model predictions match those of observations?" Therefore, the Q-Q plot instead of the scatterplot is a pragmatic procedure for demonstrating model performance of applied models, and it is widely used by EPA (e.g., Perry et al. 2005). Venkatram et al. (2001)

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

support the use of Q-Q plots for evaluating regulatory models. Several Q-Q plots are included in this paper in the discussion provided below.

3) Meteorological Conditions Associated with Peak Observed vs. Modeled Concentrations

Lists of the meteorological conditions and hours/dates of the top several predictions and observations provide an indication as to whether these conditions are consistent between the model and monitoring data. For example, if the peak observed concentrations generally occur during daytime hours, we would expect that a well-performing model would indicate that the peak predictions are during the daytime as well. Another meteorological variable of interest is the wind speed magnitudes associated with observations and predictions. It would be expected, for example, that if the wind speeds associated with peak observations are low, then the modeled peak predicted hours would have the same characteristics. A brief qualitative summary of this analysis is included in this paper and supplemental files contain the tables of the top 25 (unpaired) predictions and observations for all monitors and cases tested.

North Dakota Database Model Evaluation Procedures and Results

AERMOD was run for five test cases to compute the 1-hour daily maximum 99th percentile averaged over four years at the five ambient monitoring locations listed in Table 3.

A regional background of 10 μg/m^3 was added to the AERMOD modeled predictions. The 1-hour 99th percentile background concentration was computed from the 2007-2010 lowest hourly

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

monitored concentration among the five monitors so as to avoid double-counting impacts from sources already being modeled.

The ratios of the modeled (including the background of 10 $\mu g/m^3$) to monitored design concentrations are summarized in Table 4 and graphically plotted in Figure 4 and are generally greater than 1. (Note that the background concentration is a small fraction of the total concentration, as shown in Table 4). For the monitors in simple terrain (DGC#12, DGC#14, and Beulah), the evaluation results are similar for both the default and beta options and are within 5-30% of the monitored concentrations depending on the model option. The evaluation result for the monitor in the highest terrain (DGC#17) shows that the ratio of modeled to monitored concentration is more than 2, but when this location is modeled with the AERMET and AERMOD low wind beta option, the ratio is significantly better, at less than 1.3. It is noteworthy that the modeling results for inclusion of just the beta u_* option are virtually identical to the default AERMET run for the simple terrain monitors, but the differences are significant for the higher terrain monitor (DGC#17). For all of the monitors, it is evident that further reductions of AERMOD's over-predictions occur as the minimum σ_v in AERMOD is increased from 0.3 to 0.5 m/sec. For a minimum σ_v of 0.5 m/sec at all the monitors, AERMOD is shown to be conservative with respect to the design concentration.

The Q-Q plots of the ranked top fifty daily maximum 1-hour SO_2 concentrations for predictions and observations are shown in Figure 5. For the convenience of the reader, a vertical dashed line is included in each Q-Q plot to indicate the observed design concentration. In general, the Q-Q plots indicate the following:

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

- For all of the monitors, to the left of the design concentration line, the AERMOD hourly runs all show ranked predictions at or higher than observations. To the right of the design concentration line, the ranked modeled values for specific test cases and monitors are lower than the ranked observed levels, and the slope of the line formed by the plotted points is less than the slope of the 1:1 line. For model performance goals that would need to predict well for the peak concentrations (rather than the 99th percentile statistic), this area of the Q-Q plots would be of greater importance.

- The very highest observed value (if indeed valid) is not matched by any of the models for all of the monitors, but since the focus is on the 99th percentile form of the United States ambient standard for SO_2, this area of model performance is not important for this application.

- The ranked SHARP modeling results are lower than all of the hourly AERMOD runs, but at the design concentration level, they are, on average, relatively unbiased over all of the monitors. The AERMOD runs for SHARP included the meander component, which probably contributed to the small under-predictions noted for SHARP. In future modeling, we would advise users of SHARP to employ the AERMOD LOWWIND1 option to disable the meander component.

Table 4 here.

Figure 4 here.

Figure 5 here.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Gibson Generating Station Database Model Evaluation Procedures and Results

AERMOD was run for five test cases for this database as well in order to compute the 1-hour daily maximum 99th percentile averaged over three years at the four ambient monitoring locations listed in Table 3.

A regional background of 18 μg/m^3 was added to the AERMOD modeled predictions. The 1-hour 99th percentile background concentration was computed from the 2008-2010 lowest hourly monitored concentration among the four monitors so as to avoid impacts from sources being modeled.

The ratio of the modeled (including the background of 18 μg/m^3) to monitored concentrations is summarized in Table 5 and graphically plotted in Figure 6 and are generally greater than 1.0. (Note that the background concentration is a small fraction of the total concentration, as shown in Table 5.) Figure 6 shows that AERMOD with hourly averaged meteorological data over-predicts by about 40-50% at Mt. Carmel and Gibson Tower monitors and by about 9-31% at East Mt. Carmel and Shrodt monitors. As expected (due to dominance of impacts with convective conditions), the AERMOD results do not vary much with the various low wind speed options in this flat terrain setting. AERMOD with sub-hourly meteorological data (SHARP) has the best (least biased predicted-to-observed ratio of design concentrations) performance among the five

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

cases modeled. Over the four monitors, the range of predicted-to-observed ratios for SHARP is a narrow one, ranging from a slight under-prediction by 2% to an over-prediction by 14%.

The Q-Q plots of the ranked top fifty daily maximum 1-hour SO_2 concentrations for predictions and observations are shown in Figure 7. It is clear from these plots that the SHARP results parallel and are closer to the 1:1 line for a larger portion of the concentration range than any other model tested. In general, AERMOD modeling with hourly data exhibits an over-prediction tendency at all of the monitors for the peak ranked concentrations at most of the monitors. The AERMOD/SHARP models predicted lower relative to observations at the East Mt. Carmel monitor for the very highest values, but match well for the 99th percentile peak daily 1-hour maximum statistic.

Table 5 here.

Figure 6 here.

Figure 7 here.

Evaluation Results Discussion

The modeling results for these tall stack releases are sensitive to the source local setting and proximity to complex terrain. In general, for tall stacks in simple terrain, the peak ground-level impacts mostly occur in daytime convective conditions. For settings with a mixture of simple and complex terrain, the peak impacts for the higher terrain are observed to occur during both daytime and nighttime conditions, while AERMOD tends to favor stable conditions only without

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

low wind speed enhancements. Exceptions to this "rule of thumb" can occur for stacks with aerodynamic building downwash effects. In that case, high observed and modeled predictions are likely to occur during high wind events during all times of day.

The significance of the changes in model performance for tall stacks (using a 90th percentile confidence interval) was independently tested for a similar model evaluation conducted for Eastman Chemical Company (Paine et al., 2013; Szembek et al., 2013), using a modification of the Model Evaluation Methodology (MEM) software that computed estimates of the hourly stability class (Strimaitis et al., 1993). That study indicated that relative to a perfect model, a model that over-predicted or under-predicted by less than about 50% would likely show a performance level that was not significantly different. For a larger difference in bias, one could expect a statistically significant difference in model performance. This finding has been adopted as an indicator of the significance of different modeling results for this study.

A review of the North Dakota ratios of monitored to modeled values in Figure 4 generally indicates that for DGC#12, DGC#14, and Beulah, the model differences were not significantly different. For DGC#16, it could be concluded that the SHARP results were significantly better than the default AERMOD results, but other AERMOD variations were not significantly better. For the high terrain monitor, DGC#17, is it evident that all of the model options departing from default were significantly better than the default option, especially the SHARP approach.

For the Gibson monitors (see Figure 6), the model variations did not result in significantly different performance except for the Gibson Tower (SHARP vs. the hourly modes of running AERMOD).

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

General conclusions from the review of meteorological conditions associated with the top observed concentrations at the North Dakota monitors , provided in the supplemental file called "North Dakota Meteorological Conditions Resulting in Top 25 Concentrations", are as follows:

- A few peak observed concentrations occur at night with light winds. Majority of observations for the DGC#12 monitor are mostly daytime conditions with moderate to strong winds.

- Peak observations for the DGC#14 and Beulah monitors are mostly daytime conditions with a large range of wind speeds. Once again, a minority of the peak concentrations occur at night with a large range of wind speeds.

- Peak observed concentrations for the DGC#16 and DGC#17 monitors occur at night with light winds. Majority of observations are mixed between daytime and nighttime conditions with a large range of wind speeds for both. The DGC#17 monitor is located in elevated terrain.

The conclusions from the review of the meteorological conditions associated with peak AERMOD or SHARP predictions are as follows:

- AERMOD hourly peak predictions for the DGC#12 and Beulah monitors are consistently during the daytime with light to moderate wind speeds and limited mixing heights. This is a commonly observed situation that is further discussed below.

- There are similar AERMOD results for DGC#14, except that there are more periods with high winds and higher mixing heights.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

- The AERMOD results for DGC#16 still features mostly daytime hours, but with more high wind conditions.

- The default AERMOD results for DGC#17 are distinctly different from the other monitors, with most hours featuring stable, light winds. There are also a few daytime hours of high predictions with low winds and low mixing heights. This pattern changes substantially with the beta u_* options employed, when the majority of the peak prediction hours are daytime periods with light to moderate wind speeds. This pattern is more consistent with the peak observed concentration conditions.

- The SHARP peak predictions at the North Dakota monitors were also mostly associated with daytime hours with a large range of wind speeds for all of the monitors.

The North Dakota site has some similarities due to a mixture of flat and elevated terrain to the Eastman Chemical Company model evaluation study in Kingsport, Tennessee (this site features three coal-fired boiler houses with tall stacks). In that study (Paine et al. 2013; Szembek et al., 2013), there was one monitor in elevated terrain and two monitors in flat terrain with a full year of data. Both the North Dakota and Eastman sites featured observations of the design concentration being within about 10% of the mean design concentration over all monitors. Modeling results using default options in AERMOD for both of these sites indicated a large spread of the predictions, with predictions in high terrain exceeding observations by more than a factor of 2. In contrast, the predictions in flat terrain, while higher than observations, showed a lower overprediction bias. The use of low wind speed improvements in AERMOD (beta u_* in

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

AERMET and an elevated minimum σ_v value) did improve model predictions for both databases.

The conclusions from the review of the meteorological conditions associated with peak observations , provided in the supplemental file called "Gibson Meteorological Conditions Resulting in Top 25 Concentrations", are as follows:

- Peak observations for the Mt. Carmel and East Mt. Carmel monitors occur during both light wind convective conditions and strong wind conditions (near neutral, both daytime and nighttime).

- Nighttime peaks that are noted at Mt. Carmel and East Mt. Carmel could be due to downwash effects with southerly winds.

- Gibson Tower and Shrodt monitors were in directions with minimal downwash effects; therefore, the peak impacts at these monitors occur with convective conditions.

- The Gibson Tower and Shrodt monitor peak observation conditions were similarly mixed for wind speeds, but they were consistently occurring during the daytime only.

AERMOD (hourly) modeling runs and SHARP runs are generally consistent with the patterns of observed conditions for Shrodt and Gibson Tower monitors. Except for downwash effects, the peak concentrations were all observed and predicted during daytime hours. There are similar AERMOD results for Mt. Carmel and East Mt. Carmel, except that there are more nighttime periods and periods with strong wind conditions.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

As noted above, AERMOD tends to focus its peak predictions for tall stacks in simple terrain (those not affected by building downwash) for conditions with low mixing heights in the morning. However, a more detailed review of these conditions indicates that the high predictions are not simply due to plumes trapped within the convective mixed layer, but instead due to plumes that initially penetrate the mixing layer, but then emerge (after a short travel time) into the convective boundary layer in concentrated form with a larger-than-expected vertical spread. Tests of this condition were undertaken by Dr. Ken Rayner of the Western Australia Department of Environmental Regulation (2013), who found the same condition occurring for tall stacks in simple terrain for a field study database in his province. Rayner found that AERMOD tended to over-predict peak concentrations by a factor of about 50% at a key monitor, while with the penetrated plume removed from consideration, AERMOD would underpredict by about 30%. Therefore, the correct treatment might be a more delayed entrainment of the penetrated plume into the convective mixed layer. Rayner's basic conclusions were that:

- A plume penetrates and disperses within a 1-hour time step in AERMOD, while in the real world, dispersion of a penetrated puff may occur an hour or more later, after substantial travel time.

- A penetrated plume initially disperses via a vertical Gaussian formula, not a convective probability density function. Because penetrated puffs typically have a very small vertical dispersion, they are typically fully entrained (in AERMOD) in a single hour by a growing mixed layer, and dispersion of a fully entrained puff is via convective mixing, with relatively rapid vertical dispersion, and high ground-level concentrations.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Conclusions and Recommendations for Further Research

This study has addressed additional evaluations for low wind conditions involving tall stack releases for which multiple years of concurrent emissions, meteorological data, and monitoring data were available. The modeling cases that were the focus of this study involved applications with only one level of meteorological data and no direct turbulence measurements or vertical temperature gradient observations.

For the North Dakota evaluation, the AERMOD model over-predicted, using the design concentration as the metric for each monitor. For the relatively low elevation monitors, the results were similar for both the default and beta options and are within 5-30% of the monitored concentrations depending on the model option. The modeling result for the elevated DGC#17 monitor showed that this location is sensitive to terrain as the ratio of modeled to monitored concentration is over 2. However, when this location was modeled with the low wind beta option, the ratio was notably better, at less than 1.3. Furthermore, the low wind speed beta option changed the AERMOD's focus on peak predictions conditions from mostly nighttime to mostly daytime periods, somewhat more in line with observations. Even for a minimum σ_v as high as 0.5 m/sec, all of the AERMOD modeling results were conservative or relatively unbiased (for the design concentration). The North Dakota evaluation results for the sub-hourly (SHARP) modeling were, on average, relatively unbiased, with a predicted-to-observed design concentration ratio ranging from 0.89 to 1.2. With a 10% tolerance in the SO_2 monitored values,

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

we find that the SHARP performance is quite good. Slightly higher SHARP predictions would be expected if AERMOD were run with the LOWWIND1 option deployed.

For the Gibson flat terrain evaluation, AERMOD with hourly averaged meteorological data over-predicted at three of the four monitors between 30-50 %, and about 10% at the fourth monitor. The AERMOD results did not vary much with the various low wind speed options in this flat terrain setting. AERMOD with sub-hourly meteorological data (SHARP) had the best (least biased predicted-to-observed ratio of design concentrations) performance among the five cases modeled. Over the four monitors, the range of predicted-to-observed ratios for SHARP was a narrow one, ranging from a slight under-prediction by 2% to an over-prediction by 14%. All other modeling options had a larger range of results.

The overall findings with the low wind speed testing on these tall stack databases indicate that:

- The AERMOD low wind speed options have a minor effect for flat terrain locations.

- The AERMOD low wind speed options have a more significant effect with AERMOD modeling for elevated terrain locations, and the use of the LOWWIND2 option with a minimum σ_v on the order of 0.5 m/sec is appropriate.

- The AERMOD sub-hourly modeling (SHARP) results are mostly in the unbiased range (modeled to observed design concentration ratios between 0.9 and 1.1) for the two databases tested with that option.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

- The AERMOD low wind speed options improve the consistency of meteorological conditions associated with the highest observed and predicted concentration events.

Further analysis of the low wind speed performance of AERMOD with either the SHARP procedure or the use of the minimum σ_v specifications by other investigators is encouraged. However, SHARP can only be used if sub-hourly meteorological data is available. For Automated Surface Observing Stations (ASOS) with 1-minute data, this option is a possibility if the 1-minute data are obtained and processed.

Although the SHARP results reported in this paper are encouraging, further testing is recommended to determine the optimal sub-hourly averaging time (no less than 10 minutes is recommended) and whether other adjustments to AERMOD (e.g., total disabling of the meander option) is recommended. Another way to implement the sub-hourly information in AERMOD and to avoid the laborious method of running AERMOD several times for SHARP would be to include a distribution, or range, of the sub-hourly wind directions to AERMOD so that the meander calculations could be refined.

For most modeling applications that use hourly averages of meteorological data with no knowledge of the sub-hourly wind distribution, it appears that the best options with the current AERMOD modeling system are to implement the AERMET beta u_* improvements and to use a minimum σ_v value on the order of 0.5 m/sec/sec.

It is noteworthy that EPA has recently approved (EPA, 2015) as a site-specific model for Eastman Chemical Company the use of the AERMET beta u_* option as well as the LOWWIND2

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

option in AERMOD with a minimum σ_v of 0.4 m/sec. This model, which was evaluated with site-specific meteorological data and 4 SO_2 monitors operated for 1 year, performed well in flat terrain, but overpredicted in elevated terrain, where a minimum σ_v value of 0.6 m/sec actually performed better. This would result in an average value of the minimum σ_v of about 0.5 m/sec, consistent with the findings of Hanna (1990).

The concept of a minimum horizontal wind fluctuation speed on the order of about 0.5 m/sec is further supported by the existence of vertical changes (shears) in wind direction (as noted by Etling, 1990) that can result in effective horizontal shearing of a plume that is not accounted for in AERMOD. Although we did not test this concept here, the concept of vertical wind shear effects, which are more prevalent in de-coupled stable conditions than in well-mixed convective conditions suggests that it would be helpful to have a "split minimum σ_v" approach in AERMOD that enables the user to specify separate minimum σ_v values for stable and unstable conditions. This capability would, of course, be backward-compatible to the current minimum σ_v specification that applies for all stability conditions in AERMOD now.

References

Anfossi, D., D. Oettl, G. Degrazia, A. Goulart. 2005. An analysis of sonic anemometer observations in low wind speed conditions. *Boundary Layer Meteorology* 114, 179–203. doi:10.1007/s10546-004-1984-4

Barad, M.L., 1958. Project Prairie Grass, a field program in diffusion. *Geophys. Res. Pap*. 59. Air Force Cambridge Centre.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Brett, A. C., and S. E. Tuller, 1991. The autocorrelation of hourly wind speed observations. *Journal of Applied Meteorology* 30, 823–833. doi:10.1175/1520-0450(1991)030%3C0823:TAOHWS%3E2.0.CO;2

Chambers, J. M., W. S. Cleveland, B. Kleiner, and P.A. Tukey. 1983. Comparing Data Distributions. Graphical Methods for Data Analysis. Bell Laboratories. Wadsworth International Group and Duxbury Press.

Chowdhury, B., R. I. Sykes, D. Henn, P. Karamchandani. 2014. SCICHEM Version 3.0 (Beta 2) Technical Documentation. Available at http://sourceforge.net/projects/epri-dispersion/files/SCICHEM/SCICHEM3.0b2.zip/download.

Cimorelli, A.J., S.G. Perry, A. Venkatram, J.C. Weil, R.J. Paine, R.B. Wilson, R.F. Lee, W.D. Peters, and R.W. Brode. 2005. AERMOD: A Dispersion Model for Industrial Source Applications. Part I: General Model Formulation and Boundary Layer Characterization. *Journal of Applied Meteorology* 44, 682-693. doi:10.1175/JAM2227.1

Electric Power Research Institute (EPRI). 2013. Sub Hourly AERMOD Run Procedure (SHARP), version 13011 User's Guide. Research Project 1025622. http://sourceforge.net/projects/epri-dispersion/files/SHARP/ (accessed June 10, 2015).

Etling, D. 1990. On Plume Meandering under Stable Stratification. *Atmospheric. Environment* 8, 1979–1985. doi:10.1016/0960-1686(90)90232-C

Hanna, S. R. 1990. Lateral Dispersion in Light-Wind Stable Conditions, *Nuovo Cimento* 13, 889–894. doi:10.1007/BF02514777

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Irwin, J. S. 2014. A suggested method for dispersion model evaluation. *Journal of the Air & Waste Management Association*, 64:3, 255-264. doi:10.1080/10962247.2013.833147

Kaplan, M. and R.J. Paine. 2012. Comparison of AERMOD Modeled 1-Hour SO_2 Concentrations to Observations at Multiple Monitoring Stations in North Dakota. Presented at the 105th Annual Conference and Exhibition of the Air & Waste Management Association, San Antonio, TX.

Luhar, A.K. and K.N. Rayner. 2009. Methods to estimate surface fluxes of momentum and heat from routine weather observations for dispersion applications under stable stratification. *Boundary Layer Meteorology* 132, 437-454. doi:10.1007/s10546-009-9409-z

Mahrt, L. 1998. Stratified Atmospheric Boundary Layers and Breakdown of Models. *Theor. Comput. Fluid Dyn*. 11, 263–279. doi:10.1007/s001620050093

Paine, R., J.A. Connors, and C.D. Szembek, 2010. AERMOD Low Wind Speed Evaluation Study: Results and Implementation. Paper 2010-A-631-AWMA, presented at the 103rd Annual Conference, Air & Waste Management Association, Calgary, Alberta, Canada.

Paine, R., F. Tringale, and S. Gossett, 2013. Resolution of 1-hour SO2 Non-attainment Area in Kingsport, TN: Advanced Meteorological and Monitoring Study. Presented at the Air & Waste Management Association's Specialty Conference. Raleigh, NC. March 2013.

Pasquill, F. and F. B. Smith. 1983. Atmospheric Diffusion. Ellis Horwood. Series in Environmental Science.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Perez, I., M. Garcia, M. Sanchez, B. De Torre. 2004. Autocorrelation Analysis of Meteorological Data from a RASS Sodar. *Journal of Applied Meteorology*, 43: 1213-1223. doi:10.1175/1520-0450(2004)043%3C1213:AAOMDF%3E2.0.CO;2

Perry, S.G., A.J. Cimorelli, R.J. Paine, R.W. Brode, J.C. Weil, A. Venkatram, R.B. Wilson, R.F. Lee, and W.D. Peters. 2005. AERMOD: A Dispersion Model for Industrial Source Applications. Part II: Model Performance against 17 Field Study Databases. *Journal of Applied Meteorology* 44, 694-708. doi:10.1175/JAM2228.1

Qian, W. and A. Venkatram. 2011. Performance of steady-state dispersion models under low wind-speed conditions. *Boundary Layer Meteorology,* 138, pp 475-491. doi:10.1007/s10546-010-9565-1

Rayner, K. 2013. Personal communication with Robert Paine, AECOM.

Sagendorf, J. F. and Dickson, C. R. 1974. Diffusion under Low Windspeed, Inversion Conditions. *NOAA Technical Memorandum* 52, 89 pp.

Smedman, A. S. 1988. Observations of a Multi-Level Turbulence Structure in a Very Stable Atmospheric Boundary Layer. *Boundary Layer Meteorology* 66, 105–126. doi:10.1007/BF00116064

Strimaitis, D., E. Insley, M. Korc, and F. Lurmann.1993. User's Guide for the Model Evaluation Methodology (MEM) System for Comparing Model Performance, Version 1.0. STI-93261-1392-FR. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC 27711.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Szembek, C., R. Paine, and S. Gossett. 2013. Resolution of 1-hour SO2 Non-attainment Area in Kingsport, TN: Model Evaluation Analysis Results to Date. Presented at the Air & Waste Management Association's Specialty Conference. Raleigh, NC. March 2013.

U.S. Environmental Protection Agency. 2004. AERMOD: Description of Model Formulation. EPA-454/R-03-004. http://www.epa.gov/ttn/scram/7thconf/aermod/aermod_mfd.pdf. (accessed June 10, 2015).

U.S. Environmental Protection Agency. 2005. Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions. Final Rule. Federal Register, Volume 70, No. 216, November 9, 2005. http://www.gpo.gov/fdsys/pkg/FR-2005-11-09/html/05-21627.htm. (accessed June 10, 2015).

U.S. Environmental Protection Agency. 2009. AERMOD Implementation Guide (AIG). http://www.epa.gov/ttn/scram/7thconf/aermod/aermod_implmtn_guide_19March2009.pdf (accessed June 10, 2015).

U.S. Environmental Protection Agency. 2012. AERMET 12345 Model Change Bulletin MCB#3. http://www.epa.gov/ttn/scram/7thconf/aermod/aermet_mcb3.txt. (accessed June 10, 2015).

U.S. Environmental Protection Agency. 2013a. Personal communication from Roger Brode, EPA, to Robert Paine, AECOM.

U.S. Environmental Protection Agency. 2013b. Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II, Ambient Air Quality Monitoring Program. http://www.epa.gov/ttnamti1/files/ambient/pm25/qa/QA-Handbook-Vol-II.pdf (accessed June 10, 2015).

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

U.S. Environmental Protection Agency. 2014a. Webinar: AERMOD Modeling System Update, January 15, 2014. http://www.epa.gov/ttn/scram/webinar/AERMOD_13350_Update/AERMOD_System_Update_Webinar_01-14-2014_FINAL.pdf (accessed June 10, 2015).

U.S. Environmental Protection Agency. 2014b. Webinar: AERMOD Modeling System Update, August 14, 2014. http://www.epa.gov/ttn/scram/webinar/AERMOD_14134-NO2_Memo/20140812-Webinar_Slides.pdf (accessed June 10, 2015).

U.S. Environmental Protection Agency. 2015. Approval of Alternative Model Request: Modeling of Sulfur Dioxide Emissions from Eastman Chemical Company, Sullivan County, Tennessee, 2010 Sulfur Dioxide National Ambient Air Quality Standards (NAAQS) Nonattainment Area. Letter to Mr. Barry R. Stephens, Tennessee Department of Environment and Conservation from Beverly H. Bannister, Director of Air, Pesticides and Toxics Management Division (EPA Region 4).

Van der Hoven, I. 1976. A survey of field measurements of atmospheric diffusion under low-wind-speed inversion conditions. *Nuclear. Safety* 17, 223–230.

Venkatram, A., R.W. Brode, A.J. Cimorelli, J.T. Lee, R.J. Paine, S.G. Perry, W.D. Peters, J.C. Weil, and R.B. Wilson. 2001. A complex terrain dispersion model for regulatory applications. *Atmospheric .Environment.* 35, 4211-4221. doi:10.1016/S1352-2310(01)00186-8

Wilson, R. B., Start, G. E., Dickson, C. R., and Ricks, N. R. 1976. Diffusion under low wind speed conditions near Oak Ridge, Tennessee, *NOAA Technical Memorandum* ERL ARL-61, 83 pp.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Table 1. Databases Selected for the Model Evaluation

	Mercer County, North Dakota	**Gibson Generating Station, Indiana**
Number of emission sources modeled	15	5
Number of SO_2 monitors	5 (one above stack top for several sources)	4 (all below stack top)
Type of terrain	Rolling	Flat
Meteorological years and data source	2007-2010 local 10-meter tower data	2008-2010 Evansville airport
Meteorological data time step	Hourly and sub-hourly	Hourly and sub-hourly

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Emissions and exhaust data	Actual hourly variable emissions and velocity, fixed temperature	Actual hourly variable emissions and velocity, fixed temperature

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Table 2. Source Information

Data Base	Source ID	UTM X (m)	UTM Y (m)	Base Elev. (m)	Stack Height (m)	Exit Temp (K)	Stack Dia. (m)
ND	Antelope Valley	285920	5250189	588.3	182.9	Vary	7.0
ND	Antelope Valley	285924	5250293	588.3	182.9	Vary	7.0
ND	Leland Olds	324461	5239045	518.3	106.7	Vary	5.3
ND	Leland Olds	324557	5238972	518.3	152.4	Vary	6.7
ND	Milton R Young	331870	5214952	597.4	171.9	Vary	6.2
ND	Milton R Young	331833	5214891	600.5	167.6	Vary	9.1

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

ND	Coyote	286875	5233589	556.9	151.8	Vary	6.4
ND	Stanton	323642	5239607	518.2	77.7	Vary	4.6
ND	Coal Creek	337120	5249480	602.0	201.2	Vary	6.7
ND	Coal Creek	337220	5249490	602.0	201.2	Vary	6.7
ND	Dakota Gasification Company	285552	5249268	588.3	119.8	Vary	7.0
ND	Dakota Gasification Company	285648	5249553	588.3	68.6	Vary	0.5
ND	Dakota Gasification Company	285850	5248600	588.3	76.2	Vary	1.0
ND	Dakota Gasification	285653	5249502	588.3	30.5	Vary	0.5

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

	Company						
Gibson	Gibson 1	432999	4247189	119.0	189.0	327.2	7.6
Gibson	Gibson 2	432999	4247189	119.0	189.0	327.2	7.6
Gibson	Gibson 3	432923	4247251	118.5	189.0	327.2	7.6
Gibson	Gibson 4	432886	4247340	117.9	152.4	327.2	7.2
Gibson	Gibson 5	432831	4247423	116.3	152.4	327.2	7.2

Notes: SO_2 emission rate and exit velocity vary on hourly basis for each modeled source. Exit temperature varies by hour for the ND sources, but with wet scrubbing, is fixed at 327.2 deg K.

UTM zones are 14 for North Dakota and 16 for Gibson.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Table 3. Monitor/Receptor Locations

Data base	Monitor	UTM X (m)	UTM Y (m)	Monitor Elevation (m)
ND	DGC#12	291011	5244991	593.2
ND	DGC#14	290063	5250217	604.0
ND	DGC#16	283924	5252004	629.1
ND	DGC#17[(a)]	279025	5253844	709.8
ND	Beulah	290823	5242062	627.1
Gibson	Mt. Carmel	432424	4250202	119.0
Gibson	East Mt. Carmel	434654	4249666	119.3
Gibson	Shrodt	427175	4247182	138.0
Gibson	Gibson Tower	434792	4246296	119.0

[(a)] This monitor's elevation is above stack top for several of the ND sources.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Table 4. North Dakota Ratio of Monitored to Modeled Design Concentrations*

Test Case	Monitor	Observed	Predicted	Ratio
Test Case 1 (Default AERMET, Default AERMOD)	DGC#12	91.52	109.96	1.20
	DGC#14	95.00	116.84	1.23
	DGC#16	79.58	119.94	1.51
	DGC#17	83.76	184.48	2.20
	Beulah	93.37	119.23	1.28
Test Case 2 (Beta AERMET, Default AERMOD)	DGC#12	91.52	109.96	1.20
	DGC#14	95.00	116.84	1.23
	DGC#16	79.58	119.94	1.51
	DGC#17	83.76	127.93	1.53
	Beulah	93.37	119.23	1.28
Test Case 3 (Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.3 m/sec)	DGC#12	91.52	103.14	1.13
	DGC#14	95.00	110.17	1.16
	DGC#16	79.58	111.74	1.40
	DGC#17	83.76	108.69	1.30
	Beulah	93.37	106.05	1.14

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Test Case 4 (Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.5 m/sec)	DGC#12	91.52	95.86	1.05
	DGC#14	95.00	100.50	1.06
	DGC#16	79.58	106.65	1.34
	DGC#17	83.76	101.84	1.22
	Beulah	93.37	92.32	0.99
Test Case 5 (SHARP)	DGC#12	91.52	82.18	0.90
	DGC#14	95.00	84.24	0.89
	DGC#16	79.58	95.47	1.20
	DGC#17	83.76	88.60	1.06
	Beulah	93.37	86.98	0.93
*Design Concentration: 99th percentile peak daily 1-hour maximum, averaged over the years				

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Table 5. Gibson Ratio of Monitored to Modeled Design Concentrations*

Test Case	Monitor	Observed	Predicted	Ratio
Test Case 1 (Default AERMET, Default AERMOD)	Mt. Carmel	197.25	278.45	1.41
	East Mt. Carmel	206.89	230.74	1.12
	Shrodt	148.16	189.63	1.28
	Gibson Tower	127.12	193.71	1.52
Test Case 2 (Beta AERMET, Default AERMOD)	Mt. Carmel	197.25	287.16	1.46
	East Mt. Carmel	206.89	229.22	1.11
	Shrodt	148.16	189.63	1.28
	Gibson Tower	127.12	193.71	1.52
Test Case 3 (Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.3 m/sec)	Mt. Carmel	197.25	280.32	1.42
	East Mt. Carmel	206.89	224.65	1.09
	Shrodt	148.16	184.82	1.25
	Gibson Tower	127.12	192.22	1.51
Test Case 4 (Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.5 m/sec)	Mt. Carmel	197.25	277.57	1.41
	East Mt. Carmel	206.89	224.65	1.09
	Shrodt	148.16	176.81	1.19
	Gibson Tower	127.12	192.22	1.51
Test Case 5	Mt. Carmel	197.25	225.05	1.14

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

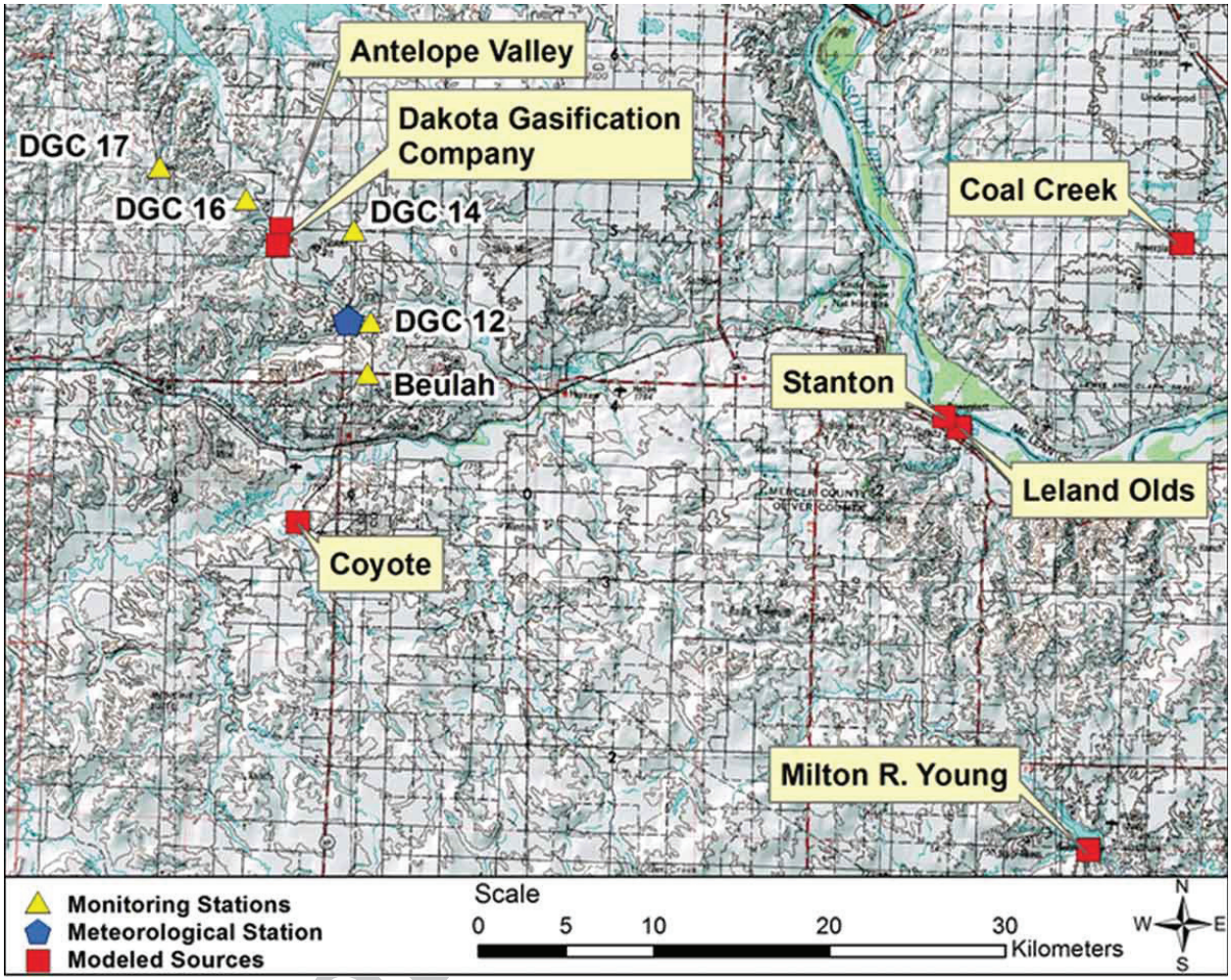
(SHARP)	East Mt. Carmel	206.89	202.82	0.98
	Shrodt	148.16	136.41	0.92
	Gibson Tower	127.12	148.64	1.17

*Design Concentration: 99th percentile peak daily 1-hour maximum, averaged over the years

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

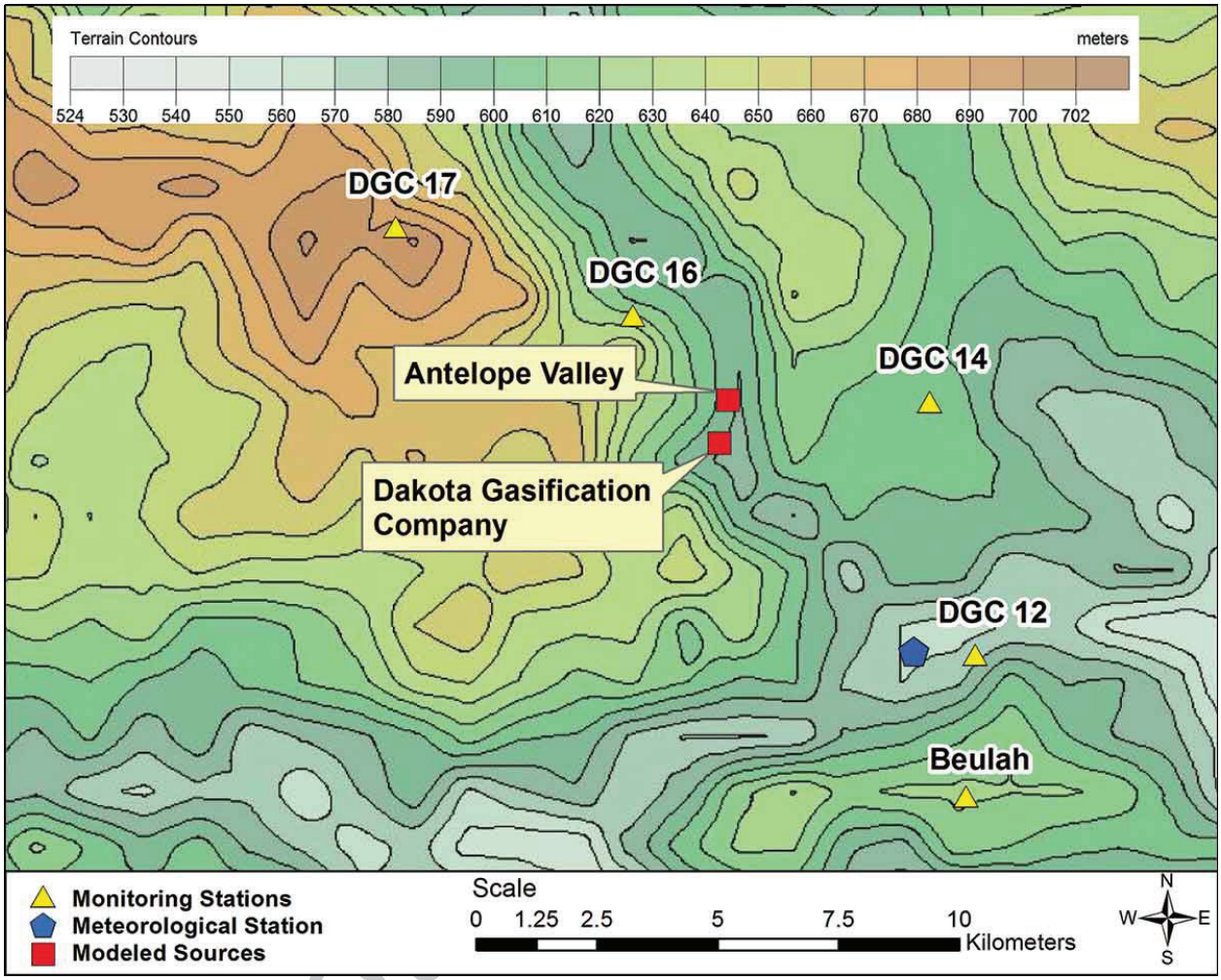
Figure 1. Map of North Dakota Model Evaluation Layout



Downloaded by [Robert Paine] at 04:31 25 August 2015

Accep

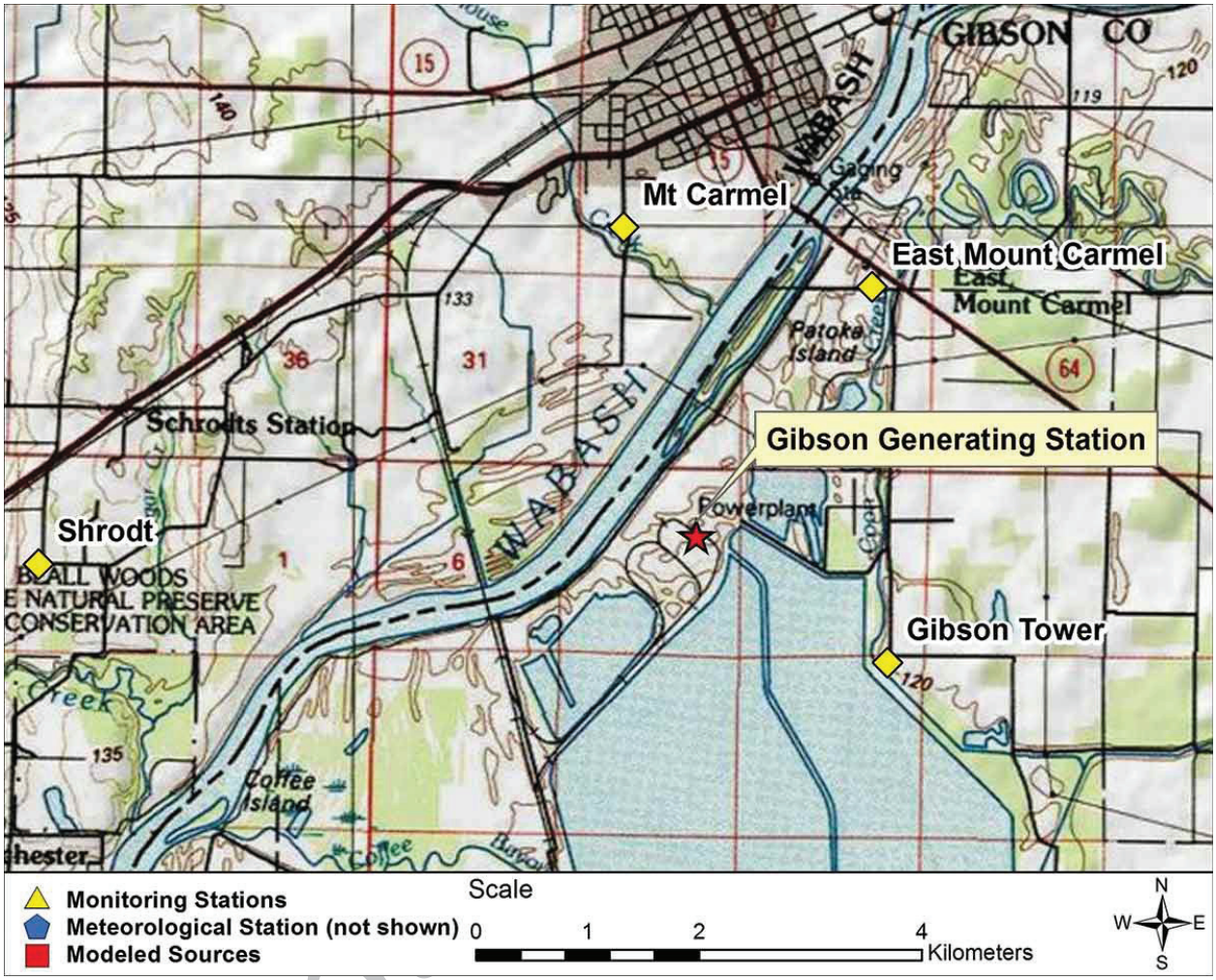
Figure 2. Terrain Around the North Dakota Monitors



Downloaded by [Robert Paine] at 04:31 25 August 2015

Accep

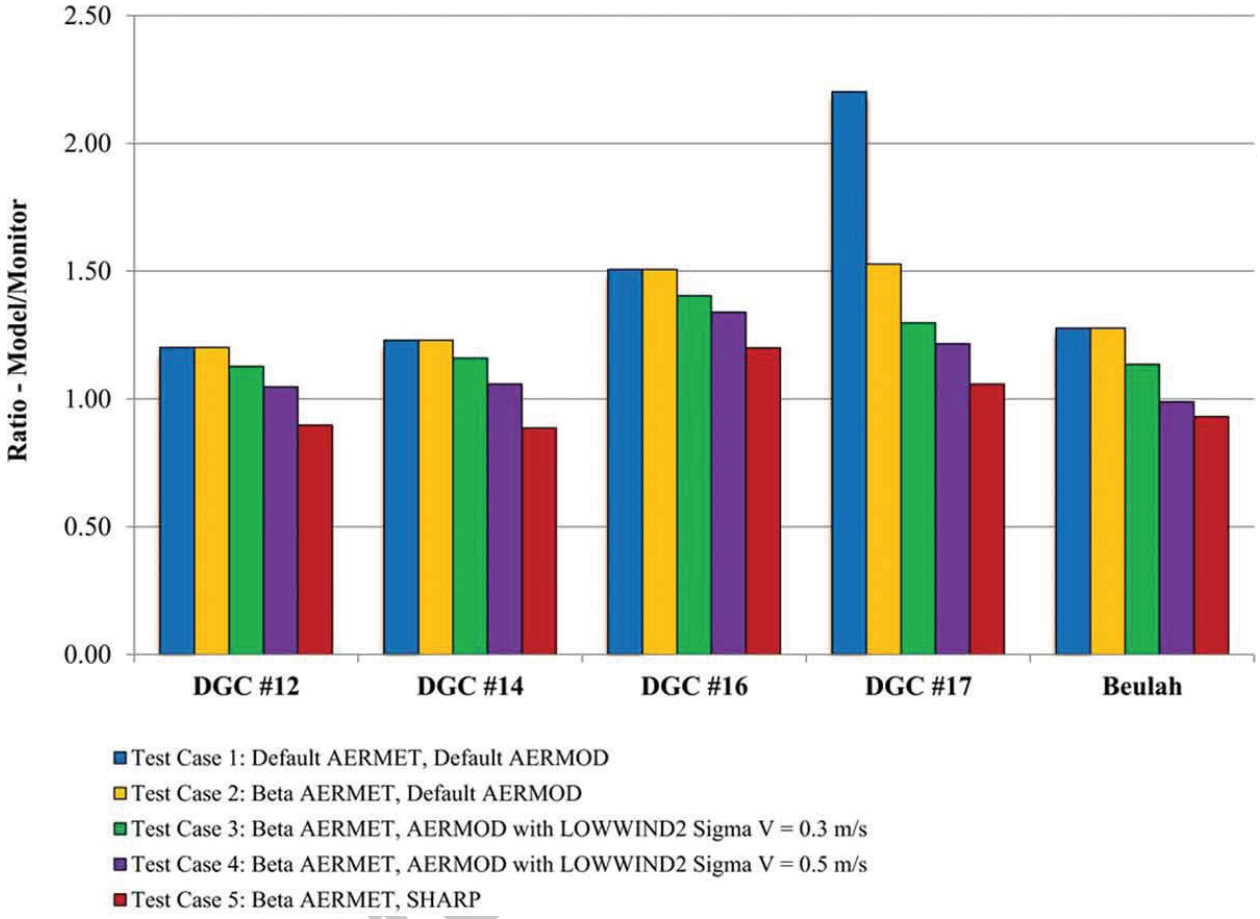
Figure 3. Map of Gibson Model Evaluation Layout



Downloaded by [Robert Paine] at 04:31 25 August 2015

Accep

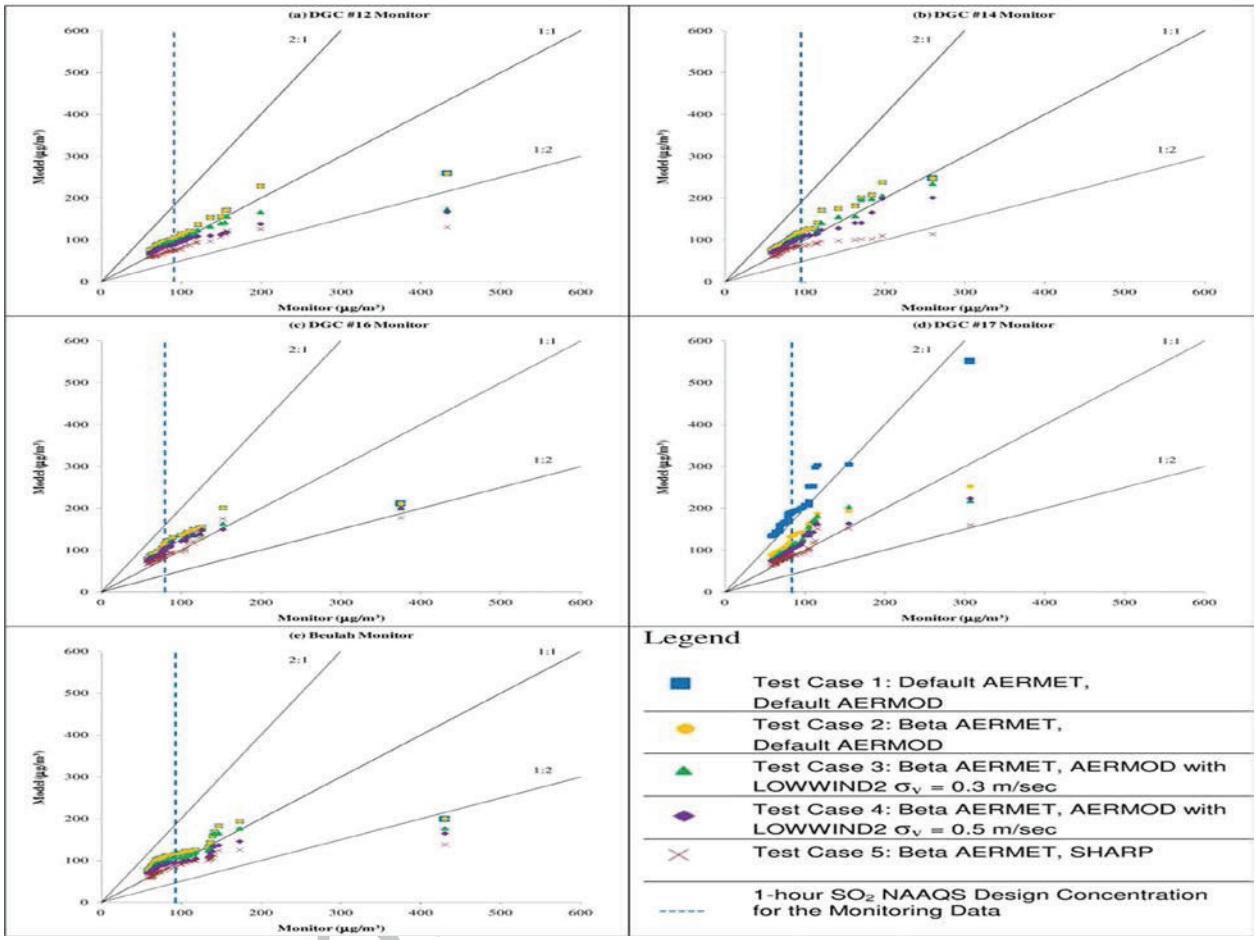
Figure 4. North Dakota Ratio of Monitored to Modeled Design Concentration Values at Specific Monitors



Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepte

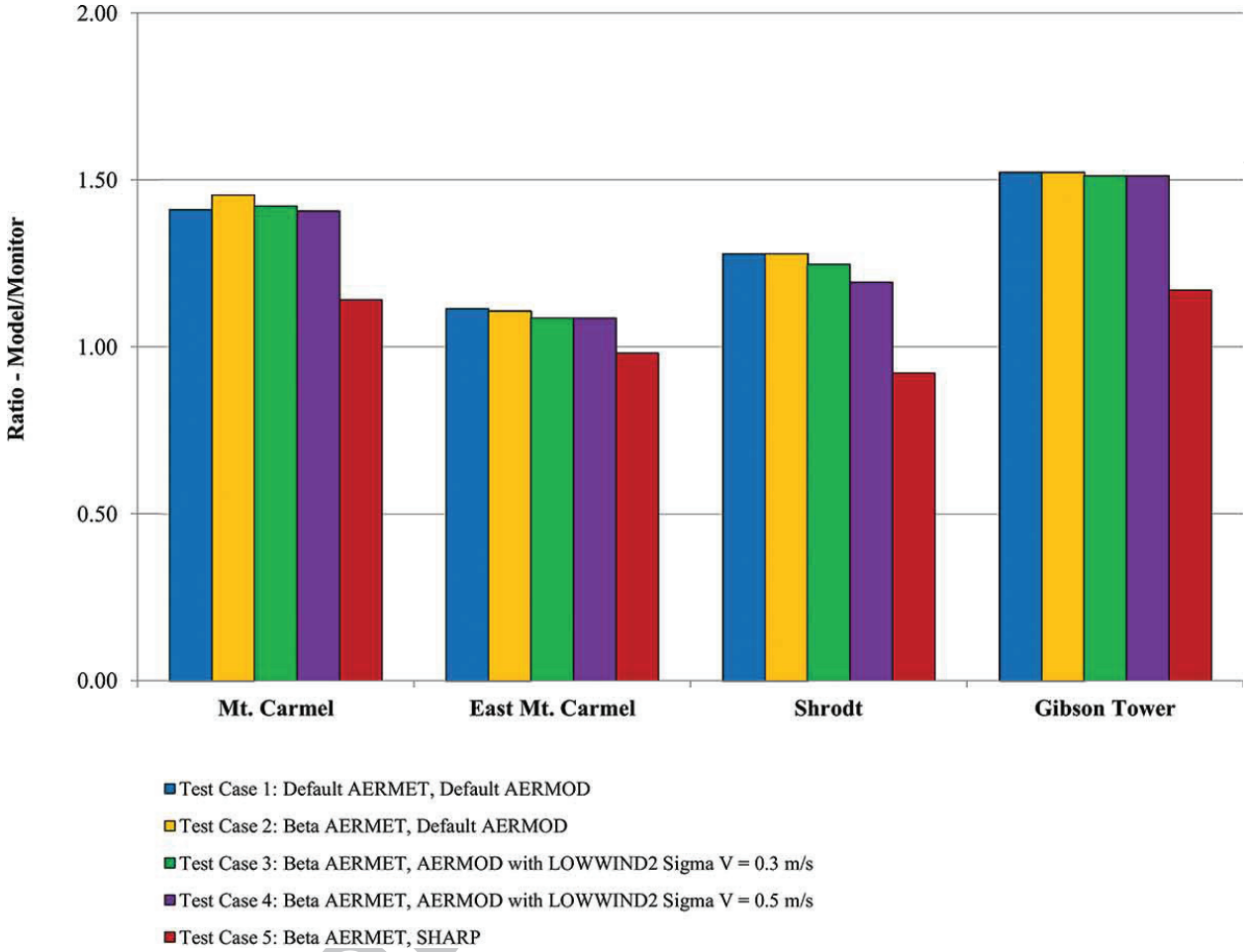
Figure 5. North Dakota Q-Q Plots: Top 50 Daily Maximum 1-hour SO_2 Concentrations. (a) DGC #12 Monitor. (b) DGC#14 Monitor. (c) DGC#16 Monitor. (d) DGC#17 Monitor. (e) Beulah Monitor



Downloaded by [Robert Paine] at 04:31 25 August 2015

Accep

Figure 6. Gibson Ratio of Monitored to Modeled Design Concentration Values at Specific Monitors

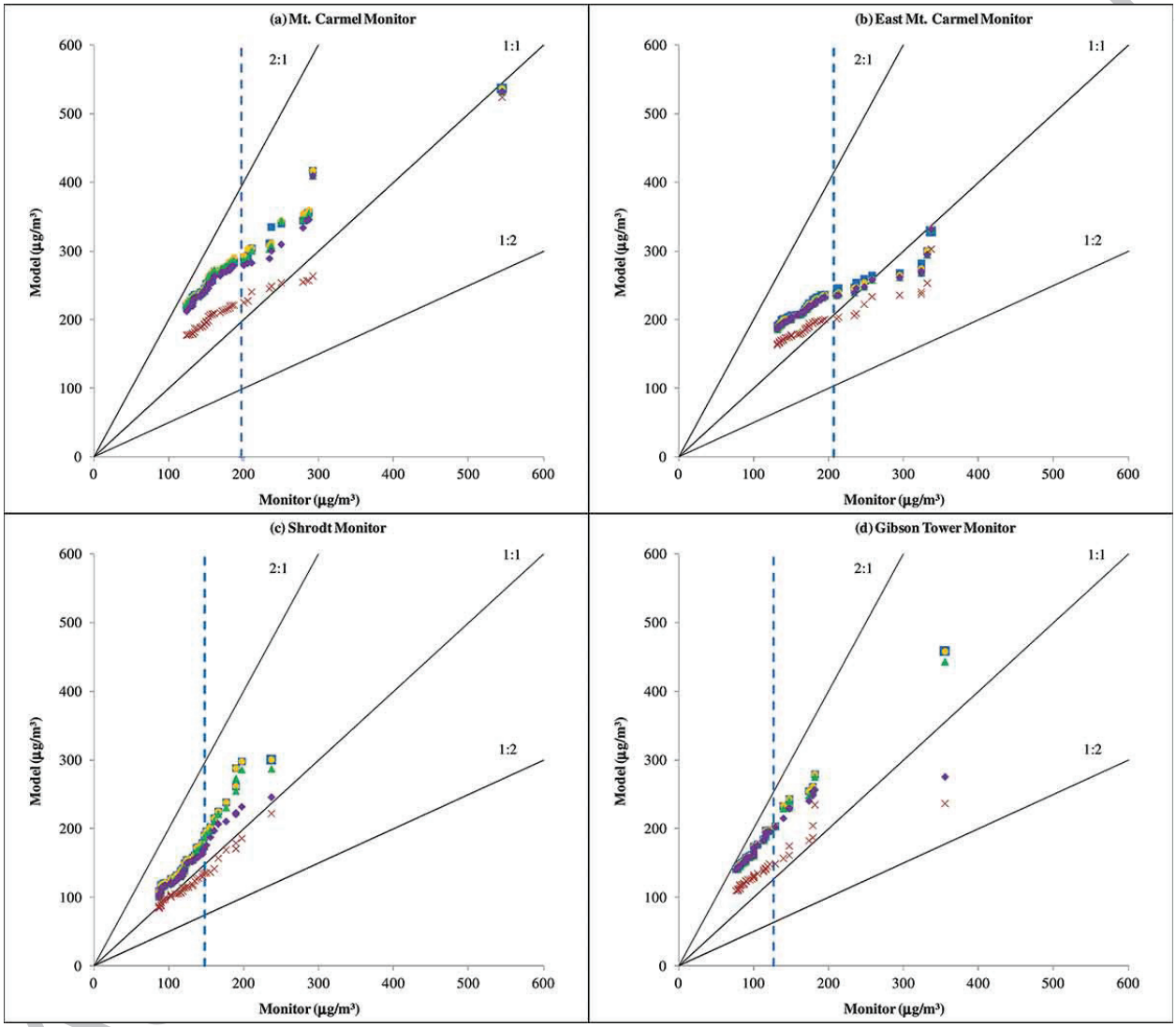


Downloaded by [Robert Paine] at 04:31 25 August 2015

Accep

Figure 7. Gibson Q-Q Plots: Top 50 Daily Maximum 1-hour SO_2 Concentrations.

(a) Mt. Carmel Monitor. (b) East Mt. Carmel Monitor. (c) Shrodt Monitor. (d) Gibson Tower Monitor. For the legend, see Figure 5.



Downloaded by [Robert Paine] at 04:31 25 August 2015

Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases with AERMET ADJ_U* and AERMOD LOWWIND3 Options

Olga Samani and Robert Paine, AECOM

August 22, 2015

Introduction

In a proposed rulemaking published in the July 29, 2015 Federal Register (80 FR 45340), the United States Environmental Protection Agency (EPA) released a revised version of AERMOD (15181), which replaces the previous version of AERMOD dated 14134. EPA proposed refinements to its preferred short-range model, AERMOD, involving low wind conditions. These refinements involve an adjustment to the computation of the friction velocity ("ADJ_U*") in the AERMET meteorological pre-processor and a higher minimum lateral lateral wind speed standard deviation, sigma-v (σ_v), as incorporated into the "LOWWIND3" option. The proposal indicates that "the LOWWIND3 BETA option increases the minimum value of sigma-v from 0.2 to 0.3 m/s, uses the FASTALL approach to replicate the centerline concentration accounting for horizontal meander, but utilizes an effective sigma-y and eliminates upwind dispersion".[1]

This document describes the evaluation of the combined ADJ_U* and LOWWIND3 options as recommended by EPA for incorporated as default options in AERMOD version 15181 on two previously evaluated tall-stack databases as described by Paine et al. (2015)[2]. Here we compare the model evaluation results of these new options relative to the various modeling options previously tested model options in AERMOD version 14134.

Modeling Options and Databases for Testing

The meteorological data, emissions, and receptors used in this analysis were identical to Paine et al. (2015) analysis. Two AERMET/AERMOD model configurations were tested for the two field study databases.

- AERMET and AERMOD in default mode with version 15181.
- Low wind beta option for AERMET (ADJ_U*) and the LOWWIND3 option for AERMOD (LOWWIND3 automatically sets minimum σ_v value to 0.3 m/sec) with version 15181.

The results were compared to the five AERMET/AERMOD model configurations previously tested in Paine et al. (2015) with version 13350.

- AERMET and AERMOD in default mode.

---

[1] Addendum User's Guide for the AMS/EPA Regulatory Model – AERMOD http://www.epa.gov/ttn/scram/models/aermod/aermod_userguide.zip

[2] Paine, R., Samani, O., Kaplan, M. Knipping, E., and Kumar, N. Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases. Pending publications (as of August, 2015) in the Journal of Air & Waste Management Association.

- Low wind beta option for AERMET and default options for AERMOD (minimum σ_v value of 0.2 m/sec).
- Low wind beta option for AERMET and the LOWWIND2 option for AERMOD (minimum σ_v value of 0.3 m/sec).
- Low wind beta option for AERMET and the LOWWIND2 option for AERMOD (minimum σ_v value of 0.5 m/sec).
- Low wind beta option for AERMET and AERMOD run in sub-hourly mode (SHARP).

All model applications used one wind level, a minimum wind speed of 0.5 m/sec, and also used hourly average meteorological data with the exception of SHARP applications.

The Mercer County, North Dakota and Gibson Generating Station, Indiana databases were selected for the low wind model evaluation due to the following attributes:

- They feature multiple years of hourly SO_2 monitoring at several sites.
- Emissions are dominated by tall stack sources that are available from continuous emission monitors.
- They include sub-hourly meteorological data so that the SHARP modeling approach could be tested as well.
- There is representative meteorological data from a single-level station typical of (or obtained from) airport-type data.

Model Evaluation Results

The model evaluation employed metrics that address two basic areas:

1) 1-hour SO_2 NAAQS Design Concentration averaged over the years modeled at each monitor.

An operational metric that is tied to the form of the 1-hour SO_2 NAAQS is the "design concentration" (99th percentile of the peak daily 1-hour maximum values). This tabulated statistic was developed for each modeled case and for each individual monitor for each database evaluated.

2) Quantile-Quantile Plots for each monitor.

Operational performance of models for predicting compliance with air quality regulations, especially those involving a peak or near-peak value at some unspecified time and location, can be assessed with quantile-quantile (Q-Q) plots, which are widely used in AERMOD evaluations. Q-Q plots are created by independently ranking (from largest to smallest) the predicted and the observed concentrations from a set of predictions initially paired in time and space. A robust model would have all points on the diagonal (45-degree) line.

North Dakota Database Model Evaluation Procedures and Results

AERMOD was run for the two version 15181 configurations described above to compute the 1-hour daily maximum 99th percentile averaged over four years at the five ambient monitoring locations. A regional background of 10 µg/m^3 was added to the AERMOD modeled predictions, as determined from a review of rural monitors unaffected by local sources.

The 1-hour SO_2 design concentrations and ratios of the modeled (including the background of 10 µg/m^3) to monitored design concentrations for the North Dakota evaluation database are summarized in Table 1 and graphically plotted in Figure 2. The results of the Paine et al. (2015) model evaluation analysis for the five options (version 13350) is shown here along with the results of the new evaluation with AERMOD version 15181.

The overall results indicate that the predicted-to-observed ratios are generally greater than 1.0 and AERMOD version 15181 still over-predicts even with use of the proposed ADJ_u* and the LOWWIND3 options. The low wind options show improvement relative to the default options at all monitors, especially the monitor in higher terrain (DGC #17).

As shown in Figure 1, and as expected the results for the new model with low wind options are very close to the AERMOD version 14134 model with ADJ_U* and LOWWIND2. The results of the two model versions with default options are also very close to each other.

The Q-Q plots of the ranked top fifty daily maximum 1-hour SO_2 concentrations for predictions and observations are shown in Figure 2 (a-e) for AERMOD version 15181 default and low wind options. For the convenience of the reader, a vertical dashed line is included in each Q-Q plot to indicate the observed design concentration. In general, the Q-Q plots indicate the following:

- For all of the monitors, to the left of the design concentration line, the ranked predictions are at or higher than observations.
- To the right of the design concentration line, some of the ranked modeled values are lower than the ranked observed levels (although this is not the case for DGC #17).

Gibson Generating Station Database Model Evaluation Procedures and Results

AERMOD was run for the two version 15181 configurations described above to compute the 1-hour daily maximum 99th percentile averaged over three years at the four ambient monitors. A regional background of 18 µg/m^3 was added to the AERMOD modeled predictions.

The ratio of the modeled (including the background of 18 µg/m^3) to monitored concentrations is summarized in Table 2 and graphically plotted in Figure 3, and these ratios are generally greater than 1.0. The current version of AERMOD (version 15181) run in default mode showed no changes from the previous version's default results, still having over-predictions of about 10-50%. The proposed low wind options provided modest improvements in performance relative to the default options, while still showing an over-prediction tendency at each monitor.

The Q-Q plots of the ranked top fifty daily maximum 1-hour SO_2 concentrations for predictions and observations are shown in Figure 4 (a-d). As in the case of the North Dakota evaluation results, the Gibson plots indicate the following:

- For all of the monitors, to the left of the design concentration line, the ranked predictions are at or higher than observations.
- To the right of the design concentration line, some of the ranked modeled values are lower than the ranked observed levels (although this is not the case for Shrodt or Mt. Carmel for the low wind options).

Conclusions

The model evaluation results for the new version of AERMOD (version 15181) on the two databases showed that the proposed low wind options (ADJ_U* and LOWWIND3) perform better than the default options, while still overpredicting the design concentration at each monitor in both databases. Therefore, in conjunction with other evaluations that EPA reported at the 11th modeling conference on August 12, 2015, we recommend that EPA adopt the proposed low wind options default options, and allow their use in the interim for all modeling applications.

Table 1: North Dakota Ratio of Monitored to Modeled Design Concentrations*

Model Version	Test Case	Monitor	Observed	Predicted	Ratio
13350 (previously reported results)	Default AERMET, Default AERMOD	DGC#12	91.52	109.96	1.20
		DGC#14	95.00	116.84	1.23
		DGC#16	79.58	119.94	1.51
		DGC#17	83.76	184.48	2.20
		Beulah	93.37	119.23	1.28
15181	Default AERMET, Default AERMOD	DGC#12	91.52	110.77	1.21
		DGC#14	95.00	117.51	1.24
		DGC#16	79.58	120.30	1.51
		DGC#17	83.76	184.49	2.20
		Beulah	93.37	120.31	1.29
13350 (previously reported results)	Beta AERMET, Default AERMOD	DGC#12	91.52	109.96	1.20
		DGC#14	95.00	116.84	1.23
		DGC#16	79.58	119.94	1.51
		DGC#17	83.76	127.93	1.53
		Beulah	93.37	119.23	1.28
13350 (previously reported results)	Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.3 m/sec	DGC#12	91.52	103.14	1.13
		DGC#14	95.00	110.17	1.16
		DGC#16	79.58	111.74	1.40
		DGC#17	83.76	108.69	1.30
		Beulah	93.37	106.05	1.14
13350 (previously reported results)	Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.5 m/sec	DGC#12	91.52	95.86	1.05
		DGC#14	95.00	100.50	1.06
		DGC#16	79.58	106.65	1.34
		DGC#17	83.76	101.84	1.22
		Beulah	93.37	92.32	0.99
15181	Beta AERMET, AERMOD with LOWWIND3	DGC#12	91.52	98.75	1.08
		DGC#14	95.00	112.09	1.18
		DGC#16	79.58	111.20	1.40
		DGC#17	83.76	108.76	1.30
		Beulah	93.37	99.54	1.07
13350 (previously reported results)	SHARP	DGC#12	91.52	82.18	0.90
		DGC#14	95.00	84.24	0.89
		DGC#16	79.58	95.47	1.20
		DGC#17	83.76	88.60	1.06
		Beulah	93.37	86.98	0.93

*Design Concentration: 99th percentile peak daily 1-hour maximum, averaged over the years modeled and monitored.

Figure 1: North Dakota Ratio of Monitored to Modeled Design Concentration Values

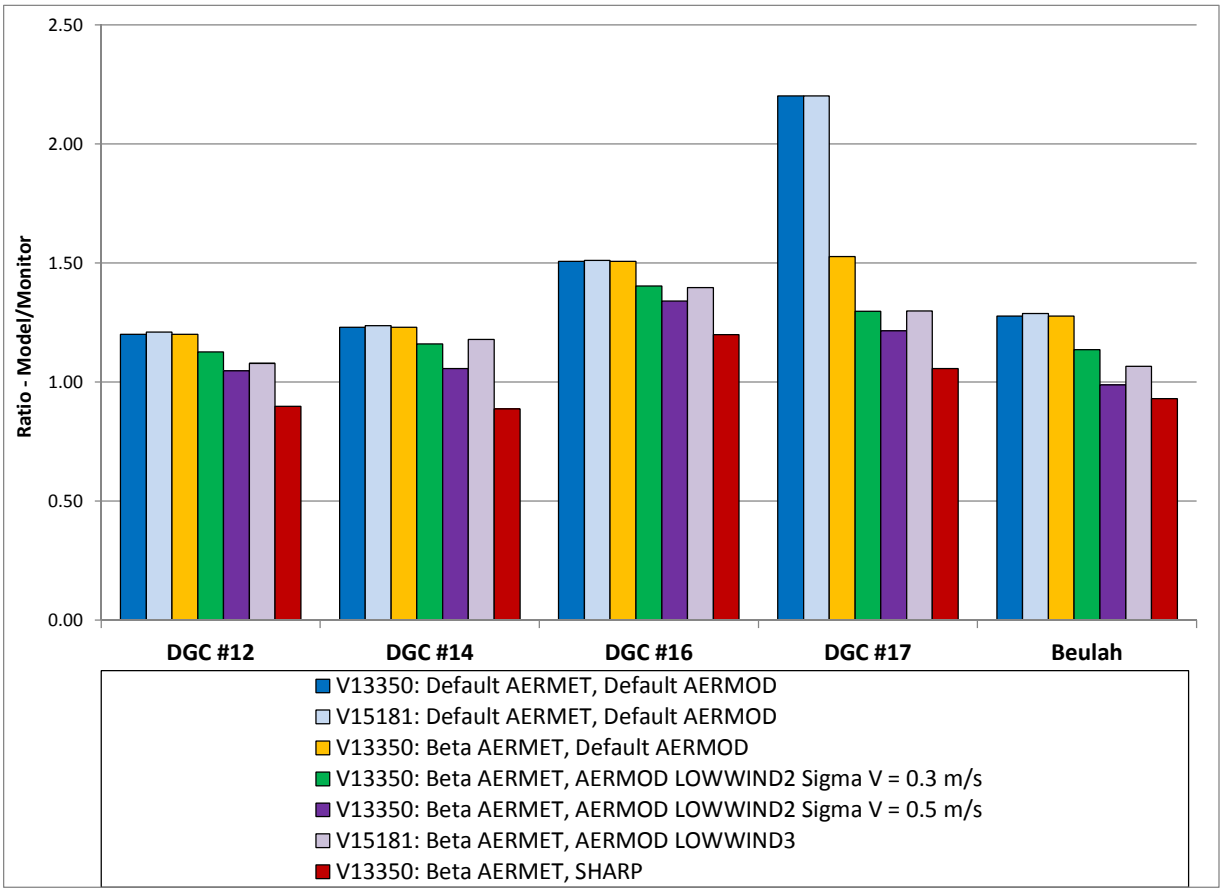
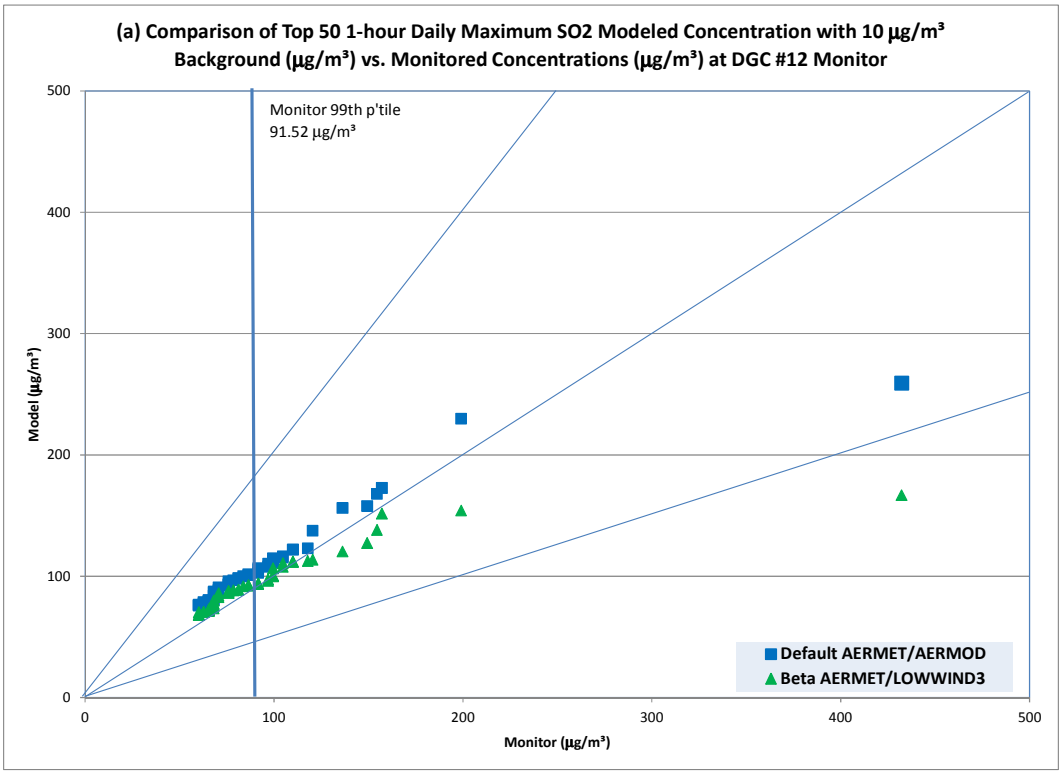
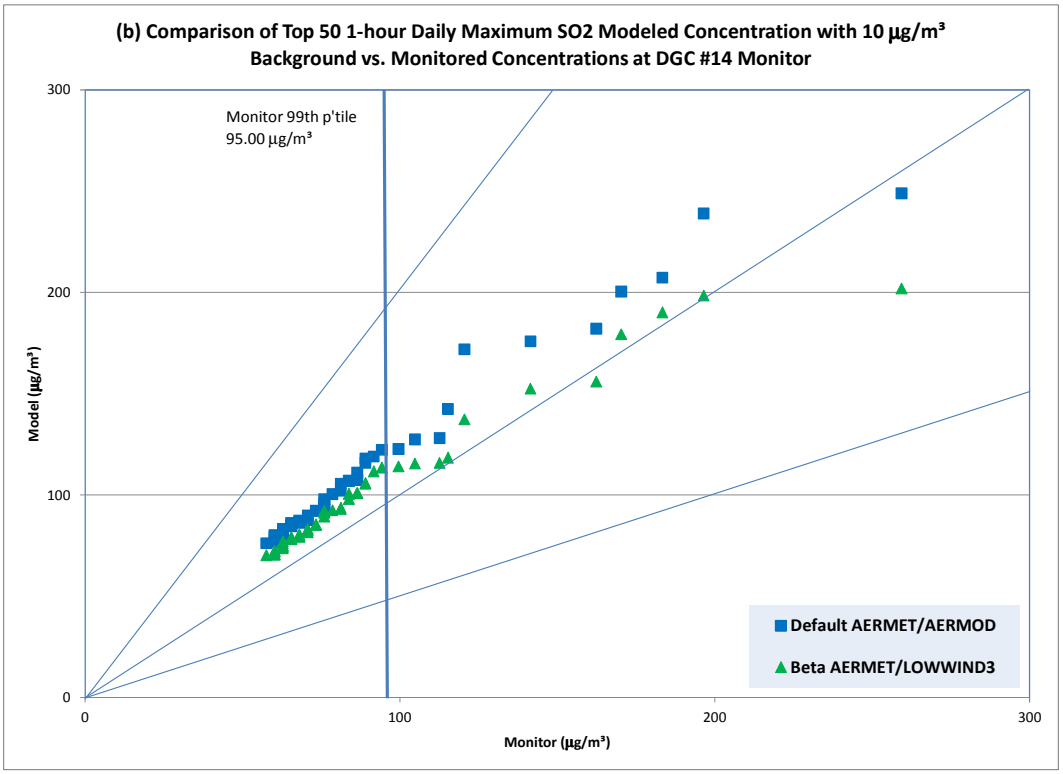
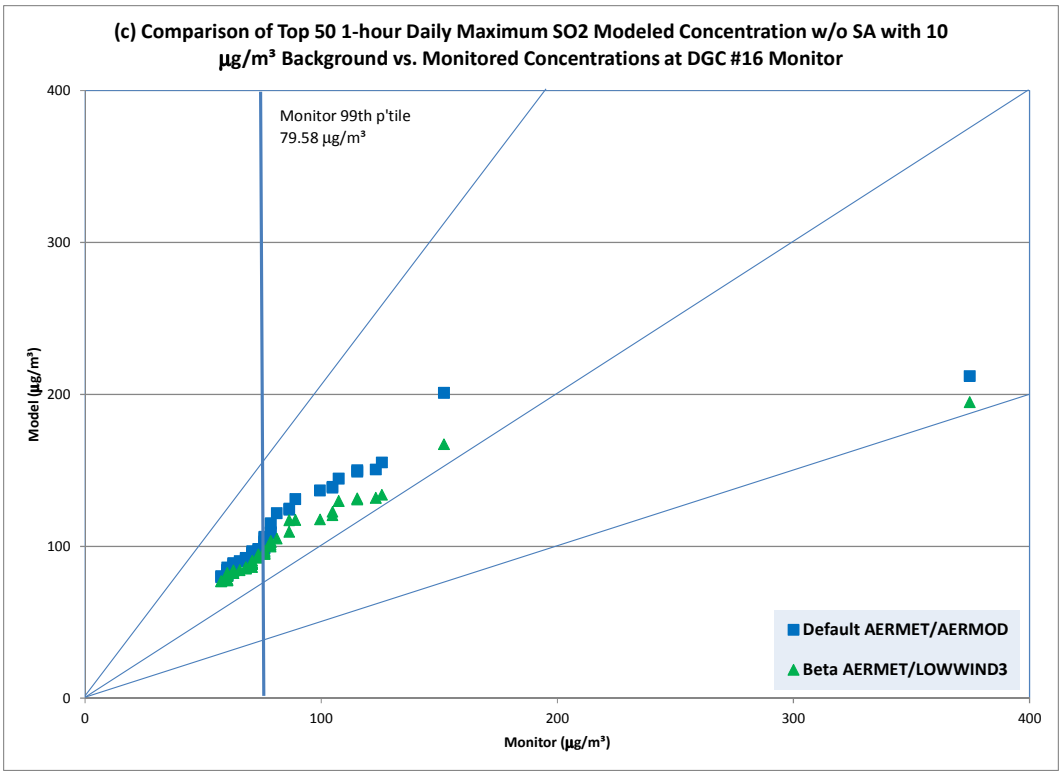
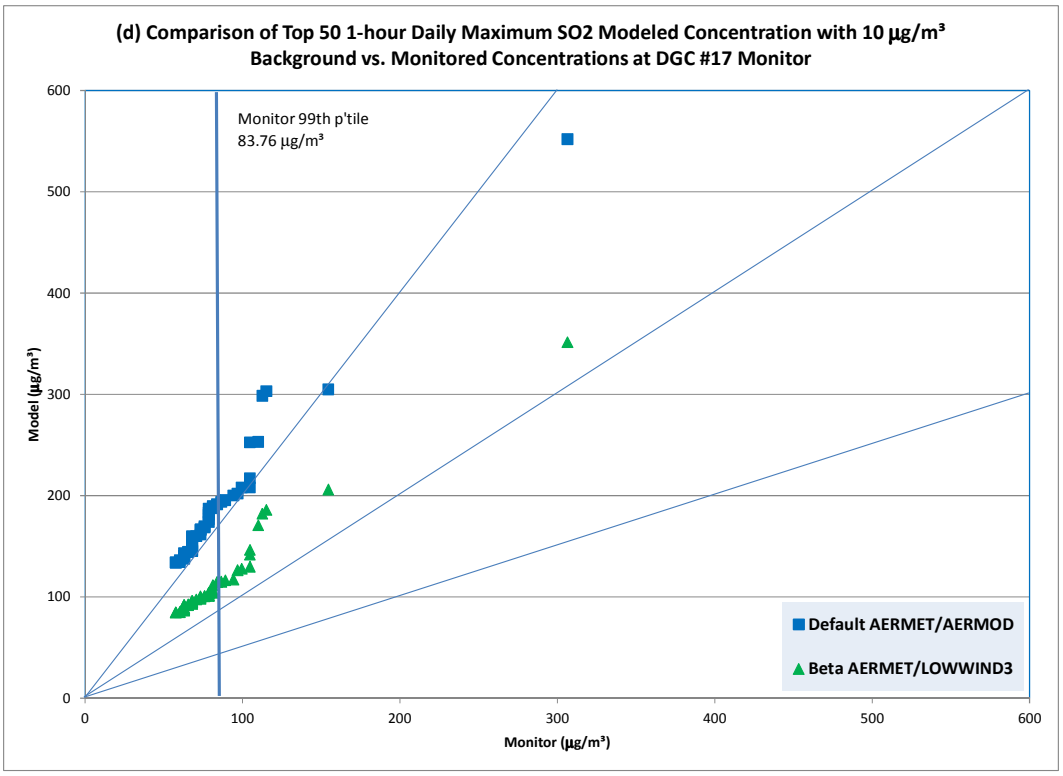


Figure 2: North Dakota Q-Q Plots: Top 50 Daily Maximum 1-hour SO_2 Concentrations. (a) DGC #12 Monitor. (b) DGC#14 Monitor. (c) DGC#16 Monitor. (d) DGC#17 Monitor. (e) Beulah Monitor






(c) Comparison of Top 50 1-hour Daily Maximum SO2 Modeled Concentration w/o SA with 10 µg/m³ Background vs. Monitored Concentrations at DGC #16 Monitor
Monitor 99th p'tile
79.58 µg/m³
Model (µg/m³)
Monitor (µg/m³)
0
100
200
300
400
Default AERMET/AERMOD
Beta AERMET/LOWWIND3


(d) Comparison of Top 50 1-hour Daily Maximum SO2 Modeled Concentration with 10 µg/m³ Background vs. Monitored Concentrations at DGC #17 Monitor
Monitor 99th p'tile
83.76 µg/m³
Model (µg/m³)
Monitor (µg/m³)
0
100
200
300
400
500
600
Default AERMET/AERMOD
Beta AERMET/LOWWIND3

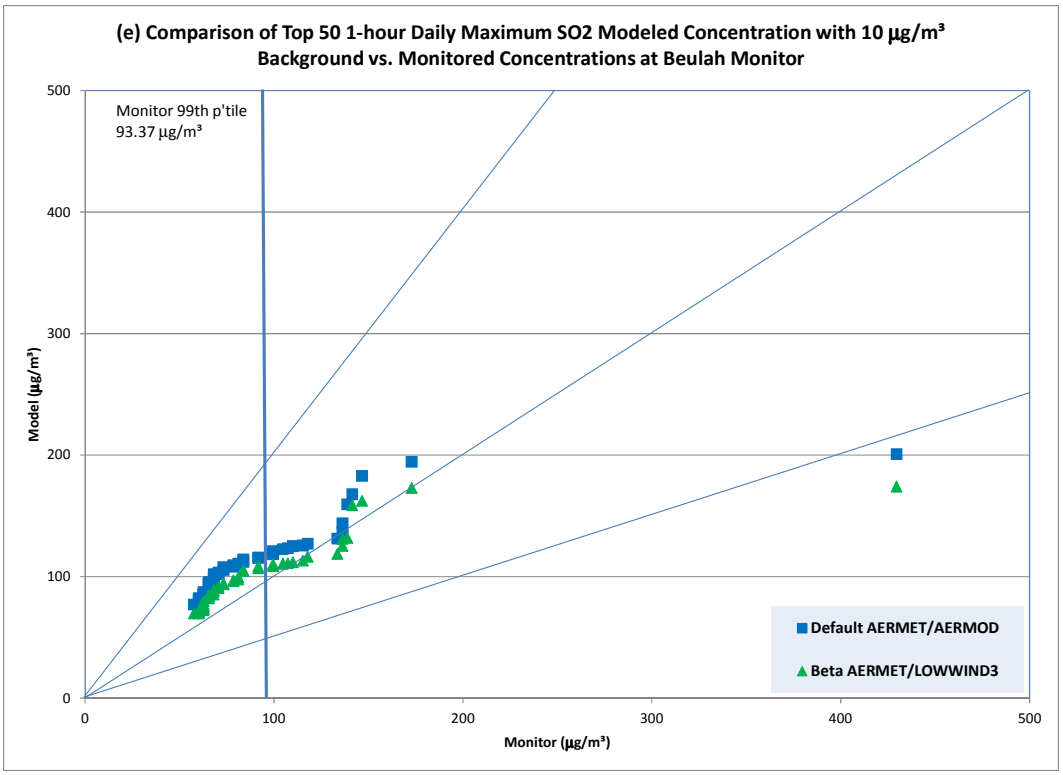

(e) Comparison of Top 50 1-hour Daily Maximum SO2 Modeled Concentration with 10 µg/m³ Background vs. Monitored Concentrations at Beulah Monitor
Monitor 99th p'tile
93.37 µg/m³
Model (µg/m³)
Monitor (µg/m³)
0
100
200
300
400
500
Default AERMET/AERMOD
Beta AERMET/LOWWIND3

Table 2: Gibson Ratio of Monitored to Modeled Design Concentrations*

Model Version	Test Case	Monitor	Observed	Predicted	Ratio
13350 (previously reported results)	Default AERMET, Default AERMOD	Mt. Carmel	197.25	278.45	1.41
		East Mt.	206.89	230.74	1.12
		Shrodt	148.16	189.63	1.28
		Gibson Tower	127.12	193.71	1.52
15181	Default AERMET, Default AERMOD	Mt. Carmel	197.25	278.45	1.41
		East Mt.	206.89	230.74	1.12
		Shrodt	148.16	189.63	1.28
		Gibson Tower	127.12	193.71	1.52
13350 (previously reported results)	Beta AERMET, Default AERMOD	Mt. Carmel	197.25	287.16	1.46
		East Mt.	206.89	229.22	1.11
		Shrodt	148.16	189.63	1.28
		Gibson Tower	127.12	193.71	1.52
13350 (previously reported results)	Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.3 m/sec	Mt. Carmel	197.25	280.32	1.42
		East Mt.	206.89	224.65	1.09
		Shrodt	148.16	184.82	1.25
		Gibson Tower	127.12	192.22	1.51
13350 (previously reported results)	Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.5 m/sec	Mt. Carmel	197.25	277.57	1.41
		East Mt.	206.89	224.65	1.09
		Shrodt	148.16	176.81	1.19
		Gibson Tower	127.12	192.22	1.51
15181	Beta AERMET, AERMOD with LOWWIND3	Mt. Carmel	197.25	276.12	1.40
		East Mt.	206.89	217.05	1.05
		Shrodt	148.16	175.42	1.18
		Gibson Tower	127.12	175.92	1.38
13350 (previously reported results)	SHARP	Mt. Carmel	197.25	225.05	1.14
		East Mt.	206.89	202.82	0.98
		Shrodt	148.16	136.41	0.92
		Gibson Tower	127.12	148.64	1.17

*Design Concentration: 99th percentile peak daily 1-hour maximum, averaged over the years modeled and monitored.

Figure 3: Gibson Ratio of Monitored to Modeled Design Concentration Values

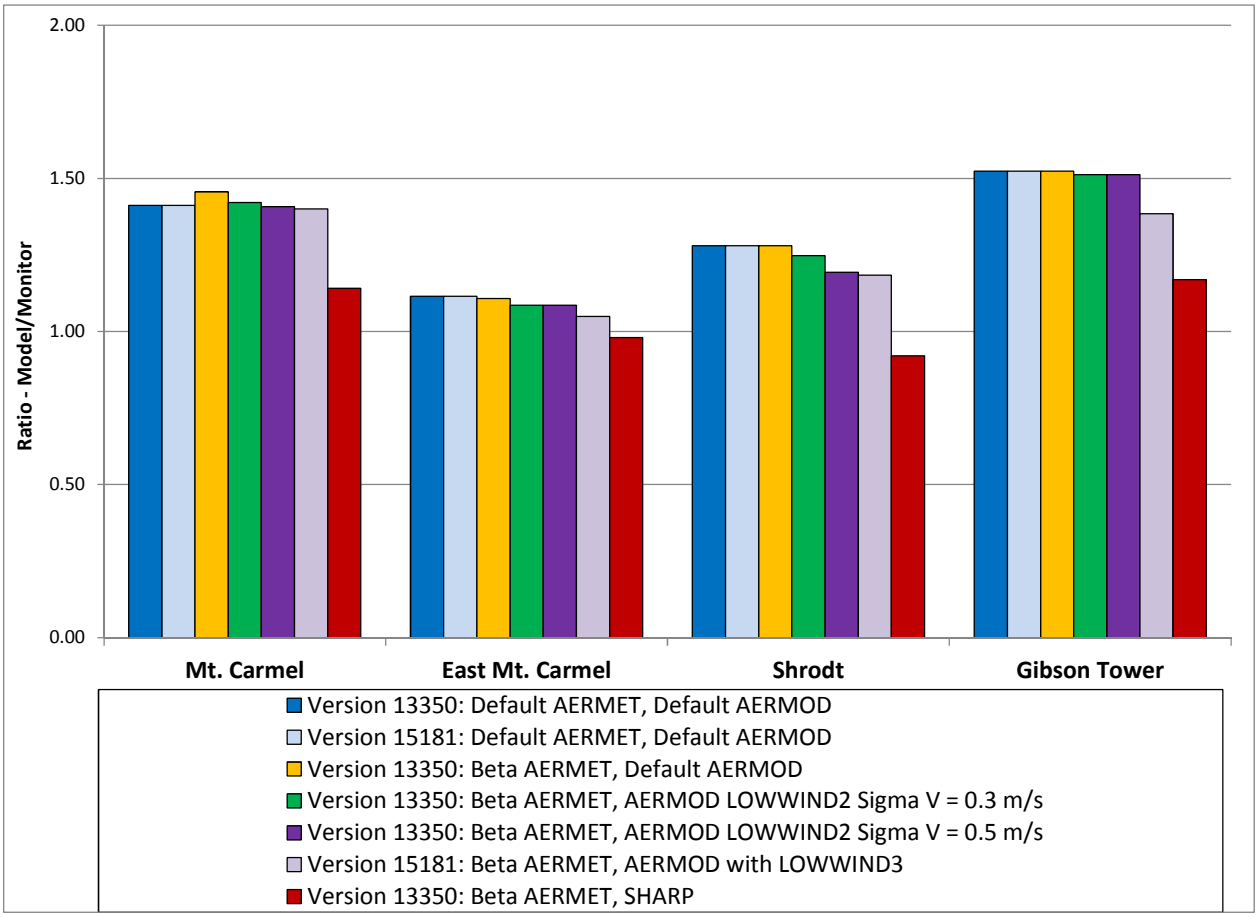
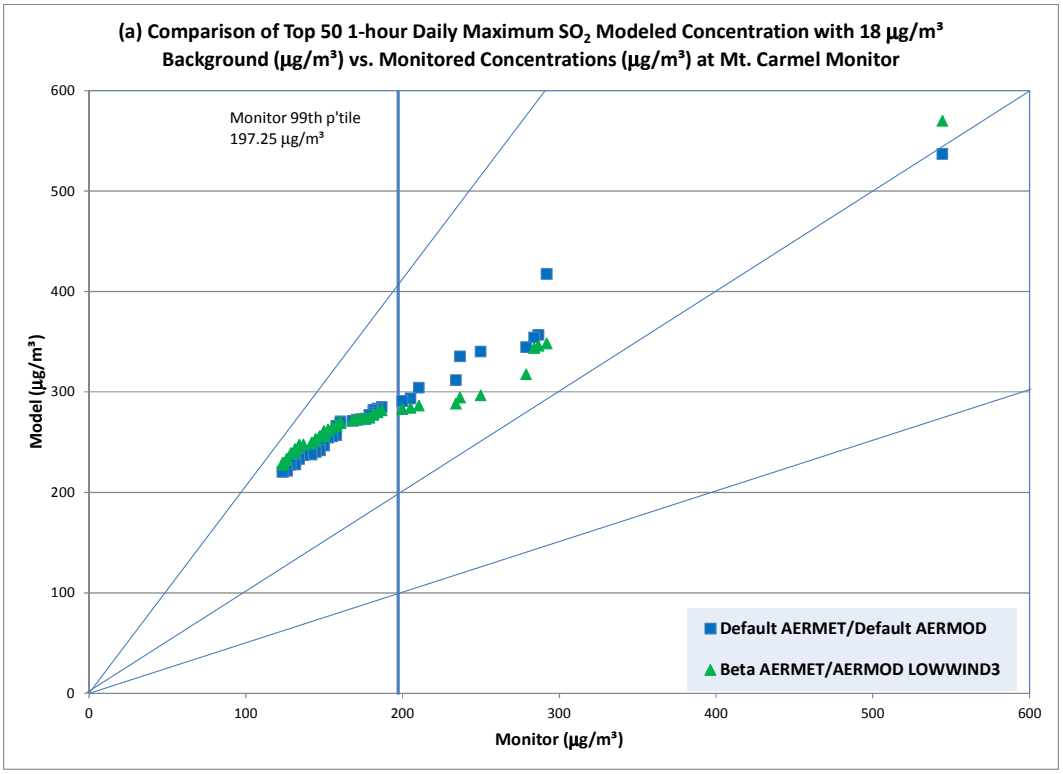
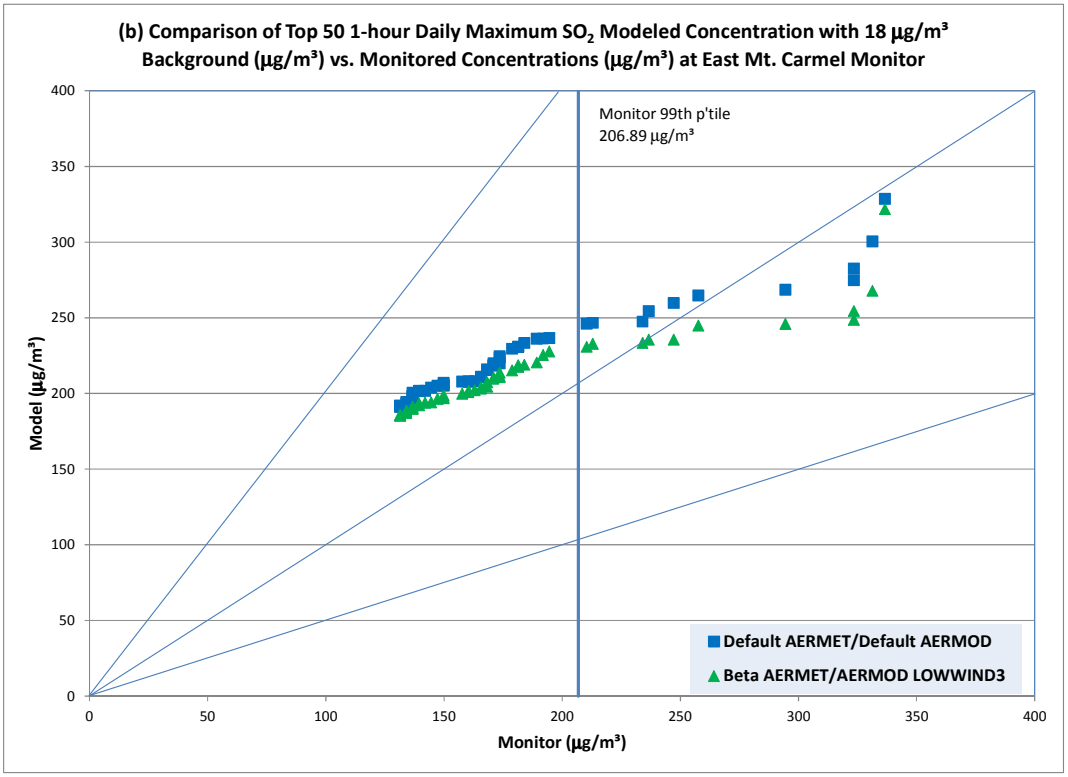
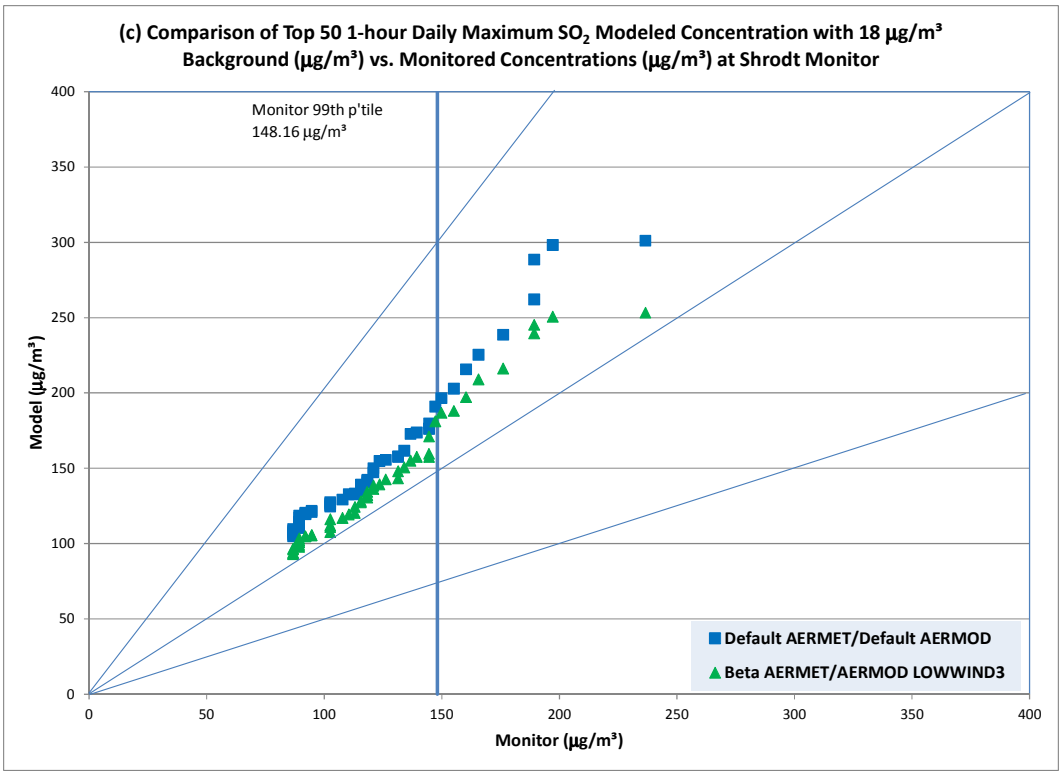
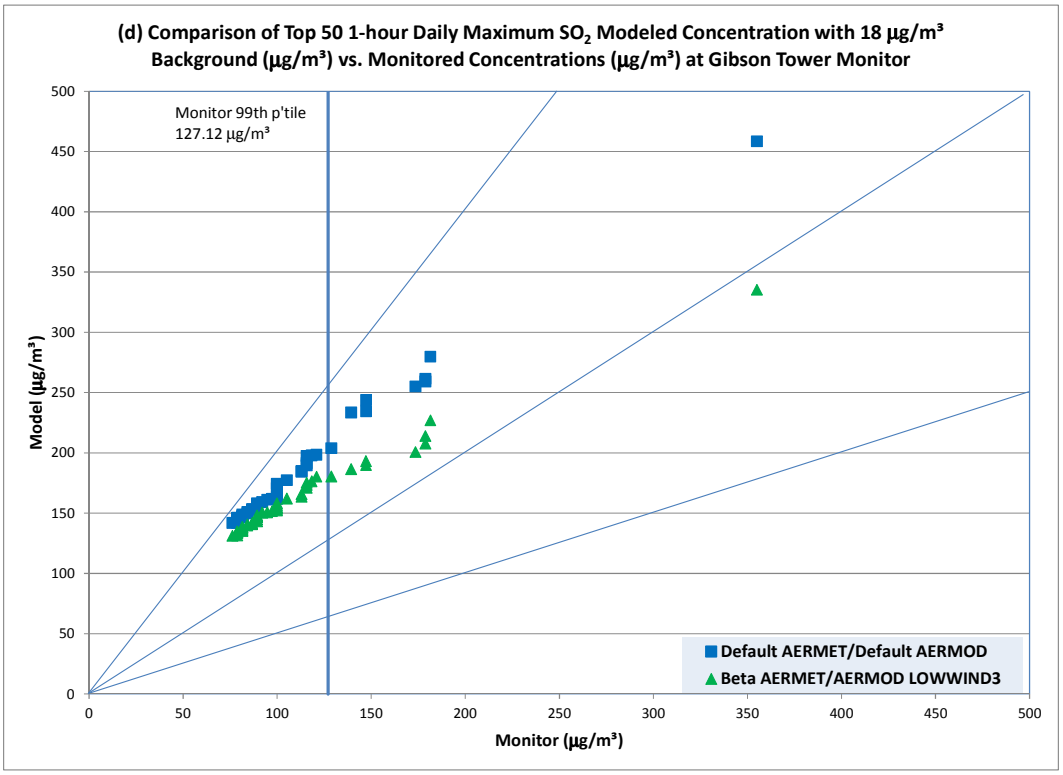


Figure 4: Gibson Q-Q Plots: Top 50 Daily Maximum 1-hour SO_2 Concentrations.
(a) Mt. Carmel Monitor. (b) East Mt. Carmel Monitor. (c) Shrodt Monitor. (d) Gibson Tower Monitor






(c) Comparison of Top 50 1-hour Daily Maximum SO_2 Modeled Concentration with 18 µg/m³ Background (µg/m³) vs. Monitored Concentrations (µg/m³) at Shrodt Monitor
Monitor 99th p'tile
148.16 µg/m³
Model (µg/m³)
Monitor (µg/m³)
Default AERMET/Default AERMOD
Beta AERMET/AERMOD LOWWIND3
0
50
100
150
200
250
300
350
400

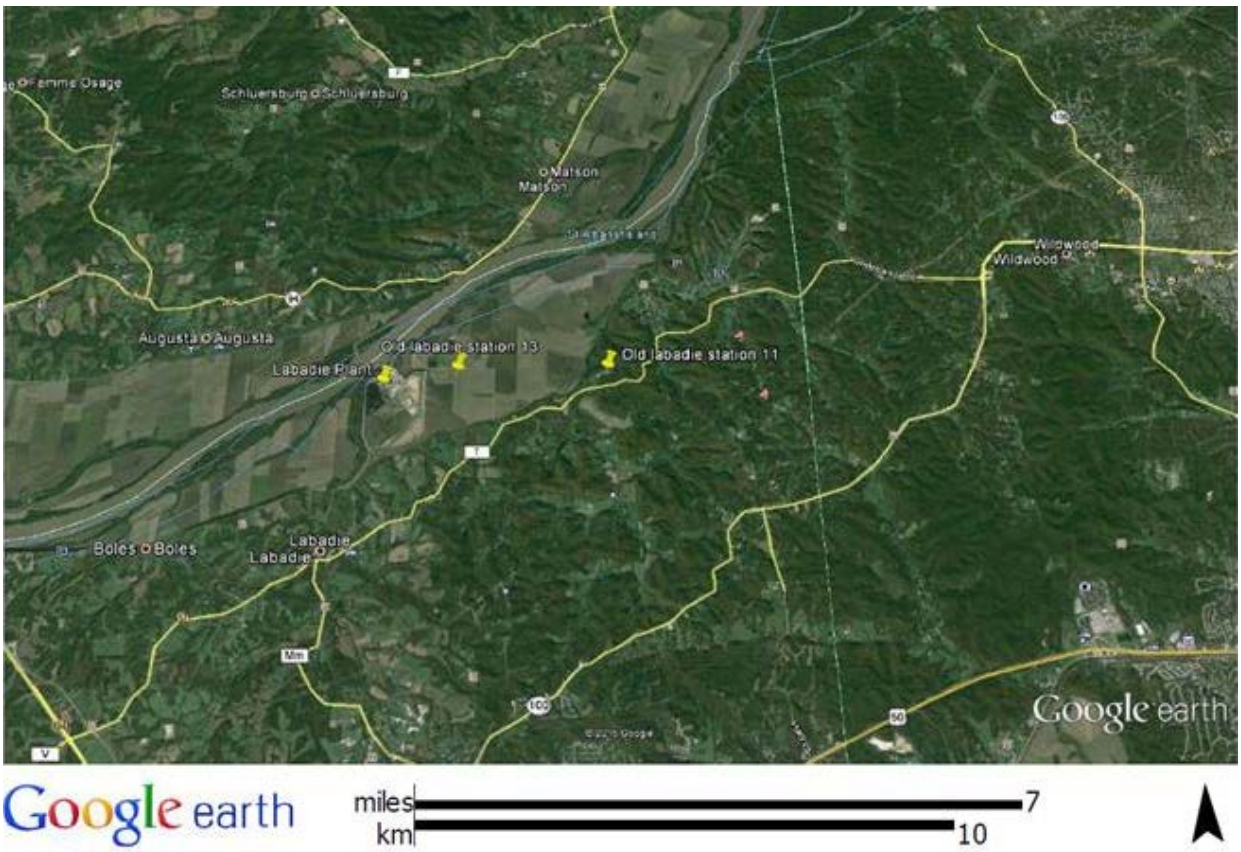

(d) Comparison of Top 50 1-hour Daily Maximum SO_2 Modeled Concentration with 18 µg/m³ Background (µg/m³) vs. Monitored Concentrations (µg/m³) at Gibson Tower Monitor
Monitor 99th p'tile
127.12 µg/m³
Model (µg/m³)
Monitor (µg/m³)
Default AERMET/Default AERMOD
Beta AERMET/AERMOD LOWWIND3
0
50
100
150
200
250
300
350
400
450
500

Appendix D

Comparison of Wind Roses from Jefferson City and Spirit of St. Louis Airports to Historical Tall-Tower Labadie Meteorological Data

Ameren has found in archived records that during the calendar year 1984, on-site meteorological data were taken at a 10-m tower ("Station 13") as well as from the 50-m and 85-m levels on a tall-tower ("Station 17") more reflective of stack-top conditions (213 meters) at the sites shown in Figure 1.

Figure 1: Meteorological Monitoring Sites from 1984 Data Collection Near Labadie



These stations were operated by Ameren (then Union Electric) experienced field personnel according to the applicable quality assurance guidance at that time.

Unfortunately, the hourly data gathered from this meteorological network was stored on 9-track reel tapes that no longer exist. However, hard copies of wind rose plots of the data are available for the various meteorological levels, as shown in Figure 2 for the on-site 10-m level, Figure 3 for the on-site 50-m level, and Figure 4 for the on-site 85-m level. These can be compared to the wind roses available for the KJEF and KSUS airports, available in Figures 5 and 6, respectively.

Figure 2: 1984 Wind Rose for 10-m On-site Meteorological Data Near the Labadie Energy Center

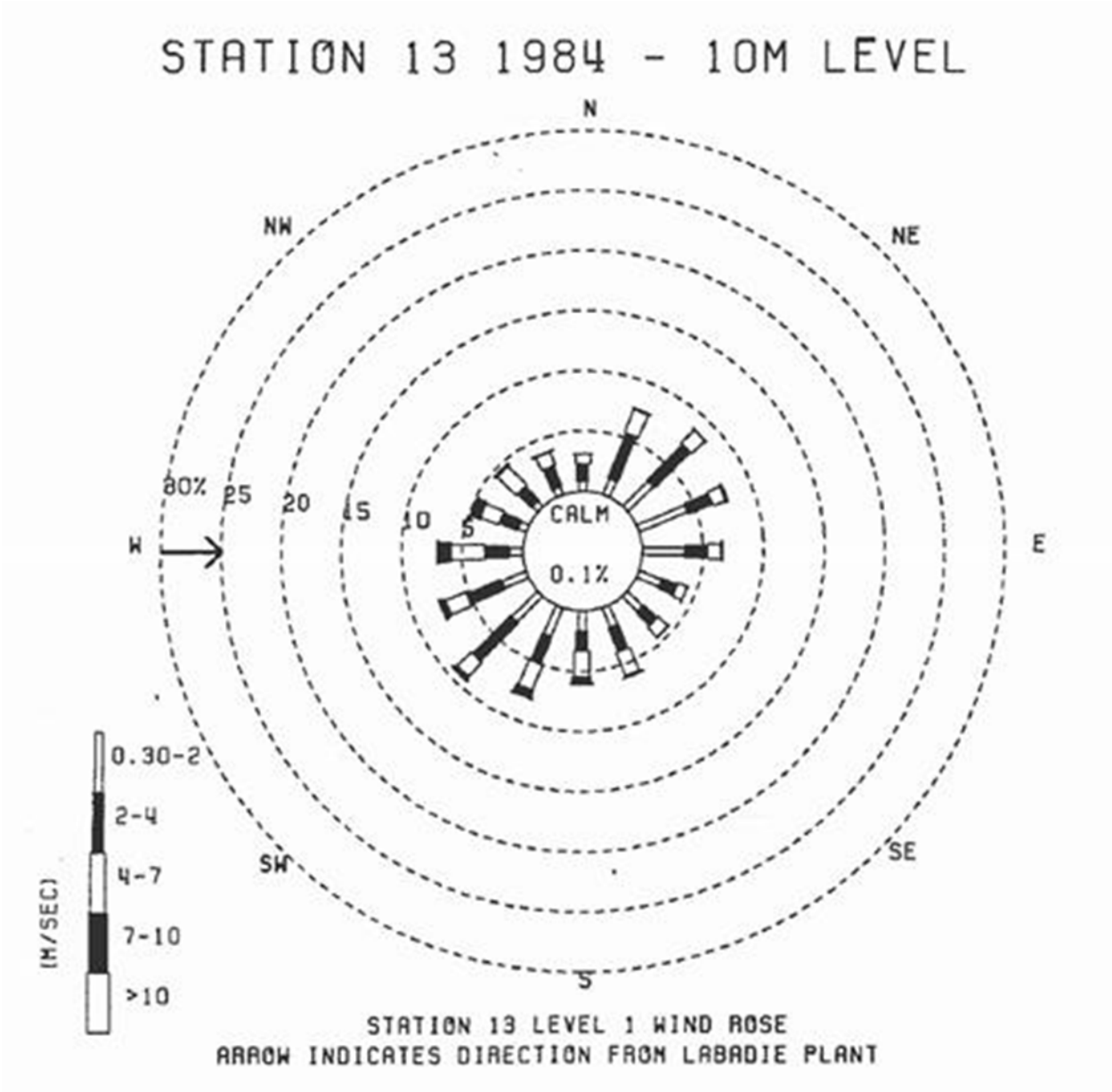


Figure 3: 1984 Wind rose for 50-m On-site Meteorological Data

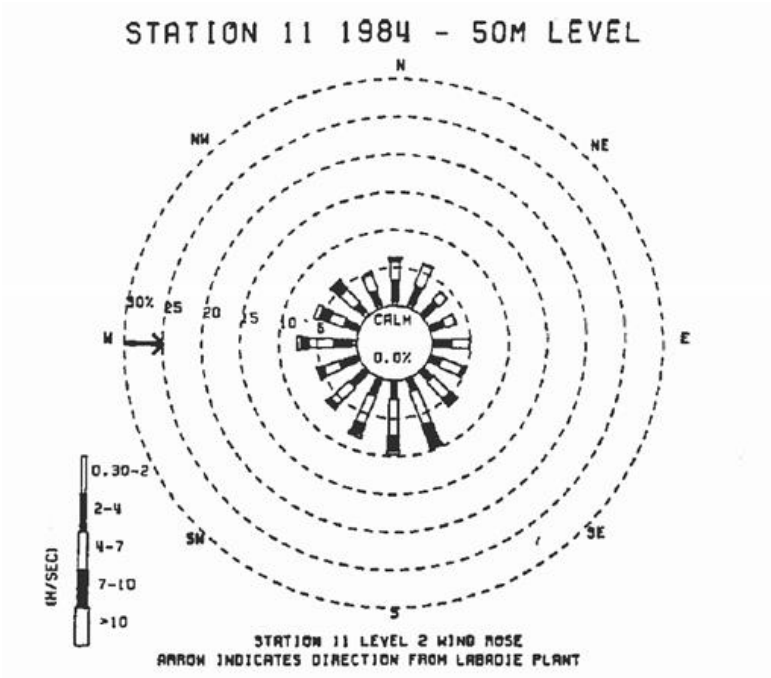


Figure 4: 1984 Wind rose for 85-m On-site Meteorological Data

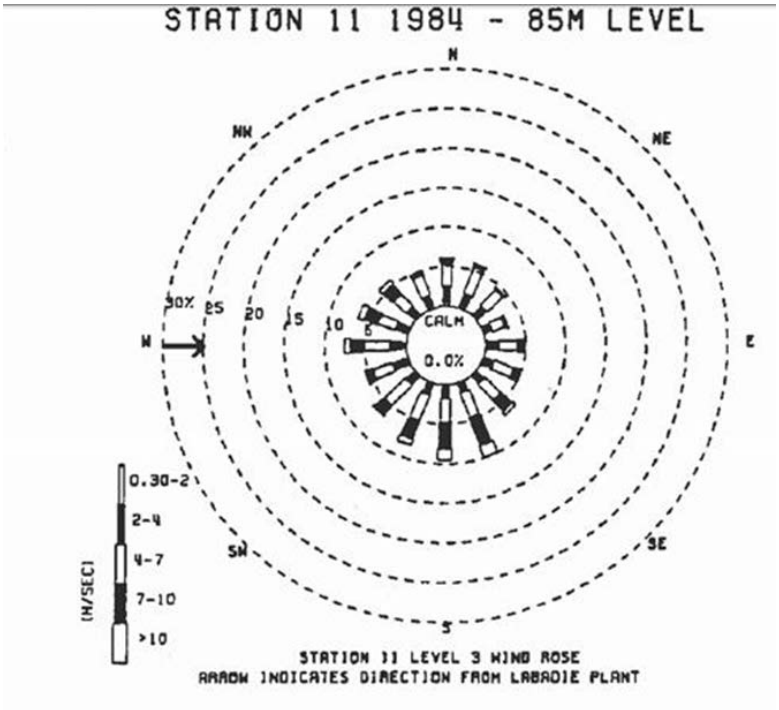


Figure 5: KJEF (Jefferson City Airport) Wind Rose (2012-2014)

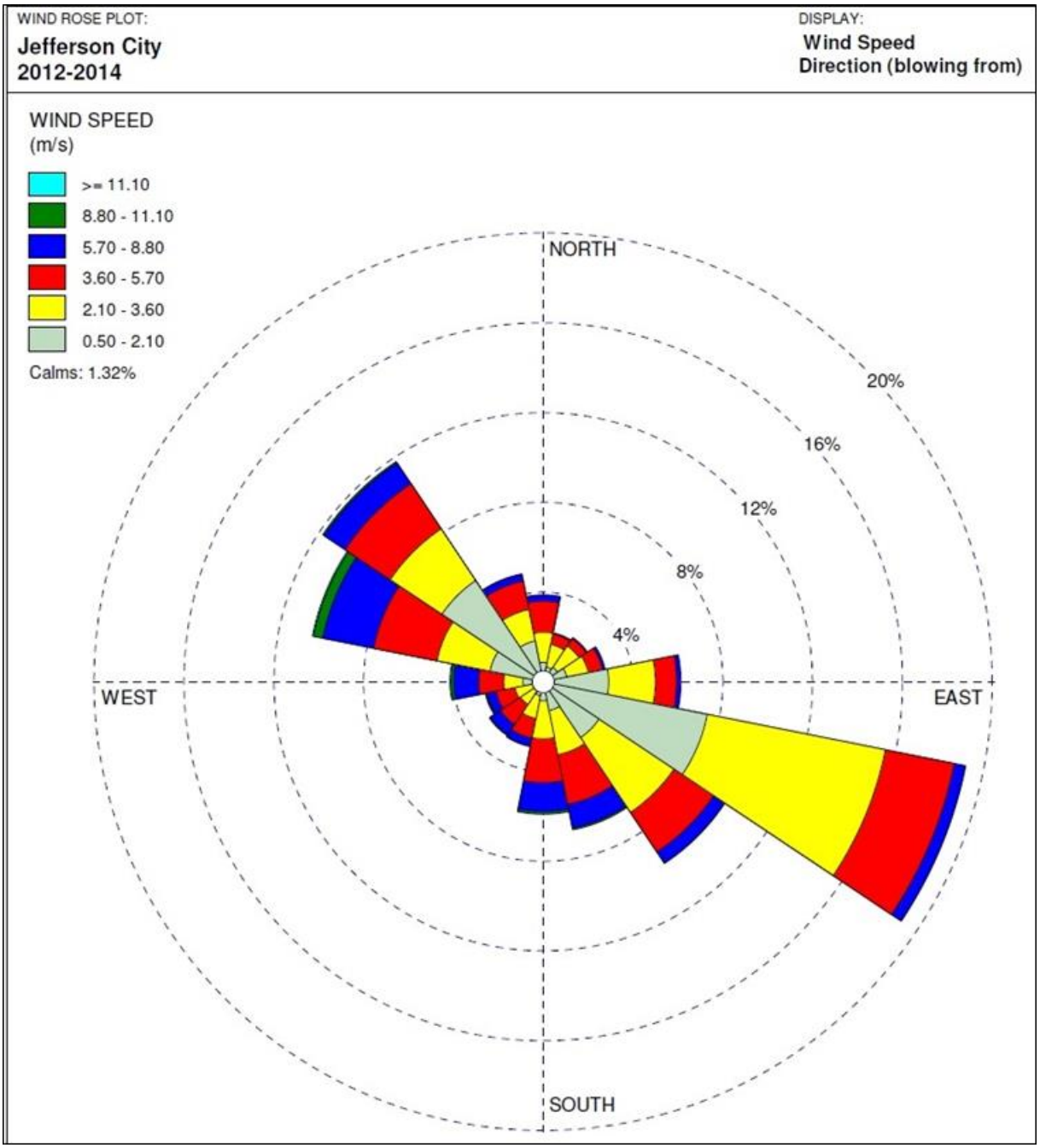
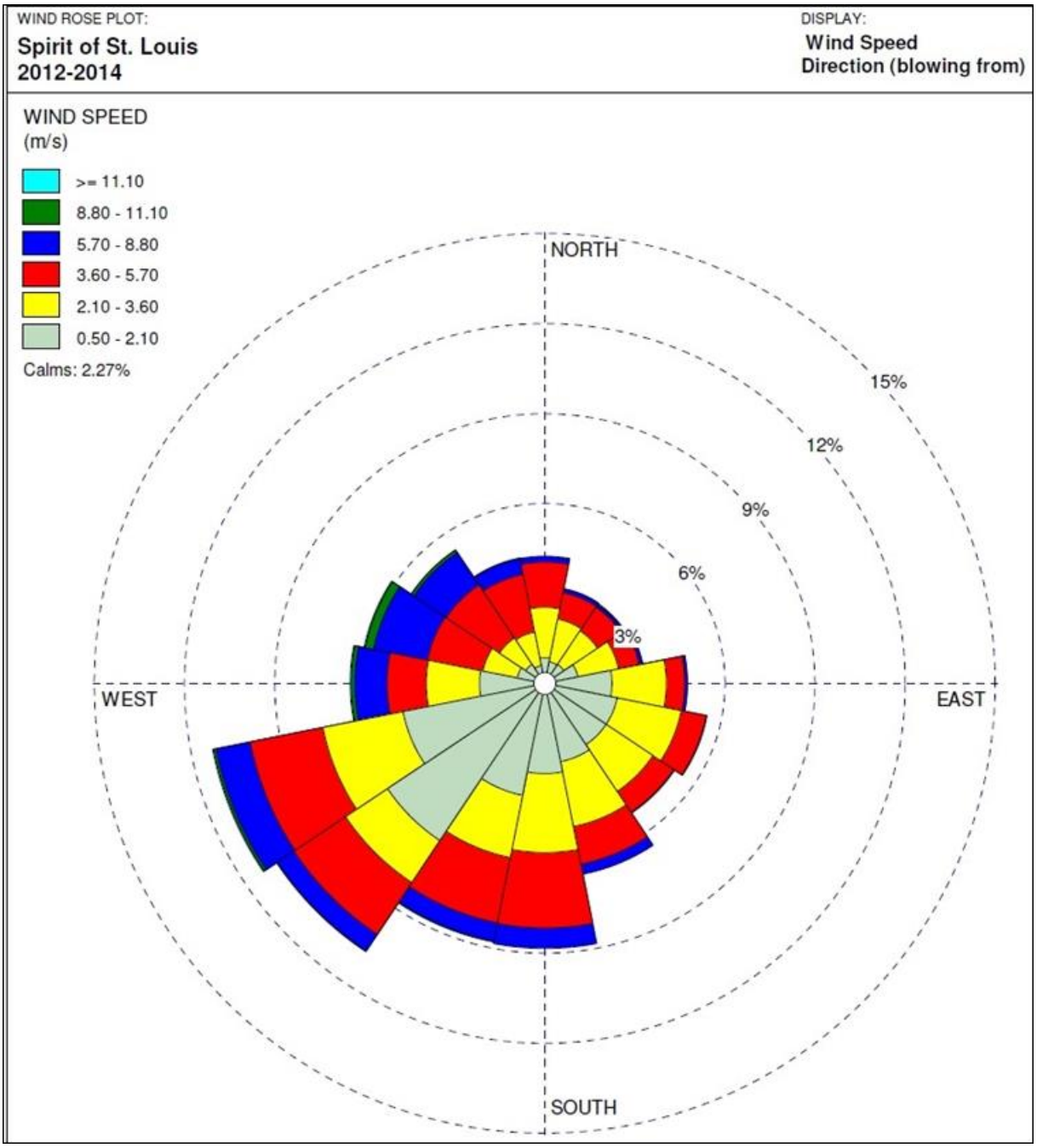


Figure 6: KSUS (Spirit of St. Louis Airport) Wind Rose (2012-2014)



It is evident from the comparison of the 10-m vs. 50-m and 85-m wind roses (Figures 2, 3, and 4, respectively), that there is a substantial difference in the wind pattern at the Labadie stack top versus the valley. While the KSUS wind pattern is more similar to the valley flow near Labadie, the KJEF wind pattern is a better match to the on-site tall tower measurements in the following respects:

- The strong alignment of the 10-m data along the Missouri River valley orientation is not at all present in the higher-level winds. Therefore, the use and reliance on the KSUS data for modeling tall stack releases from Labadie is not recommended.

- The preference for winds from the SSE and WNW from the tall tower levels is more consistent with the KJEF wind pattern. Therefore, placement of the Labadie monitors at their current locations is more in line with the upper level wind pattern seen in Figures 3 and 4.

As a result of this review of historical on-site wind data, it can be concluded that the KJEF winds are reasonably representative of upper-level flow affecting the Labadie stack-top winds.

Comments in Rebuttal to Sierra Club Challenges to the Siting of Labadie SO_2 Monitors

Bob Paine and Mary Kaplan, AECOM – September 2, 2015

Background

The Missouri Department of Natural Resources (MDNR) has established[1] an augmented SO_2 ambient monitoring program and meteorological measurement program in conjunction with Ameren Missouri for the area in the vicinity of the Labadie Energy Center. The purpose of this program is to aid the Department in making designation recommendations for the 1-hour SO_2 National Ambient Air Quality Standard (NAAQS), assessing ongoing compliance with the SO_2 NAAQS, and gathering meteorological data in the event that future dispersion modeling is needed for Labadie.

Comments have been received[2] by the Missouri Department of Natural Resources in writing and in oral testimony from the Sierra Club regarding the Labadie Energy Center SO_2 ambient monitoring program. In general, the comments indicate that the monitoring program is premature and that the monitors may be in the wrong locations. The discussion below reviews the comments from the Sierra Club that have been provided to MDNR and provides a response to each of these comments.

Sierra Club Comments and Ameren Responses on the SO_2 Monitoring Plan Around Labadie

Comment #1: paraphrased from the July 20, 2015 Sierra Club Letter:

In particular, DNR should refrain from proposing new sulfur dioxide ("SO_2") monitoring sites near Ameren's Labadie power plant until EPA completes an area designation for the plant. Monitors near Labadie should be sited based on the modeling that is used to determine the nonattainment area boundary, which will identify areas of expected peak ambient SO_2 concentrations around the plant based on current EPA guidance.

Response to Comment #1:

MDNR has already completed its modeling to determine the proper composition and location of monitors for the SO_2 monitoring network, as documented in its 2015 monitoring network plan. As discussed in response to Comment #2, the monitors around Labadie are properly sited based on modeling and EPA guidance.

[1] The plan and documentation about its design are described in the annual monitoring report available at http://dnr.mo.gov/env/apcp/docs/2015-monitoring-network-plan.pdf.

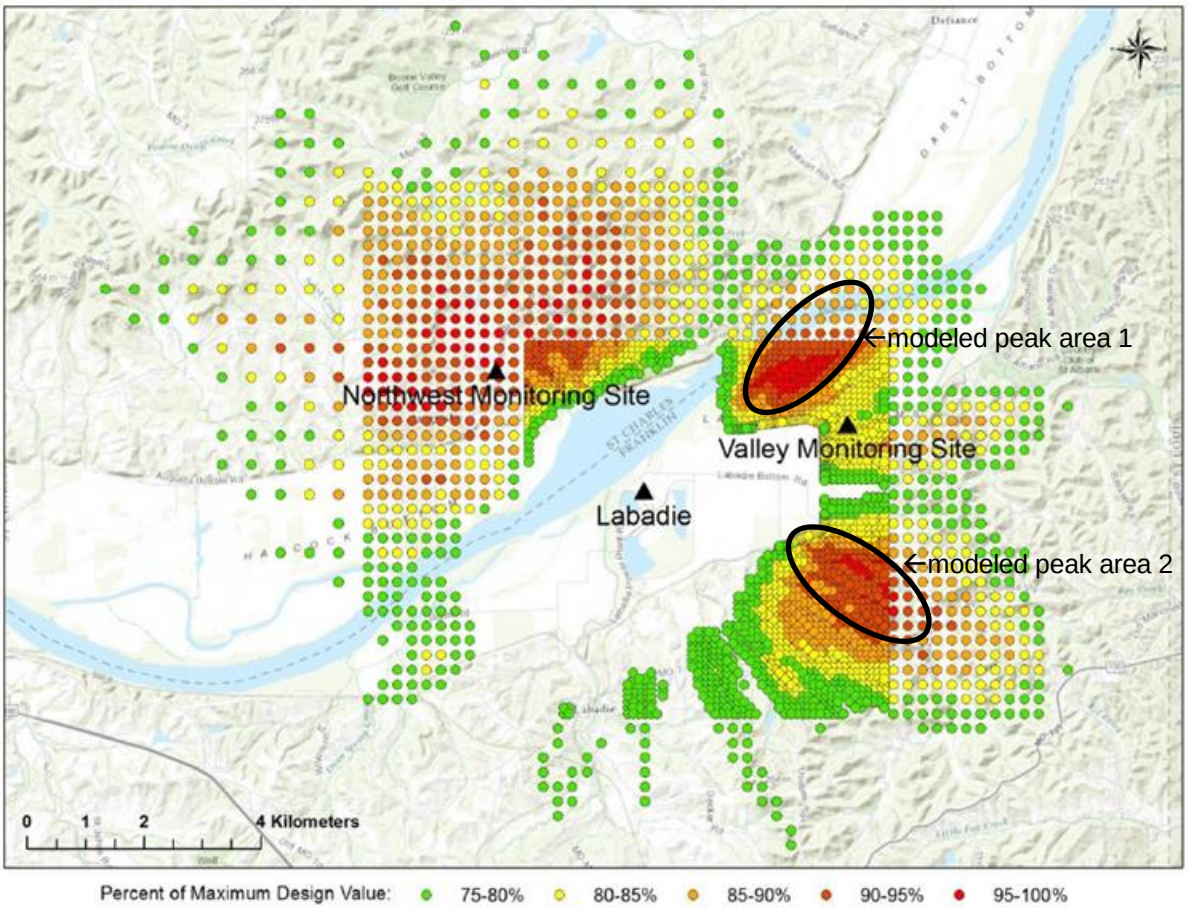
[2] Comments were provided to the MDNR in a letter to Mr. Stephen Hall dated July 20, 2015, and also supplemental comments were received on August 11, 2015. Other oral comments were provided at a public hearing on August 27, 2015 that are consistent with the comments in the two letters to Mr. Stephen Hall.

Sierra Club's comment regarding the use of the modeling to establish "nonattainment boundaries" in order to determine the location of monitors is, in itself, premature and factually incorrect. MDNR has not formally recommended that the area around Labadie be designated as nonattainment (currently, the MDNR has presented multiple options for designation) and AECOM's modeling using the updated AERMOD modeling approach demonstrates that the area is in attainment and that the modeling results are consistent with the monitoring results to date. To assume that nonattainment boundaries will be drawn is inappropriate. It is also somewhat puzzling that the Sierra Club is not in favor of ambient monitoring, which is the "gold standard" for determining whether an area is in compliance with the NAAQS. Due to the language in the Data Requirements Rule (80 FR 51070) encouraging expeditious implementation of the monitoring network "with appropriate planning, coordination, and program implementation by the air agency" [MDNR in this case], the availability of the monitoring data this early in the process is a testament to the hard work on the part of Ameren and MDNR to establish the monitoring network and implement the measurements in Spring 2015. The fact that the 99th percentile concentrations measured so far are well below the NAAQS may be a factor in the Sierra Club comments.

Comment #2: paraphrased from the August 11, 2015 Sierra Club Letter:

As described in our July 20, 2015 comments on the proposed 2015 Monitoring Network Plan, Ameren's modeling of Labadie's emissions for purposes of locating the new monitoring sites identified three distinct areas where peak SO_2 concentrations are expected to occur. These areas, demarcated by orange and red receptors, are located northwest, northeast, and southeast of the plant and are shown in Figure 1 below. However, only one of the two new monitoring sites – the Northwest site – is located in a peak concentration area as modeled by Ameren. The Valley monitoring site is located between the other two Ameren-modeled peak concentration areas, in an area where the modeled concentration is only about 80 percent of the maximum concentration predicted by Ameren's model.

Figure 1: Expected Peak SO_2 Concentration Areas* per Ameren's Modeling



* areas with black ellipses have been added

Response to Comment #2:

The monitors are correctly sited based on modeling and EPA guidance. With respect to determining the location of monitors, one must first understand that the results of the modeling indicate general areas of peak predictions. Precise locations based upon modeling must be interpreted carefully because variations in wind direction caused by uncertainties in the wind measurements used as inputs to AERMOD could change the placement of the peak concentrations. Also, due to the fact that Appendix W (70 FR 68218) indicates that model uncertainty can range between 10 and 40%, the relatively small difference of less than 20% between the modeled concentrations at the Valley Site and the modeled peak are not meaningful. It is also apparent from our response to Comment #3 below that the monitors are placed in areas with the expected highest frequency of wind directions, based upon the wind climatology near the Labadie stack top level.

It is also important to note that monitor siting has many logistical constraints, as noted in the final SO_2 Data Requirements Rule (80 FR 51072). Much of the area in the "modeled peak area #1" in Figure 1 is river or wetland, and so a monitor placement is not feasible in that area. The region in "modeled peak area #2" is mostly forested. The monitoring siting guidelines[3] for ambient SO_2 monitors indicate that an area of 20 meters from tree driplines is recommended for a buffer distance to monitors. This would significantly restrict the availability of suitable locations to the southeast of the plant. Lastly, and also consistent with EPA guidance, as long as the peak impact area is covered by at least one sited monitor, then the controlling concentrations will be observed over a 3-year period. This is the case for Labadie.

Comment #3: paraphrased from the August 11, 2015 Sierra Club Letter:

New wind climatology data from the valley monitoring site demonstrates the need to collect additional on-site meteorological data before DNR proposes new SO_2 monitors near the Labadie plant. The Valley monitoring site, which began operating in April, includes both an ambient SO_2 monitor and a meteorological monitoring station that monitors various meteorological parameters including horizontal wind speed and direction. Preliminary data from the Valley meteorological monitoring station for the period April 22 – July 13, 2015 is included in Appendix F of DNR's 2016 Area Boundary Recommendations. Analysis of this data suggests that the surface meteorological data used in both Ameren's and DNR's modeling of Labadie's emissions may not be representative of the area.

Ameren and DNR both used surface meteorological data from the Jefferson City Memorial Airport ("KJEF"), located approximately 115 kilometers west of Labadie, in their modeling of the plant's emissions instead of data from the much closer Spirit of St. Louis Airport ("KSUS"), located just 19 kilometers northeast of the plant. In making the decision to use KJEF instead of KSUS surface meteorological data, DNR relied exclusively on a comparison of surface characteristics (surface roughness, Bowen ratio, and albedo) at each airport to surface conditions at Labadie. Despite stating in its 2016 Area Boundary Recommendations that "other meteorological parameters, including wind speed and direction as influenced by terrain, must also be used when choosing a representative meteorological site," DNR did not compare available wind climatology data from the Valley monitoring site to contemporaneous wind climatology data from KJEF and KSUS to see which airport's winds are most similar to those at Labadie.

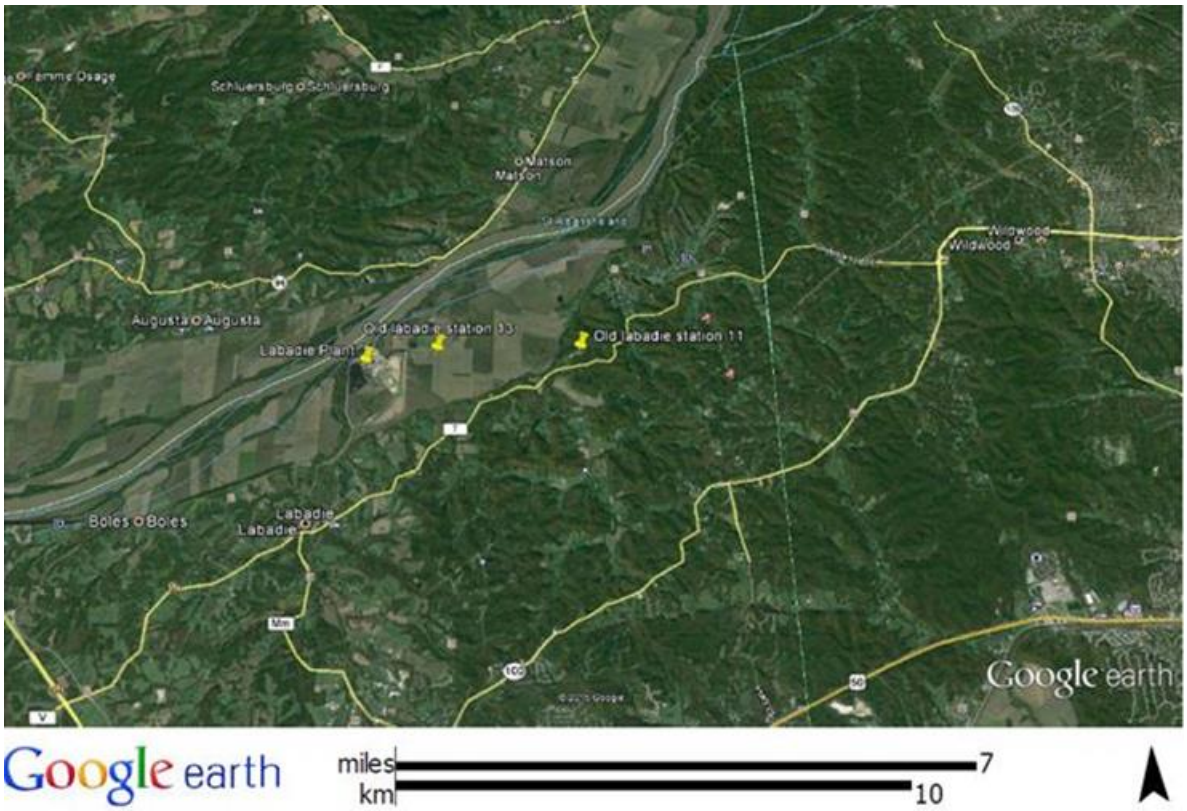
[3] https://www.azdeq.gov/environ/air/permits/download/FIle%206%20-%20Ambient%20Monitoring%20Guidance%20for%20PSD.pdf, page 26.

The preliminary [2015 Valley site] meteorological data from the Labadie area suggest that the winds at Labadie may be more similar to the winds at KSUS than the winds at KJEF, which in turn suggests that KSUS surface meteorological data may be more representative of the area and more appropriate for modeling Labadie's emissions than KJEF data.

Response to Comment #3:

In reviewing available data to respond to this comment, Ameren found in its archived records that during the calendar year 1984, on-site meteorological data were taken at a 10-m tower ("Station 13") as well as from the 50-m and 85-m levels on a tall tower ("Station 11") more reflective of stack-top conditions (213 meters) at the sites shown in Figure 2.

Figure 2: Meteorological Monitoring Sites from 1984 Data Collection Near Labadie



These stations were operated by Ameren (then Union Electric) experienced field personnel according to the applicable quality-assurance guidance at that time.

Unfortunately, the hourly data gathered from this meteorological network was stored on 9-track reel tapes that no longer exist. However, hard copies of wind rose plots of the data are available for the various meteorological levels, as shown in Figure 3 for the on-site 10-m level, Figure 4 for the on-site 50-m level, and Figure 5 for the on-site 85-m level. These can be compared to the wind roses available for the KJEF and KSUS airports, available in Figures 6 and 7, respectively.

Figure 3: 1984 Wind rose for 10-m On-site Meteorological Data Near the Labadie Energy Center

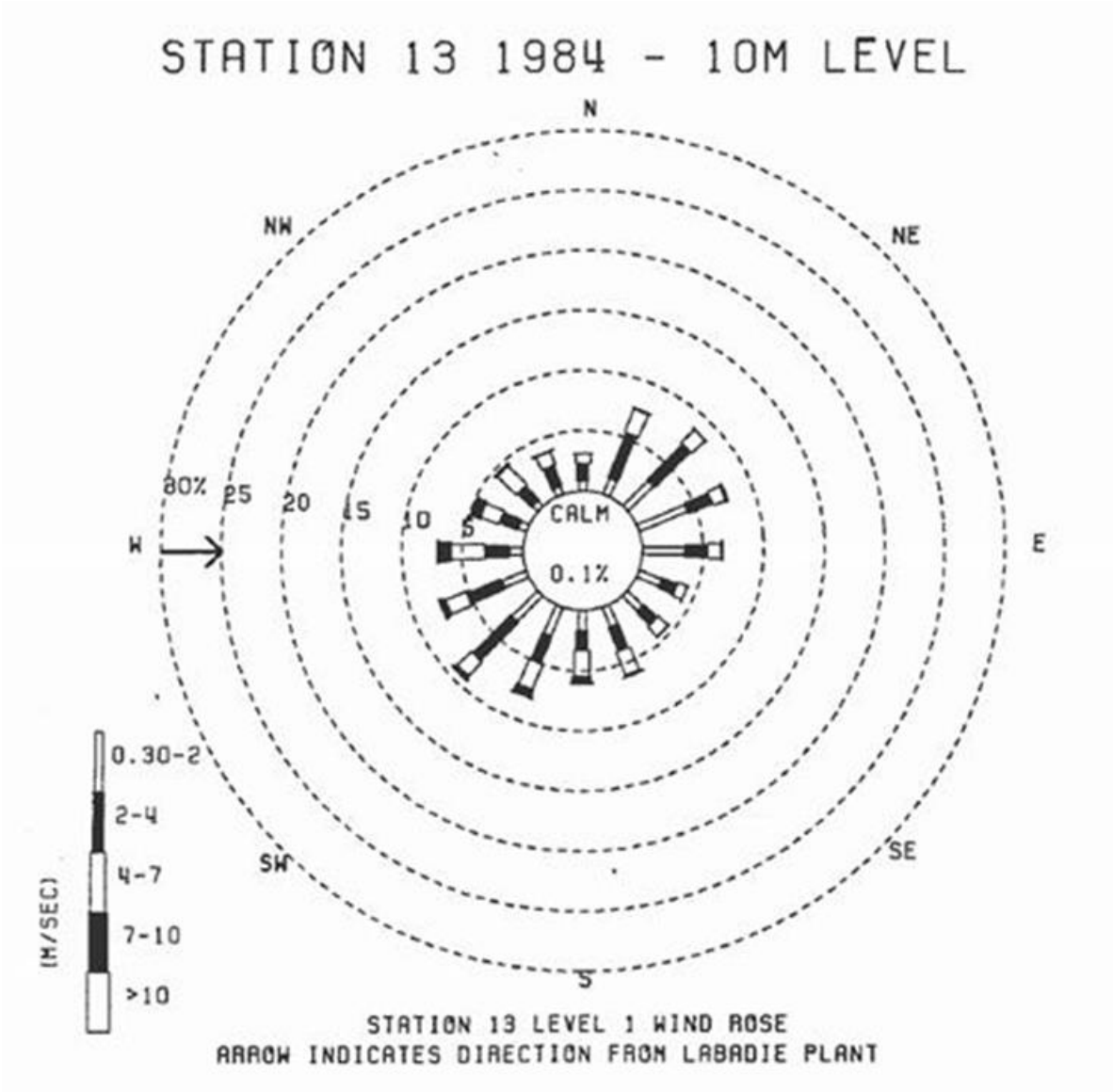


Figure 4: 1984 Wind rose for 50-m On-Site Meteorological Data

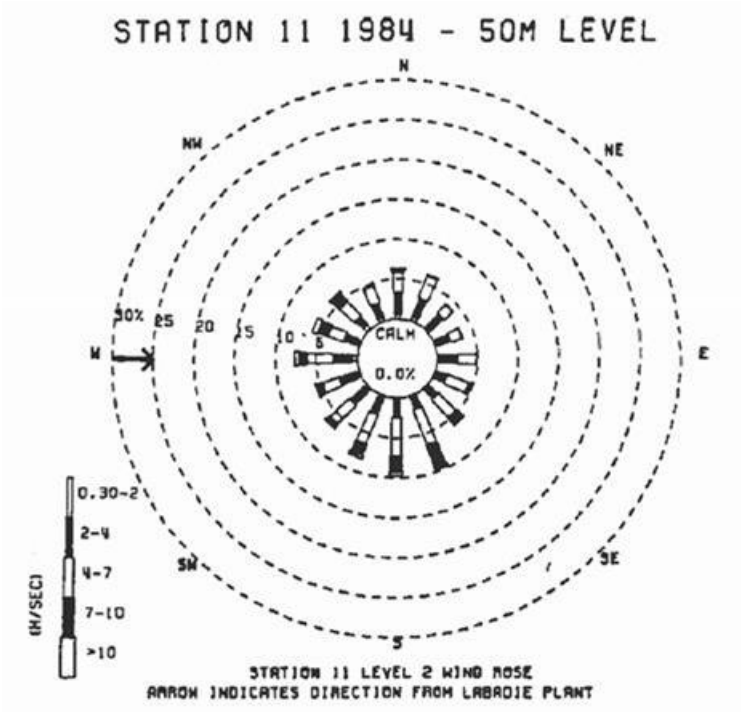


Figure 5: 1984 Wind Rose for 85-m On-site Meteorological Data

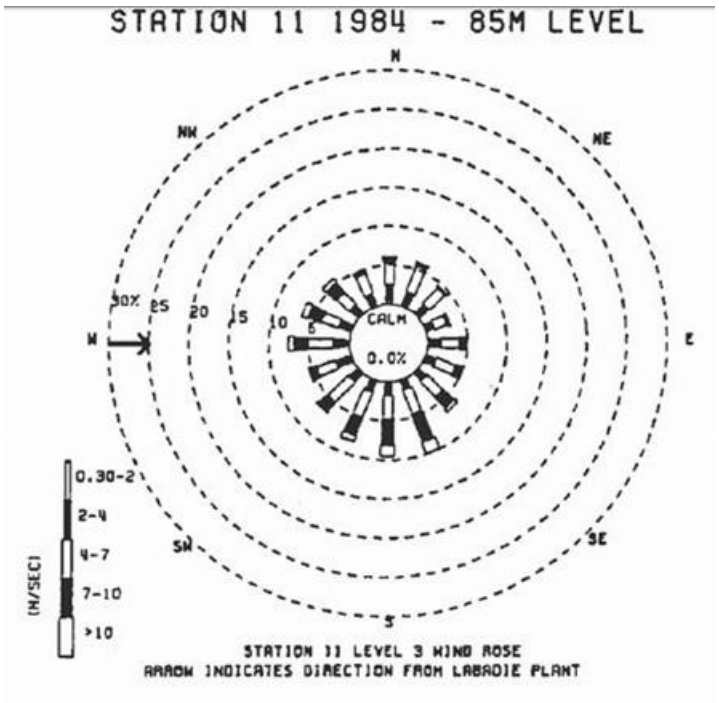


Figure 6: KJEF (Jefferson City Airport) Wind Rose (2012-2014)

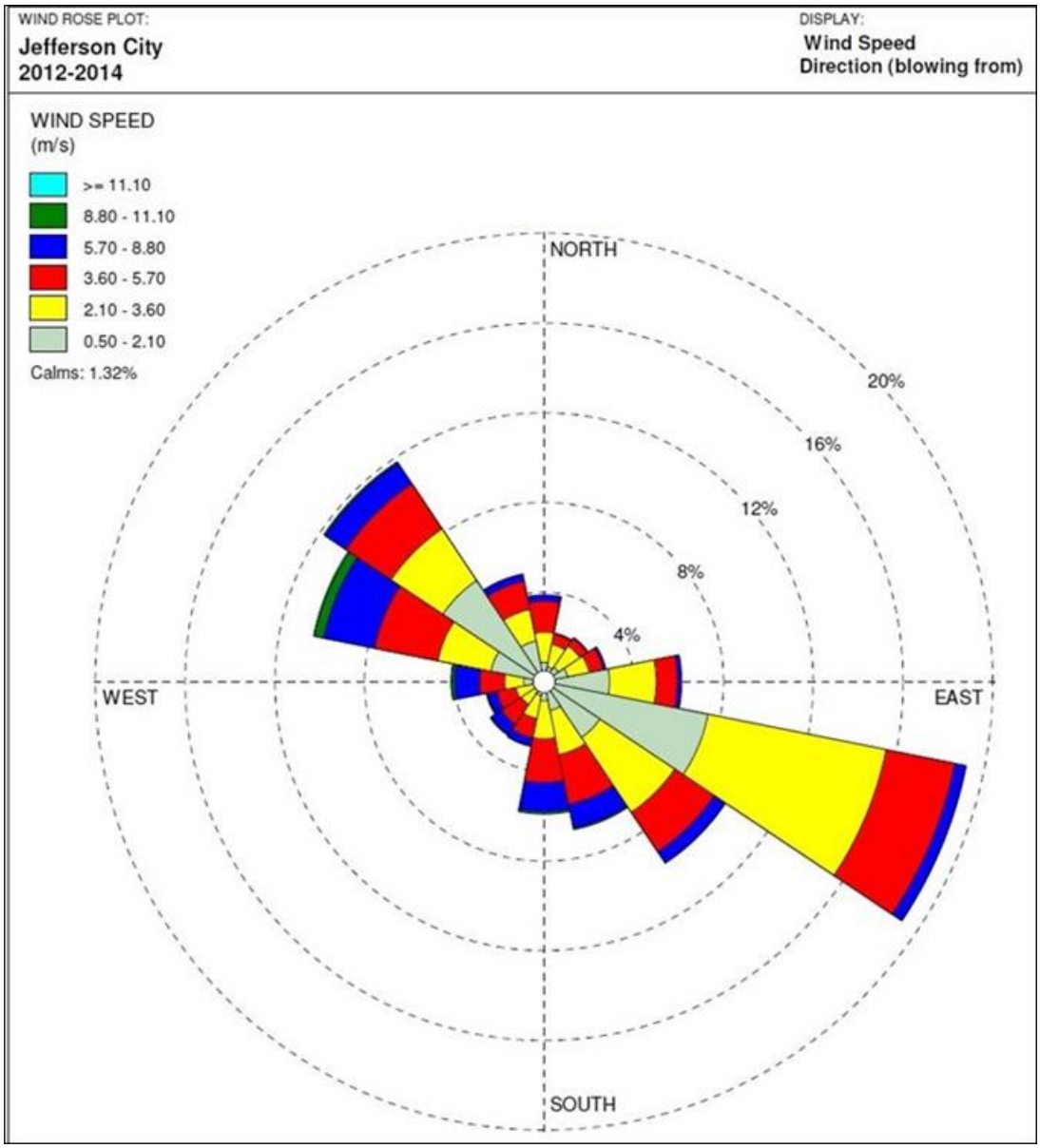
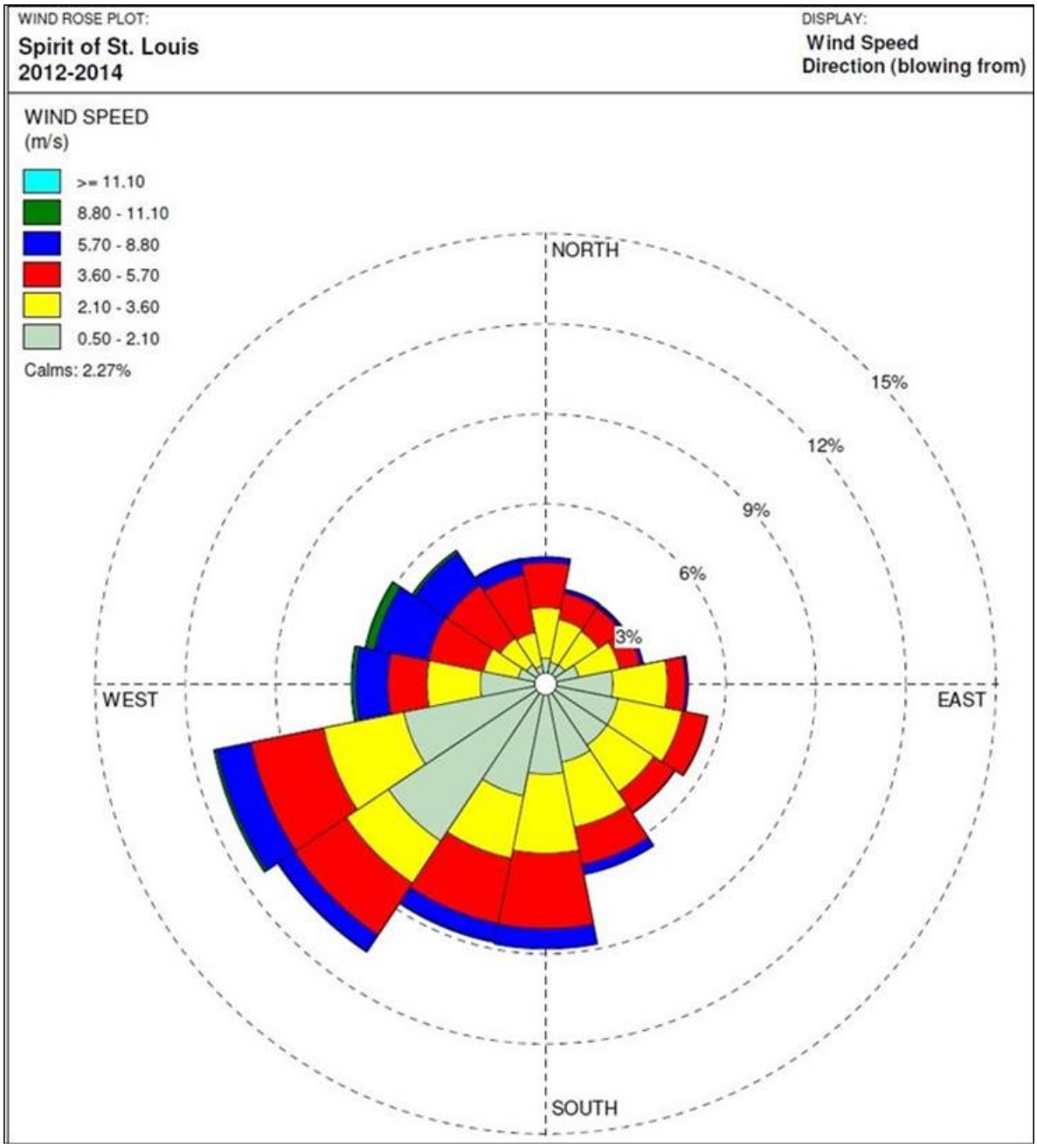


Figure 7: KSUS (Spirit of St. Louis Airport) Wind Rose (2012-2014)



It is evident from the comparison of the 10-m vs. 50-m and 85-m wind roses (Figures 3, 4, and 5 respectively), that there is a substantial difference in the wind pattern aloft (e.g., at the Labadie stack top) versus the valley 10-m level. While the KSUS wind pattern is more similar to the valley flow near Labadie, the KJEF wind pattern is a better match to the 1984 on-site tall tower measurements in the following respects:

- The strong alignment of the 10-m data along the Missouri River valley orientation is not present in the higher-level winds. Therefore, the use and reliance on the KSUS data for modeling tall stack releases from Labadie is not recommended.

- The preference for winds from the SSE and WNW from the tall tower levels is more consistent with the KJEF wind pattern. Therefore, placement of the Labadie monitors at their current locations is more in line with the upper level wind pattern seen in Figures 4 and 5.

As a result of this review of historical on-site wind data, we conclude that the KJEF winds are reasonably representative of upper-level flow affecting the Labadie stack-top winds. Therefore, the MDNR and Ameren modeling analyses provide strong technical support for the appropriate siting for the two ambient air quality stations in areas with the most frequent wind directions representative of Labadie stack-top conditions.

Comment #4: paraphrased from the August 11, 2015 Sierra Club Letter:

Ameren's modeling was inconsistent with EPA guidance. In more detailed comments we submitted to DNR on April 13, 2015 critiquing Ameren's proposed monitoring site locations, we noted that Ameren had failed to adhere to EPA's source-oriented SO_2 monitoring guidance in its modeling of the plant's emissions and therefore may have failed to correctly identify areas where peak concentrations are expected to occur. In particular, Ameren's modeling used constant emission rates instead of hourly emission rates as recommended by EPA. Using hourly emission rates, which are readily available from EPA's online Air Markets Program Data tool, allows areas where peak SO_2 concentrations are expected to occur to be determined with greater confidence because the interaction between hourly emissions and hourly variations in meteorological parameters is accounted for by the model. This interaction is ignored when constant emission rates are used.

In its recently-proposed 2010 1-Hour Sulfur Dioxide Standard, Proposed Options for Area Boundary Recommendations, July 2016 Designations ("2016 Area Boundary Recommendations"), DNR describes the modeling of Labadie's emissions that it performed for purposes of making an SO_2 area designation and boundary recommendation to EPA for the area around the plant. DNR's modeling is identical to Ameren's in most respects and uses meteorological data from the same National Weather Service site (Jefferson City Memorial Airport in Jefferson City, MO). However, unlike Ameren, DNR used hourly emission rates per EPA guidance in its modeling.

Response to Comment #4:

Labadie is a base-loaded plant. There is no expected significant correlation between load demand and meteorological conditions. The Ameren and MDNR analyses reached similar findings. Therefore, this comment has no significant effect on the findings regarding recommended monitor placements.

A TOXICOLOGIST'S PERSPECTIVE ON SO_2 HEALTH EFFECTS

Submitted By:
ZEPHYR ENVIRONMENTAL CORPORATION
TEXAS REGISTERED ENGINEERING FIRM F-102
TEXAS GEOSCIENCE FIRM NO. 50037
2600 VIA FORTUNA, SUITE 450
AUSTIN, TEXAS 78746

SEPTEMBER 3, 2015

CONTENTS

1.0 INTRODUCTION 1

2.0 NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS) ARE DESIGNED TO PROTECT HUMAN HEALTH AND WELFARE WITH A MARGIN OF SAFETY 2

3.0 HEALTH EFFECTS ASSOCIATED WITH SO_2 ARE PRIMARILY LIMITED TO EXACERBATION OF RESPIRATORY SYMPTOMS IN EXERCISING ASTHMATICS 4

3.1 ONLY EFFECT THAT EPA CONCLUDED SO_2 "CAUSES" IS SHORT-TERM RESPIRATORY EFFECTS 4

3.1.1 Asthma Severity Is Not a Key Determinant of Responsiveness to SO_2 4

3.1.2 Non-Asthmatics Are Much Less Susceptible to the Respiratory Effects of SO_2 5

3.2 1-HOUR PRIMARY SO_2 NAAQS IS DESIGNED TO PREVENT ASTHMA EXACERBATION 5

3.2.1 1-Hour SO_2 NAAQS Level Is Based on Controlled Human Exposure Studies that Evaluated Respiratory Effects in Exercising Asthmatics 6

3.2.2 Form and Level of the 1-Hour SO_2 NAAQS Are Designed to Limit 5-Minute Peak Concentrations 8

4.0 TRENDS IN ASTHMA RATES DO NOT CORRELATE WITH OUTDOOR AIR CONCENTRATIONS 9

4.1 ASTHMA RATES ARE HIGHLY VARIABLE AMONG DIFFERENT COMMUNITIES WITHIN CITIES DESPITE SIMILARITIES IN OUTDOOR AIR QUALITY 9

4.2 ASTHMA PREVALENCE HAS INCREASED OVER SAME TIME PERIOD THAT OUTDOOR POLLUTANT LEVELS HAVE DECREASED 11

4.3 FACTORS OTHER THAN OUTDOOR AIR CONCENTRATIONS ARE MORE LIKELY RESPONSIBLE FOR TRENDS IN INCREASED ASTHMA PREVALENCE 12

4.3.1 Changes in Diagnostic Coding May Be Responsible for Some of the Apparent Increase in Asthma Prevalence 12

4.3.2 Changes in Survey Questionnaires May Be Responsible for Some of the Apparent Increase in Asthma Prevalence 13

4.3.3 Changes in Health Care Access and Physician Perceptions May Be Responsible for Some of the Apparent Increase in Asthma Prevalence 13

4.4 ASTHMA APPEARS TO BE MORE CLOSELY LINKED TO ALLERGIC STATUS, LIFESTYLE FACTORS, AND INDOOR AIR POLLUTANTS 13

5.0 CLAIMS THAT COMMUNITIES NEAR THE LABADIE PLANT BEAR A DISPROPORTIONATE SHARE OF THE BURDEN OF DISEASE ARE UNFOUNDED ... 15

5.1 *REAL* DATA DEMONSTRATE THAT THE LABADIE AREA IS IN COMPLIANCE WITH THE NAAQS AND THAT ASTHMA RATES ARE NOT HIGHER NEAR COAL-FIRED POWER PLANTS (CFPPS) 15

5.2 HIGHLY UNCERTAIN HEALTH IMPACT ESTIMATES MADE IN CLEAN AIR TASK FORCE (CATF) AND ENVIRONMENTAL INTEGRITY PROJECT (EIP) REPORTS ARE UNRELIABLE 17

6.0 CRITERIA POLLUTANT CONCENTRATIONS HAVE DECREASED DRAMATICALLY IN THE ST. LOUIS REGION 18

6.1 ST. LOUIS CORE-BASED STATISTICAL AREA 19

6.2 FRANKLIN COUNTY 19

7.0 CONCLUSION 22

8.0 RESPONSES TO SELECT COMMENTS MADE DURING THE AUGUST 27, 2015 MDNR PUBLIC HEARING 23

8.1 COMMENTS RELATING TO MONITOR PLACEMENT AND HISTORICAL EMISSIONS 23

9.0 REFERENCES 26

FIGURES

Figure 1: Variation in All-Age Asthma Inpatient Hospitalizations by Zip Code in the St. Louis City Area

Figure 2: Variation in All-Age Asthma Emergency Department Visits by Zip Code in the St. Louis City Area

Figure 3: Trends in Ambient SO_2 Concentrations and Adult Asthma Prevalence

Figure 4: Trends in Ambient SO_2 Concentrations and Child Asthma Prevalence

Figure 5: Annual 99th Percentile Daily Maximum 1-Hour Average SO_2 Concentration

Figure 6: Trends in SO_2 Emissions and SO_2 Monitoring for Labadie Energy Station

Figure 7: Current SO_2 Monitors in the Vicinity of Labadie Generating Station

TABLES

Table 1: National Ambient Air Quality Criteria for Sulfur Dioxide (SO_2)

Table 2: Asthma Rates in Franklin and St. Charles Counties

APPENDICES

APPENDIX A RESUME
APPENDIX B DETAILS ON THE ESTABLISHMENT OF THE 1-HOUR SO_2 NAAQS LEVEL AND FORM
APPENDIX C ISSUES ASSOCIATED WITH THE CLEAN AIR TASK FORCE (CATF) AND ENVIRONMENTAL INTEGRITY PROJECT (EIP) MODELS

1.0 INTRODUCTION

The purpose of this report is to provide additional detail and documentation for opinions that I expressed regarding the potential health effects associated with SO_2 at the August 27, 2015 hearing on area designations for the 2010 1-hour SO_2 NAAQS. In addition, I provide a toxicologist's perspective on statements made at the hearing by the Sierra Club and other local environmental groups about the potential health effects associated with SO_2. The comments made by these groups misconstrue, mischaracterize or simply ignore the scientific body of evidence that is currently available on health effects associated with SO_2 exposure.

A copy of my resume is provided in **Appendix A** of this report.

2.0 NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS) ARE DESIGNED TO PROTECT HUMAN HEALTH AND WELFARE WITH A MARGIN OF SAFETY

Not all air emissions constitute air pollution. According to 10 CSR 10-6.020, the Missouri Department of Natural Resources (MDNR) defines air pollution as:

> "The presence in the ambient air of one (1) or more air contaminants in quantities, of characteristics, and of a duration which directly and approximately cause or contribute to injury to human, plant, or animal life or health, or to property or which unreasonably interfere with the enjoyment of life or use of property."

National Ambient Air Quality Standards (NAAQS) are standards set by the United States (US) Environmental Protection Agency (EPA) for specific emissions that are determined to be protective of human health and the environment *with a margin of safety* (i.e., a safety buffer).

There are two types of NAAQS—primary and secondary NAAQS. Primary NAAQS provide public *health* protection, including protecting the health of "sensitive" populations *such as asthmatics, children, and the elderly*. Secondary NAAQS provide public *welfare* protection, including protection against damage to crops, vegetation, and materials (ferrous and non-ferrous metals, zinc and other protective coatings, and inorganic building materials [e.g., concrete and limestone]) and certain textiles. Thus, evaluating whether ambient SO_2 concentrations exceed the SO_2 NAAQS is a quantitative way to answer the question of whether adverse health or welfare effects can be expected and whether ambient air concentrations represent pollution.

Each NAAQS consists of a *level* and a *form*. The "level" is the concentration of the pollutant in parts per billion (ppb). The "form" of the NAAQS defines the air quality statistic or metric used to determine whether the NAAQS is met. The level and form of the NAAQS for SO_2 are provided in **Table 1**.

TABLE 1: NATIONAL AMBIENT AIR QUALITY CRITERIA FOR SULFUR DIOXIDE (SO_2)

Sulfur Dioxide (SO_2) Standards	Averaging Time	Level ppb	Form
Primary	1-Hour	75	99th percentile of 1-hour daily maximum concentration, averaged over 3 years
Secondary	3-Hour	500	Not to be exceeded more than once per year

The Primary SO_2 NAAQS is largely based on controlled human exposure studies of SO_2-induced respiratory effects among exercising asthmatics following peak exposures (defined as 5- to 10-minute exposures to relatively high concentrations, e.g., 200 to 1,000 ppb) (EPA, 2008). Details on how the 1-hour SO_2 Primary NAAQS was established, including a discussion on how both the

level and the form were determined and why the NAAQS is highly conservative, is provided in **Appendix B** of this report.

3.0 HEALTH EFFECTS ASSOCIATED WITH SO_2 ARE PRIMARILY LIMITED TO EXACERBATION OF RESPIRATORY SYMPTOMS IN EXERCISING ASTHMATICS

Contrary to the assertions made by environmental groups, health effects associated with SO_2 are primarily limited to exacerbation of respiratory symptoms in asthmatics that are engaged in physical exercise. Assertions have also been made that secondary formation of particulate matter (PM) with a mean diameter equal to or less than 2.5 micrometers ($PM_{2.5}$) from gaseous pollutants, including SO_2, is responsible for the majority of the alleged health effects that environmental groups attribute to coal-fired power plants (CFPPs). However, these claims are entirely reliant on highly uncertain modeled health impacts that are not supported by the evidence.

This section of my report focuses on health effects associated with SO_2 and does not address potential health effects that may be associated with $PM_{2.5}$, for which secondary formation may be partially dependent on SO_2 emissions. Allegations of health effects associated with $PM_{2.5}$ formed from gaseous pollutants emitted by CFPPs are addressed in **Section 5.2**.

3.1 ONLY EFFECT THAT EPA CONCLUDED SO_2 "CAUSES" IS SHORT-TERM RESPIRATORY EFFECTS

EPA evaluated potential health effects associated with SO_2 exposure during the most recent SO_2 NAAQS review and identified only one causal relationship: short-term respiratory effects. At levels in the range of the 1-hour SO_2 NAAQS, SO_2 causes bronchoconstriction (tightening of the airways in the lungs) in asthmatics, while studies in healthy people provide little evidence of respiratory effects at concentrations more than 10 times the NAAQS. Therefore, claims made by citizen and environmental groups that SO_2 causes other health effects, such as cardiovascular effects (including stroke) and premature mortality, should be viewed with skepticism because a causal link between SO_2 exposure and these effects has not been clearly established.

With regard to cardiovascular effects, the EPA (EPA, 2008) specifically concluded that, as a whole, the evidence from animal toxicological, human clinical, and epidemiologic studies is ***"inadequate"*** to infer a causal relationship between short-term SO_2 exposure and cardiovascular effects (see p. 3-42). EPA further concluded that the evidence for a ***causal link*** between short-term SO_2 exposure and mortality at current ambient SO_2 levels is limited by potential confounding and lack of understanding regarding the interaction of SO_2 with co-pollutants (see p. 3-52). Moreover, EPA concluded that the available evidence for a causal link between long-term SO_2 exposure and any type of morbidity or mortality is inadequate (see p. 5-8).

3.1.1 Asthma Severity Is Not a Key Determinant of Responsiveness to SO_2

The response of asthmatics to SO_2 has been extensively studied in controlled human exposure studies. Evidence from studies conducted in adult asthmatics have demonstrated that asthmatics are more sensitive to the effects of SO_2 than healthy individuals (and possibly individuals with

Chronic Obstructive Pulmonary Disease or COPD). However, even amongst asthmatics, elevated ventilation (i.e., exercise) is required to provoke a respiratory response at SO_2 concentrations that are anywhere close to ambient levels.

Most SO_2 is absorbed by the nasal passages when breathing through the nose, as is common during rest and normal activity levels (i.e., resting ventilation rates). During exercise, ventilation increases and shifts from nasal to oronasal or mouth breathing. When this occurs, the pattern of SO_2 absorption switches from the upper airways to the lower airways. SO_2 must reach the lower airways to cause bronchoconstriction and trigger an asthma attack.

For ethical reasons, the most severe asthmatics are not evaluated in controlled human exposure studies on the effects of SO_2 (Linn, Avol, Peng, Shamoo, & Hackney, 1987; Linn, et al., 1988; Linn, et al., 1990). Environmental groups often argue that because subjects participating in these human exposure studies do not include the most severe asthmatics, that the thresholds observed in these studies may not represent the lowest threshold level to which more severe asthmatics may respond. However, limited studies conducted to examine the effect of asthma severity on SO_2-induced respiratory effects suggest that asthma severity does not affect the responsiveness of asthmatics to SO_2. While severe asthmatics could be more susceptible to the adverse effects of SO_2, it may be that the most severe asthmatics are less likely to experience SO_2-induced bronchoconstriction due to exercise limitations (Johns & Linn, 2011).

3.1.2 Non-Asthmatics Are Much Less Susceptible to the Respiratory Effects of SO_2

In healthy adults, SO_2-induced bronchoconstriction is generally only observed after exposures to 5,000 ppb (for periods of 10 to 60 minutes) or more. Even during exercise, studies in healthy people provide little evidence of respiratory effects at concentrations below 1,000 ppb (Amdur, Melvin, & Drinker, 1953) (Lawther, 1955) (Frank, Amdur, Worcester, & Whittenberger, 1962) (Nadel, Salem, Tamplin, & Tokiwa, 1965).

Studies in which healthy individuals and individuals with COPD at rest were exposed to SO_2 concentrations of 300 to 4,000 ppb failed to show bronchoconstrictive effects (Reichel, 1972; Weir & Bromberg, 1972; Weir & Bromberg, 1973). Another study exposed volunteers with COPD to SO_2 concentrations of 400 and 800 ppb for 1 hour, with two 15-minute periods of light exercise, neither significantly affecting lung function nor the severity of respiratory symptoms (Linn, et al., 1985). While these studies suggest that individuals with COPD are not more susceptible to the effects of SO_2, it may simply be the case that very little of the SO_2 reached the lower airways, which is necessary for bronchoconstriction.

3.2 1-HOUR PRIMARY SO_2 NAAQS IS DESIGNED TO PREVENT ASTHMA EXACERBATION

Studies of controlled human exposures are described as providing the "definitive" evidence of the relationship between short-term SO_2 exposure and respiratory symptoms (EPA, 2008, Section 5-

2). Controlled human exposure studies are studies conducted with human volunteers in a laboratory setting.

3.2.1 1-Hour SO_2 NAAQS Level Is Based on Controlled Human Exposure Studies that Evaluated Respiratory Effects in Exercising Asthmatics

Because asthmatics are more susceptible to the respiratory effects of SO_2 and respiratory effects occur more readily at elevated ventilation rates, EPA relied almost exclusively on human exposure studies conducted with asthmatics who were exposed to SO_2 while exercising in establishing the level (i.e., concentration) of the 1-hour SO_2 NAAQS.

EPA adopted an extraordinarily conservative approach in setting the most recent SO_2 NAAQS standard. Despite the conclusion of the World Health Organization (WHO) that changes in lung function observed during 5- to 10-minute exposures of 200 ppb SO_2 are similar to those seen in asthmatics with exercise alone (WHO, 2006), the fact that a single study (Linn, et al., 1983) reported statistically significant increases in respiratory symptoms below a concentration of 400 ppb, and no studies reported clinically relevant decreases in lung function below 400 ppb (Goodman, Dodge, & Bailey, 2010), EPA identified a short-term (5-minute) exposure threshold for SO_2 of 200 ppb in the most recent decision on the SO_2 NAAQS (75 CFR 35220, Jun 22, 2010).

3.2.1.1 Measurement Error and Exposure Misclassification Are Reduced in Controlled Human Exposure Studies Relative to Epidemiology Studies

Human chamber studies are powerful in assessing acute, reversible effects from short-duration exposures in humans, such as those associated with SO_2 exposure. The major advantage of human exposure studies is that the conditions of exposure are carefully controlled (i.e., air concentrations, breathing rates, exposure durations, etc.) and health outcomes can generally be measured more precisely, which reduces measurement errors and exposure misclassifications, both of which are common to epidemiology studies. A further advantage of clinical studies is the random assignment of subjects to treatment groups, which reduces both confounding[1] and selection bias[2], also common in epidemiology studies.

3.2.1.2 EPA Judged the Available Epidemiology Studies Inappropriate for Use in Its Risk and Exposure Assessment Due to Their Substantial Uncertainties

In contrast with most recent NAAQS reviews, EPA did not use the results of epidemiology studies in its quantitative risk assessment because of the substantial uncertainties associated with them. Unlike clinical studies, epidemiological studies are not conducted in a controlled environment, but rather are observational studies designed to evaluate whether ambient SO_2 levels are associated with increases in adverse health effects at the population level. Observational epidemiological

[1] A confounder is an extraneous variable in a statistical model that correlates (directly or inversely) with both the dependent variable (e.g., asthma ED visits) and the independent variable (e.g., air concentrations).

[2] Selection bias refers to the selection of individuals, groups or data for analysis in a way that proper randomization is not achieved, thereby making the sample unrepresentative of the population to be analyzed

studies attempt to determine which factors are associated with diseases, but cannot prove that a specific risk factor actually causes the disease being studied. This is because epidemiological studies cannot control for, nor can they necessarily identify all of the factors that may influence a health outcome. Therefore, they are plagued with issues of confounding. For example, if coffee drinkers are more likely to also be cigarette smokers, and a study was conducted to explore potential associations between coffee drinking and lung cancer, without taking the smoking habits of the coffee drinkers into account, smoking would be a confounder and the results may seem to show that coffee drinking increases the risk of lung cancer.

When associations are observed in epidemiology studies, the first question that should be asked is "Is it real?" Epidemiology studies test whether there is an *association* between exposure and disease, not whether exposure *causes* a disease. If there is an *association*, the exposure is called a risk factor of the disease. However, the risk factor can either be:

- A predictor (i.e., a marker or a proxy), such as employment in a specific industry or socioeconomic status; or
- A causal factor, such as cigarette smoking for lung cancer.

In addition, if a non-representative population was chosen for study, the association may have occurred by *chance*. This is why it is important to pay attention to whether results from studies (epidemiology and clinical) are statistically significant because results that are statistically significant are not likely to have occurred by *chance alone*.

Although epidemiological studies have the advantage of studying the population of interest (including sensitive individuals) at ambient pollutant levels, their utility is limited because invariably the study population is exposed to mixtures of pollutants from which health effects associated with a particular pollutant are difficult to disentangle. Sophisticated statistical models that few people adequately understand are required to separate (even partially) the effects of individual pollutants. Furthermore, relevant information is rarely collected for individuals admitted to the hospital or emergency department (ED), which precludes ruling out other factors, such as workplace exposures, pre-existing disease, or lifestyle factors as being the causative agent for the health effects observed. **Due to confounding factors and a lack of individual exposure measurements, it is widely recognized that observational epidemiology studies alone cannot be used to infer causality**. According to the *Reference Guide on Epidemiology in* the National Academy of Science's Reference Manual on Scientific Evidence (NAS, 2011):

"Epidemiology is concerned with the incidence of disease in populations and does not address the question of the cause of an individual's disease. This question, sometimes referred to as specific causation, is beyond the domain of the science of epidemiology. **Epidemiology has its limits at the point where an inference is made that the relationship between an agent and a disease is causal** (general causation) and where the magnitude of excess risk attributed to the agent has been determined; that is, epidemiology addresses whether an agent can cause a disease, not whether an agent did cause a specific plaintiff's disease."

Unfortunately, environmental advocates typically rely upon and misuse such epidemiologic studies in presenting their views and making unsupported claims about health effects.

3.2.2 Form and Level of the 1-Hour SO_2 NAAQS Are Designed to Limit 5-Minute Peak Concentrations

As discussed previously, EPA identified a short-term (5-minute) exposure threshold for SO_2 of 200 ppb, despite the fact that changes in lung function observed at this level are similar to those seen in asthmatics with exercise alone. Using data from monitors that voluntarily reported 5-minute data, EPA demonstrated that there is a high correlation between the 5-minute maximum level and the corresponding 1-hour average SO_2 concentration (section 2.5.2 of EPA, 2009) and used this information to support the establishment of a 1-hour standard that limits peak (5-minute) exposures of 200 ppb. Since the 1-hour 75 ppb NAAQS for SO_2 is designed to prevent peak exposures of 200 ppb, it represents a highly health-protective level.

Therefore, even though the SO_2 NAAQS does not have a 5-minute averaging time, the form and level were established specifically to limit 5-minute peak concentrations (section 10.5.3 and Figures 7–27 and 7–28 of EPA, 2009). EPA concluded that a concentration-based NAAQS that is averaged over a three year period better reflects the continuum of health risks of increasing SO_2 concentrations by weighting years when 1-hour daily maximum SO_2 concentrations are well above the level of the standard more heavily than those when 1-hour daily maximum SO_2 concentrations that are just above the level of the standard. Because it is designed to give greater weight to days with high levels of SO_2 in determining compliance, the form of the NAAQS is also conservative.

4.0 TRENDS IN ASTHMA RATES DO NOT CORRELATE WITH OUTDOOR AIR CONCENTRATIONS

There are many studies showing that regional differences in outdoor air concentrations do not correlate with asthma prevalence (Anderson H. , 1997; Anderson, et al., 2012). Moreover, there are also many studies that show low prevalence of asthma in countries with high ambient air pollution, such as Mexico, Eastern Europe, China, and Greece, whereas asthma rates are nearly 10 times higher in countries that have very good air quality and much less industry, for example, New Zealand, Australia, and Canada (Peat & Li, 1999; ISAAC, 1998 as cited in Gradient, 2015).

4.1 ASTHMA RATES ARE HIGHLY VARIABLE AMONG DIFFERENT COMMUNITIES WITHIN CITIES DESPITE SIMILARITIES IN OUTDOOR AIR QUALITY

In a study of Boston asthma hospitalizations, researchers (Gottlieb, Beiser, & O'Connor, 1995) observed dramatic differences in asthma hospitalizations among different communities despite similar ambient air quality. Similarly, Gupta, Zhang, Sharp, Shannon, & Weiss (2008) have shown that neither ambient $PM_{2.5}$ levels nor proximity to two CFPPs in operation at the time of the study explain the large geographic variability in childhood asthma prevalence across different Chicago neighborhoods.

Similar to what has been shown for other US cities, Gradient (2015) showed that there is also evidence that asthma statistics are highly variable between different St. Louis City zip codes despite similarities in outdoor air quality. The Gradient report can be found at http://www.americaspower.org/sites/default/files/FinalGradientReport_090115.pdf.

Figures 6.8 and 6.9 from the Gradient report, which are reproduced as **Figures 1** and **2** below, show that, despite being located within the same airshed, rates of total all-age asthma inpatient hospitalizations and ED visits vary significantly by zip code in the St. Louis City area. The Gradient results are based on 2010 data for asthma inpatient hospitalization discharges for St. Louis City obtained from the Missouri Information for Community Assessment (MICA) system available on the Missouri Department of Health and Senior Services website[3] (numbers of cases converted to rates using 2010 census data).

The examples discussed in this section support the conclusion that asthma rates do not correlate with criteria pollutant levels in outdoor air.

[3] http://health.mo.gov/data/mica/MICA/.

FIGURE 1: VARIATION IN ALL-AGE ASTHMA INPATIENT HOSPITALIZATIONS BY ZIP CODE IN THE ST. LOUIS CITY AREA

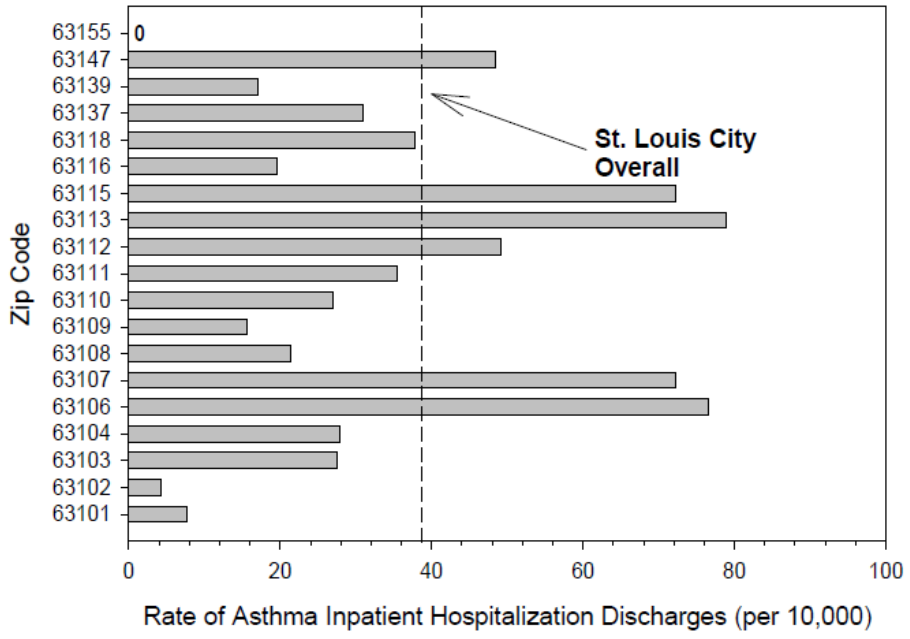
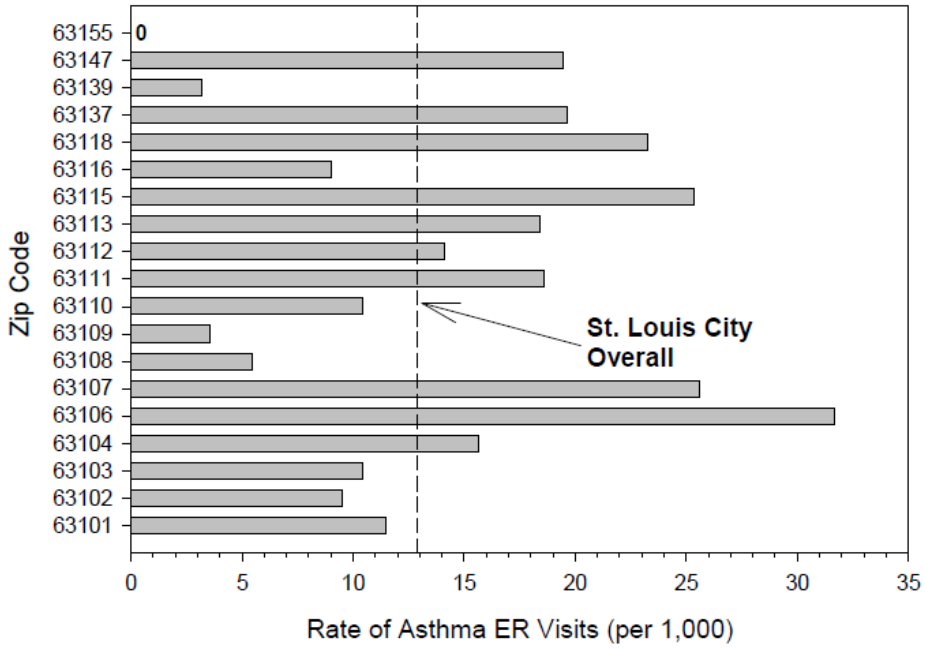


FIGURE 2: VARIATION IN ALL-AGE ASTHMA EMERGENCY DEPARTMENT VISITS BY ZIP CODE IN THE ST. LOUIS CITY AREA



Source: Gradient, 2015. A Case Study: The Public Health Consequences of Air Emissions from Coal-Fired Power Plants in the St. Louis Area

4.2 ASTHMA PREVALENCE HAS INCREASED OVER SAME TIME PERIOD THAT OUTDOOR POLLUTANT LEVELS HAVE DECREASED

Asthma prevalence has risen over the last several decades and this increase is frequently used by the Sierra Club and other environmental groups to advocate for additional reductions in outdoor pollutant levels. However, this increase in asthma has coincided with a time during which concentrations of anthropogenic air pollutants in outdoor air have been decreasing. **Figures 3** and **4** below (reproduced from Gradient, 2015) compare national-scale trends in SO_2 over the past two to three decades with national-scale trends in asthma prevalence in adults and children, respectively.

FIGURE 3: TRENDS IN AMBIENT SO_2 CONCENTRATIONS AND ADULT ASTHMA PREVALENCE

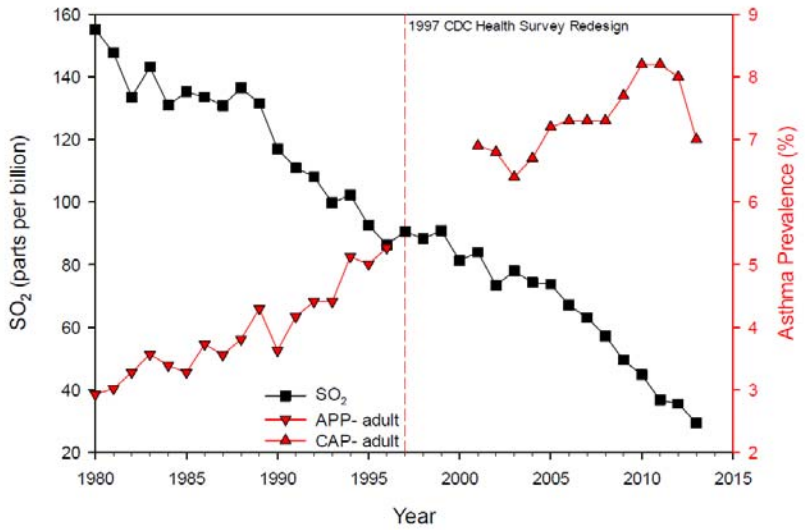
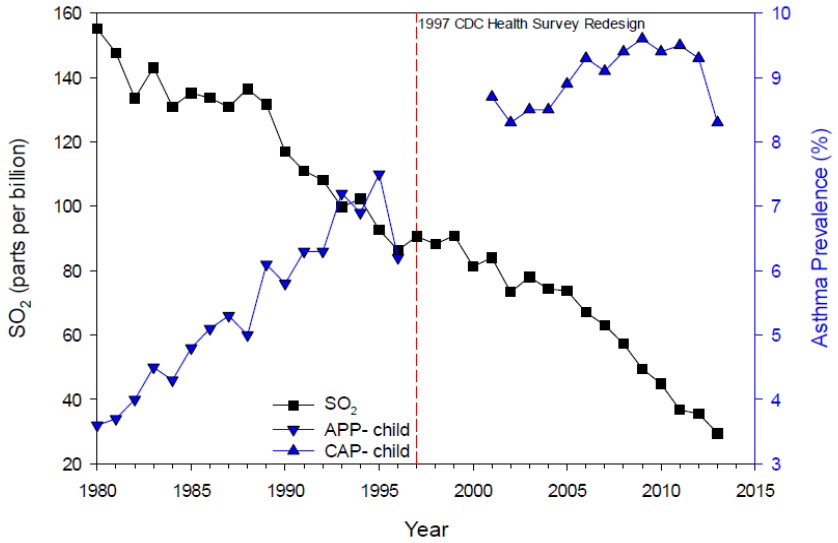


FIGURE 4: TRENDS IN AMBIENT SO_2 CONCENTRATIONS AND CHILD ASTHMA PREVALENCE



Source: Gradient, 2015. A Case Study: The Public Health Consequences of Air Emissions from Coal-Fired Power Plants in the St. Louis Area

In both figures, the black line with the boxes represents the falling SO_2 concentrations over the past 35 years. The red line with triangles represents the rising asthma prevalence in adults in the first figure and the blue line with the triangles in the second figure represents the rising asthma prevalence in children. The break in the asthma prevalence lines (red line in first graph and blue line in the second) reflects the fact that prior to 1997, the Centers for Disease Control and Prevention (CDC) collected data on asthma period prevalence (APP), which reflects the percentage of the US population with asthma in the previous 12 months. CDC redesigned its health survey in 1997, and in 2001, started collecting data on current asthma prevalence (CAP), which represents the percentage of the US population diagnosed with asthma and having asthma at the time of the survey.

As shown in the figures, SO_2 concentrations in the US have decreased significantly over the past several decades while the prevalence of asthma has increased. Although not shown here, the Gradient report (2015) shows similar trends for other criteria pollutants ($PM_{2.5}$, PM_{10}, and O_3).

4.3 FACTORS OTHER THAN OUTDOOR AIR CONCENTRATIONS ARE MORE LIKELY RESPONSIBLE FOR TRENDS IN INCREASED ASTHMA PREVALENCE

The only logical conclusion that can be drawn from the data presented in **Figures 1** through **4** is that factors other than outdoor air concentrations are triggering factors underlying the trends in increased asthma prevalence. Several possible partial explanations for the increase in asthma prevalence are explored in the paragraphs that follow.

4.3.1 Changes in Diagnostic Coding May Be Responsible for Some of the Apparent Increase in Asthma Prevalence

Changes in the diagnostic coding of asthma and survey questions in self-reporting asthma questionnaires over the last 30 years have likely altered the diagnosis of asthma cases and caused changes in prevalence and incidence statistics. The International Classification of Diseases (ICD) provided by the WHO was revised in 1978 (9th revision) and 1990 (10th revision) resulting in a change to the coding of asthma. In the ICD 8, a patient with "asthmatic bronchitis" would have been coded under bronchitis, while in ICD 9 this same person would be coded under asthma. One study that analyzed asthma patient records found an increase in patients with an asthma classification that had a history of smoking in the 1980s versus the 1970s. The cause of this difference was attributed to the change in classification of asthmatic bronchitis from a bronchitis heading to an asthma heading, resulting in asthmatic bronchitis patients now falling under the umbrella of asthma in the 1980s (Marcus & Braman, 2010). This change in coding may also influence the validity of epidemiology studies that look at hospital ED visits for asthma as potential indicators of an association between ambient pollutant concentrations and respiratory effects over years during which changes in the asthma definition has changed.

4.3.2 Changes in Survey Questionnaires May Be Responsible for Some of the Apparent Increase in Asthma Prevalence

A large source of asthma surveillance data is compiled by the National Center for Health Statistics of the CDC under the National Health Interview Survey (NHIS). As previously described, the NHIS questions used to evaluate asthma prevalence changed in 1997 and 2001, resulting in three separate types of questions that could impact asthma prevalence estimates from 1980 to 1996, 1997 to 2000, and 2001 to the present according to the National Heart, Lung, and Blood Institute website.[4] These changes prevent direct comparisons of reported asthma rates from 1980 to 1997 to the more recent data set from 1997 to 2001 and illustrate the potential variability in reported asthma prevalence depending on how asthma questions are phrased, and what sort of asthma information is requested (lifetime incidence versus episodes in the past 12 months, for example).

4.3.3 Changes in Health Care Access and Physician Perceptions May Be Responsible for Some of the Apparent Increase in Asthma Prevalence

The increase in asthma cases may also be partially explained by factors relating to changes in health care access and physician perceptions. The diagnosis of asthma may have become more likely than a similar diagnosis of bronchitis or COPD among patients with similar symptoms. One study looked at healthcare data from Manitoba, Canada from 1980-1990 and found a statistically significant increase in asthma diagnosis above background increases found for other diseases with similar symptoms over that time period. The study attributed some of the increase to an increase in the likelihood of asthma diagnoses (Manfreda, Becker, Wang, Roos, & Anthonisen, 1993).

4.4 ASTHMA APPEARS TO BE MORE CLOSELY LINKED TO ALLERGIC STATUS, LIFESTYLE FACTORS, AND INDOOR AIR POLLUTANTS

The reason for the surge in asthma prevalence over the past several decades is unclear, but it is well known that asthma is a complex disease with a multitude of triggers, of which air pollutants can be one. **However, scientific evidence indicates that asthma is more closely linked to allergic status, lifestyle factors, and indoor air pollutants than to outdoor air concentrations**.

According to the American Lung Association website,[5] common asthma triggers include:

- Medical Conditions
  - Colds, i.e., viral respiratory infections
  - Sinus infections
- Allergens
  - Allergens in fragrances, hairspray, and cleaning products
  - Food allergies (peanuts, shellfish)

[4] www.nhlbi.nih.gov/health/prof/lung/asthma/surveil.htm.
[5] http://www.lung.org/lung-disease/asthma/taking-control-of-asthma/reduce-asthma-triggers.html.

  - Animal fur/dander, dust mites, rodents, cockroaches, feathers
  - Over the counter medications, (aspirin or other non-steroidal anti-inflammatory drugs)
- Lifestyle Factors
  - Being overweight
  - Exercise, physical activity
  - Excitement/stress
  - Maternal stress during pregnancy period when child was in utero
- Weather, Pollen, Air Pollution
  - Exposure to cold air or sudden temperature change
  - Outdoor - pollens, grasses, flowers, pollutants
  - Indoor - mold, fungus, mildew, house dust, cigarette smoke, smoke from fireplace

Some of the most potent asthma-inducing allergens (such as spores, mold, pollen, and allergens from rodents, pets, fungi, cockroaches, and dust mites) can be found in indoor environments (Carr, Zeitel, & Weiss, 1992; De Palo, Mayo, & Friedman, 1994; Belanger, et al., 2003; Leaderer, et al., 2002; Teach, Crain, Quint, Hylan, & Joseph, 2006 as cited in Gradient, 2015).

Children spend much more time indoors today than they did 30 years ago. In addition to contributing to the development of asthma, exposure to various indoor air irritants can also exacerbate asthma symptoms. Cat, cockroach, and house mite dust allergens have all been causally linked to exacerbation of asthma symptoms in sensitive individuals, and environmental tobacco smoke exposure has also been causally linked to exacerbation of asthma symptoms in young children (IOM, 2000).

5.0 CLAIMS THAT COMMUNITIES NEAR THE LABADIE PLANT BEAR A DISPROPORTIONATE SHARE OF THE BURDEN OF DISEASE ARE UNFOUNDED

Despite claims by environmental and citizen groups that areas with the highest concentration of CFPPs bear a disproportionate share of the burden of disease, the facts do not support this claim. Such claims are based on overly simplistic formulas that distort the underlying scientific principles.

To support assertions of illness and mortality, environmental and citizen groups ignore the scientific research studies cited in this report and instead rely on reports from interest groups such as the Clean Air Task Force's *Toll From Coal* (CATF, 2010) and the Environmental Integrity Project's (EIP) *Net Loss: Comparing the Cost of Pollution vs. the Value of Electricity from 51 Coal-Fired Plants*, along with health projections placed on websites (CATF, 2014) of such groups. These organizations support their advocacy positions by *estimating* impacts of CFPP emissions on ambient air quality and then applying results from epidemiology studies to *approximate* changes in the incidence of adverse health outcomes, such as hospital admissions, asthma attacks, and premature deaths. Unfortunately, there is currently neither an accepted gold standard nor even a simple, reliable, and evaluated method for carrying out such assessments. As a result, the hypothetical health impacts estimated using models such as those employed by CATF (2010 and 2014) and EIP (2012) are highly uncertain and easily manipulated through choice of input parameters.

The gross oversimplifications and highly uncertain estimates made by these groups are discussed in **Section 5.2** and in much more detail in **Appendix C**.

5.1 *REAL* DATA DEMONSTRATE THAT THE LABADIE AREA IS IN COMPLIANCE WITH THE NAAQS AND THAT ASTHMA RATES ARE NOT HIGHER NEAR COAL-FIRED POWER PLANTS (CFPPS)

The areas around St. Louis have air quality that is in compliance with the health-protective $PM_{2.5}$ NAAQS. The same is true for the areas immediately surrounding Labadie and the other Missouri CFPPs[6]. Therefore, people living in these communities are not at risk for adverse health effects potentially associated with particulates, regardless of their origin.

Fortunately, the Missouri Department of Health and Senior Services (MDHSS) provides age-adjusted asthma ED visits and hospitalizations by county for the entire state (MDHSS, 2010), which shows that asthma rates are not correlated with proximity to CFPPs. The availability of county-specific asthma rates from the MDHSS allows ***real*** data on asthma ED visits and hospitalizations for counties in which CFPPs are located and/or that are being considered for designation to be compared to asthma rates for the state of Missouri and the nation as whole.

[6] http://www.epa.gov/airquality/greenbk/rncty.html.

The MDNR is considering designating portions of Franklin and St. Charles counties as either unclassifiable or non-attainment based on air dispersion modeling. **Table 2** shows asthma ED visits per 1,000 people in the population and asthma hospitalizations (inpatient) per population of 10,000 from the *Missouri Asthma Surveillance Report* (MDHSS, 2010) for Franklin and St. Charles counties and the state of Missouri as whole, and US Data on asthma rates from the CDC (CDC, 2012).

TABLE 2: ASTHMA RATES IN FRANKLIN AND ST. CHARLES COUNTIES

Geographic Area	2008 Asthma Trends		Reference
	Emergency Department Visits	Hospitalizations	
	Rate Per 1,000	Rate per 10,000	
Franklin County, MO	3.8	9.4	MDHSS, 2010
St. Charles County, MO	3.2	8.3	
State of Missouri	5.2	13.8	
United States	6.5	14.4	CDC, 2012

Sources: MDHSS, 2010. Missouri Asthma Surveillance Report: The Burden of Asthma in Missouri. http://health.mo.gov/living/healthcondiseases/chronic/asthma/pdf/burdenreport.pdf and CDC, 2012. National Surveillance of Asthma: United States, 2001–2010. http://www.cdc.gov/nchs/data/series/sr_03/sr03_035.pdf.

The first column shows the geographical area. The second column shows the age-adjusted ED visit rates per 1,000 people in the population and the third column shows age-adjusted asthma hospitalization rates per 10,000 people in the population.

As shown in **Table 2**, the age-adjusted ED visit rate for the entire state was 5.2 per 1,000 people in the Missouri population. The age-adjusted asthma hospitalization rate for all Missouri residents was 13.8 per 10,000 in the population. The Missouri asthma ED visit rate and hospitalization rate are both lower than the national average rates, which are shown in the bottom line of the table as 6.5 per 1,000 for asthma ED visits and 14.4 per 10,000 for asthma hospitalizations.

In contrast, the asthma ED visit and hospitalization rates in Franklin and St. Charles counties are well below the rates for the state of Missouri as a whole and the nation. Although not shown here, similar results are reported for other counties in which CFPPs are located. Asthma incidents are higher within metropolitan areas where other risk factors (e.g., housing conditions, inadequate access to health care etc.) could influence asthma rates. Therefore, it is clear from the Missouri asthma data that asthma ED visit and hospitalization rates simply do not correlate with proximity to power plants.

5.2 HIGHLY UNCERTAIN HEALTH IMPACT ESTIMATES MADE IN CLEAN AIR TASK FORCE (CATF) AND ENVIRONMENTAL INTEGRITY PROJECT (EIP) REPORTS ARE UNRELIABLE

The estimation of health impacts made by the CATF and EIP require multiple models, numerous model inputs, and a variety of model assumptions, each of which has many associated uncertainties. Notably, the underlying model used by these groups, the Climatological Regional Dispersion Model (CRDM), uses outdated algorithms and assumptions that are not in line with state-of-practice dispersion modeling approaches (both short-range and long-range transport and dispersion) and, according to EPA (EPA, 2015) are only capable of providing "crude estimates" of air quality changes due to emissions. Perceived determinants of health are then employed in the form of concentration-response functions from epidemiology studies that may not reflect causal relationships to *estimate* changes in the incidence of adverse health outcomes. The models predict the largest impacts from the secondary formation of $PM_{2.5}$ from gaseous pollutants (SO_2, nitrogen oxides, volatile organic compounds [VOCs], and ammonia), which is *estimated* and not only highly uncertain, but also likely substantially overestimated (Gradient, 2015).

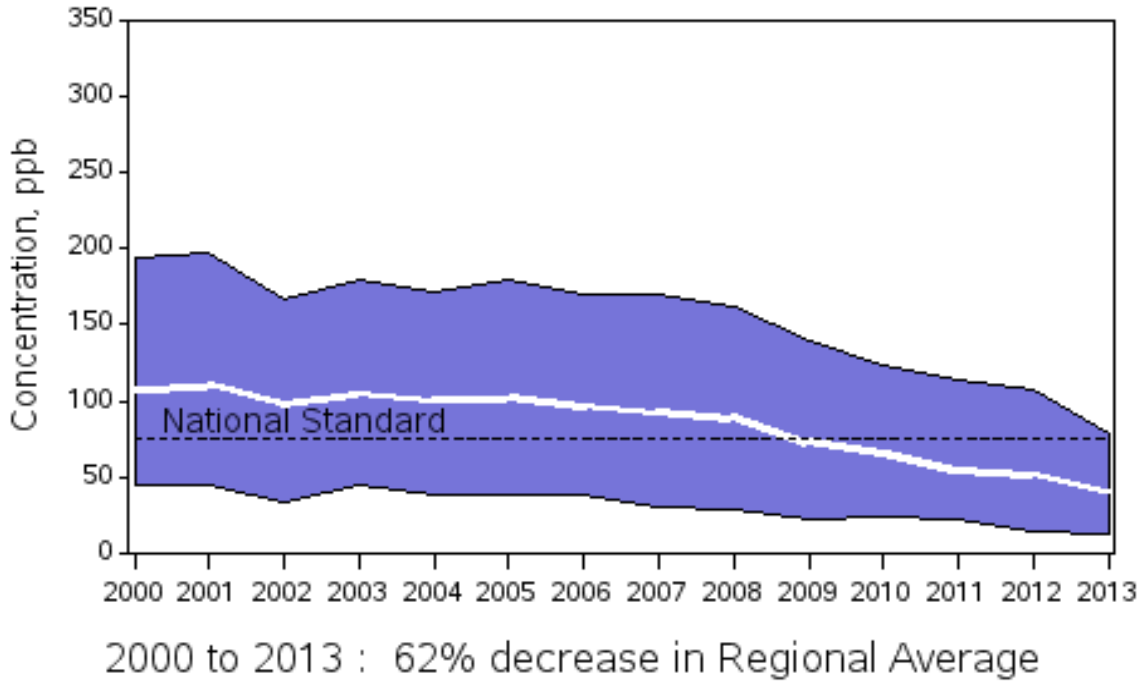
These models estimate huge impacts in terms of hypothetical lives lost or hospitalizations from incremental additions of $PM_{2.5}$ from CFPPs because large populations that are located long distances from the plants modeled are assumed to be exposed to $PM_{2.5}$ in a manner that is highly unrealistic. The majority of the impacts from such models are estimated at locations distant from the plants modeled, a fact that is rarely appreciated by citizens that live near the modeled plants and whose fears these groups exploit with their unsubstantiated claims about health effects attributable to CFPPs.

More technical detail on the issues associated with the CATF and EIP models, many of which have been identified by others (Gradient, 2015; Abt, 2010) are discussed in more detail in **Appendix C**.

6.0 CRITERIA POLLUTANT CONCENTRATIONS HAVE DECREASED DRAMATICALLY IN THE ST. LOUIS REGION

Consistent with the drop in SO_2 levels that have occurred across the US, the Central region (Missouri, Illinois, Indiana, Ohio, West Virginia, Kentucky, and Tennessee) saw a 62% decrease in ambient SO_2 levels between 2000 and 2013, as shown in **Figure 5** below.

FIGURE 5: ANNUAL 99TH PERCENTILE DAILY MAXIMUM 1-HOUR AVERAGE SO_2 CONCENTRATION



Source: EPA Sulfur Dioxide Air Trends. http://www.epa.gov/airtrends/sulfur.html.

The blue band shows the distribution of SO_2 levels among the trend sites, displaying the middle 80%. The white line represents the average among all the trend sites. Ninety percent of sites have concentrations below the top line, while 10% of sites have concentrations below the bottom line.

According to the EPA Air Trends website (EPA, 2015), decreases in Central regional averages have been observed for other criteria pollutants between 2000 and 2013, as summarized below:

- Annual $PM_{2.5}$ – 38% decrease
- 24-hour PM_{10} – 33% decrease
- 1-hour NO_2 – 22% decrease
- 8-hour ozone – 21% decrease

6.1 ST. LOUIS CORE-BASED STATISTICAL AREA

Air monitoring data from all of the central-site ambient monitors in the St. Louis Core Based Statistical Area (CBSA) were compiled and summarized in a case study of the air quality impacts of Ameren's four St. Louis-area CFPPs (Gradient, 2015). The St. Louis CBSA consists of the city of St. Louis, seven nearby counties in Missouri (Franklin, Jefferson, Lincoln, St. Charles, St. Louis, Warren, and Washington), and eight nearby counties in Illinois (Bond, Calhoun, Clinton, Jersey, Macoupin, Madison, Monroe, and St. Clair). According to the case study, ***the highest 2011-2013 1-hour SO_2 design value for all monitors in the St. Louis CBSA,* excluding Herculaneum, was approximately 50 ppb, which is well below the 75 ppb NAAQS.** Herculaneum was excluded because the Doe Run smelter, which shut down at the end of 2013, was a major source of SO_2 in the area and since its closure, SO_2 levels have fallen precipitously (2014 99th percentile 1-hour SO_2 concentration was 18 ppb). Therefore, a 2013-2015 design value for monitors in the St. Louis CBSA including Herculaneum (using unofficial data for the Herculaneum monitor through April 13, 2015 available on the US AirData website and assuming that concentrations will remain similar for the remainder of 2015) was estimated at 60 ppb, which is also well below the current NAAQS. Therefore, the air concentrations monitored in the St. Louis CBSA are below levels demonstrated to cause respiratory effects in healthy individuals and asthmatics.

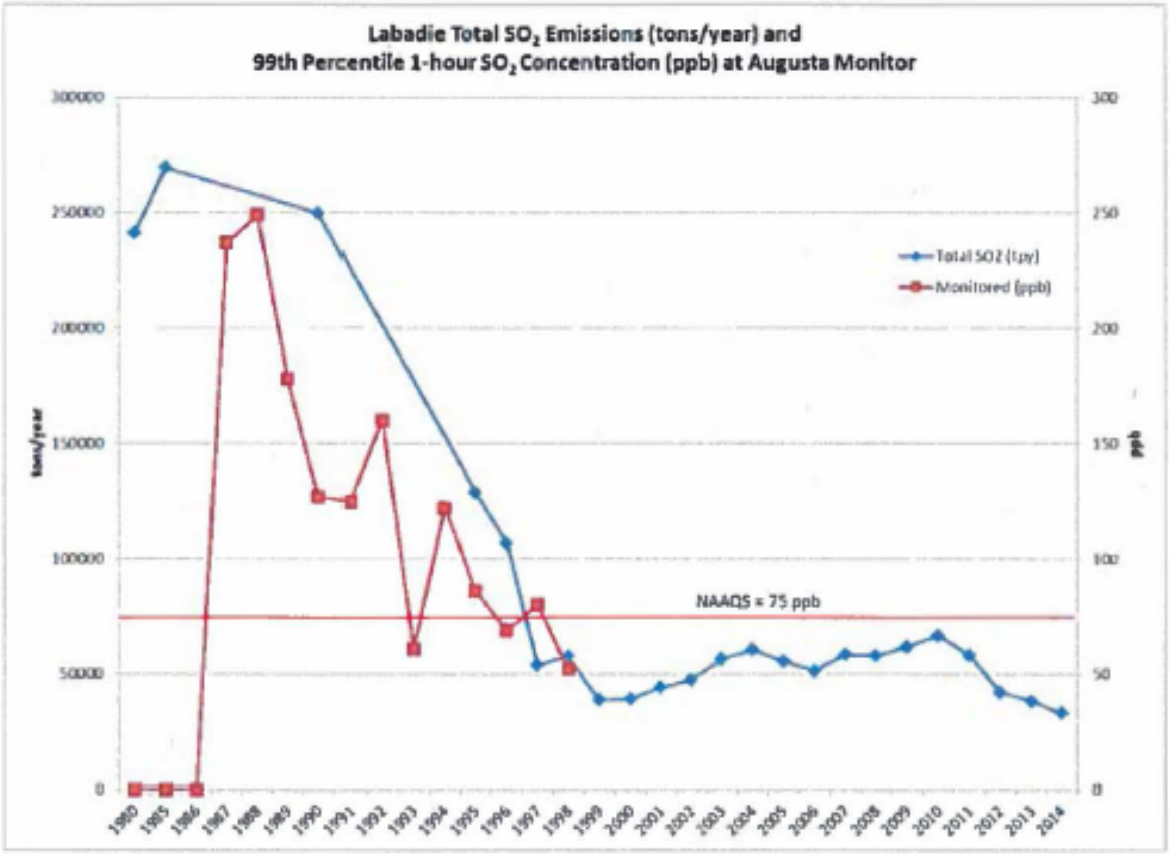
As shown in the Gradient (2015) report, 24-hour and annual concentrations of $PM_{2.5}$ (Figures 1.2 and 1.3 of Gradient report) and hourly and annual concentrations of NO_2 (Figures 1.6 and 1.7 of Gradient report) concentrations are also below their respective NAAQS in the St. Louis CBSA.

6.2 FRANKLIN COUNTY

SO_2 monitoring data in the vicinity of Ameren's Labadie plant in Franklin County are available for two different time periods: 1) current air monitoring initiated in April of 2015; and 2) previous multiple-year monitoring conducted by MDNR from 1987 to 1998. During the last few years of the MDNR monitoring (1995-1998), Plant emissions were significantly reduced as a result of the switch to low-sulfur coal obtained in response to the Clean Air Act's Acid Rain Phase 1 requirements (AECOM, 2015).

According to the *Analysis of SO_2 NAAQS Compliance for the Labadie Energy Center* conducted by AECOM (AECOM, 2015), emissions at the Labadie Generating Station decreased by about 75% from the time that the monitoring began in 1987 to when it ended in 1998, coinciding with the switch from higher sulfur coal to Powder River Basin (PBR) coal. As shown in **Figure 6** below (Figure 3 of the AECOM report), the 99th percentile 1-hour SO_2 monitored values also decreased in a similar manner during this period.

FIGURE 6: TRENDS IN SO_2 EMISSIONS AND SO_2 MONITORING FOR LABADIE ENERGY STATION



Source: AECOM, 2015. *SO_2 NAAQS Compliance for the Labadie Energy Center*.

According to the AECOM report (AECOM, 2015), the former Augusta MDNR SO_2 monitor, which was about 2 km from the Plant, was at a distance consistent with peak impacts measured near similar facilities in past field studies (Liu & Moore, 1984). In addition, it was sited in a direction with frequent winds based on Spirit of St. Louis airport wind rose (see Figure 4 of AECOM report). Therefore, the most recent data from the former MDNR Augusta monitor location, which was collected after the switch to low sulfur coal, are most relevant to current air quality.

During the last 36 months of monitoring (September 1995 - August 1998) at the Augusta monitor, a 99th percentile peak daily 1-hour maximum concentration (the "design concentration") of 69 ppb was measured. This is comfortably below the SO_2 NAAQS of 75 ppb.

Ameren initiated a new SO_2 monitoring program in 2015 to evaluate the air quality impact of the Labadie Energy Center. The monitoring plan was approved by the MDNR. Two monitors, corresponding to distances and directions expected to be in peak impact locations became operational in April (2015). As shown in **Figure 7**, one monitor (Ameren Northwest) is located across the river at the approximate location of the former MDNR Augusta monitor. The other monitor is located slightly north of the plant and approximately three kilometers to the east.

FIGURE 7: CURRENT SO_2 MONITORS IN THE VICINITY OF LABADIE GENERATING STATION

Source: Source: AECOM, 2015. *SO_2 NAAQS Compliance for the Labadie Energy Center*.

Based on the available data (about 3 months), peak (maximum) measured hourly SO_2 concentrations at the two sites were 38 ppb at the Northwest monitor and 21 ppb at the Northeast monitor. Both concentrations are well below the SO_2 NAAQS of 75 ppb.[7]

[7] For consistency with the presentation given, monitoring data collected prior to the August 27, 2015 public hearing was used for this report. On August 27th, a SO_2 concentration of 51 ppb was recorded at the Northeast monitor. This level is well below the 1-hour SO_2 NAAQS and does not change any of the opinions expressed at the hearing or in this report.

7.0 CONCLUSION

Available monitoring data indicate that the area surrounding the Labadie plant is currently in compliance with the primary SO_2 NAAQS, which provides public *health* protection, including protecting the health of "sensitive" populations *such as asthmatics, children, and the elderly*, and has been since at least 1998. In addition, the available monitoring data also indicate that the area is in compliance with the secondary NAAQS, which provides public *welfare* protection, including protection against damage to crops, vegetation, and materials. Therefore, there is no reason to fear that emissions from the Labadie plant have adversely affected air or land in the immediate vicinity of the Plant or beyond since the SO_2 impacts from the Plant are clearly localized.

8.0 RESPONSES TO SELECT COMMENTS MADE DURING THE AUGUST 27, 2015 MDNR PUBLIC HEARING

Several representatives of environmental groups at the August 27th, 2015 MDNR Public Hearing on Proposed Options for Area Boundary Recommendations for the 2010 1-Hour Sulfur Dioxide Standard: July 2016 Designations made allegations about health effects attributable to emissions from the Labadie Energy Center, the adequacy of the monitoring near the Labadie Energy Center, and the legitimacy of an "Unclassifiable Designation" for portions of Franklin and St. Charles Counties.

In the responses provided below, I have attempt to correct misrepresentations of the emissions from the Labadie Energy Center and mischaracterizations of the potential for health effects associated with emissions from the Plant by citing to *real* data to show that the claims made are not supported by the evidence. The Commission is urged not to allow unsubstantiated claims from environmental activists to substitute for credible evidence and data.

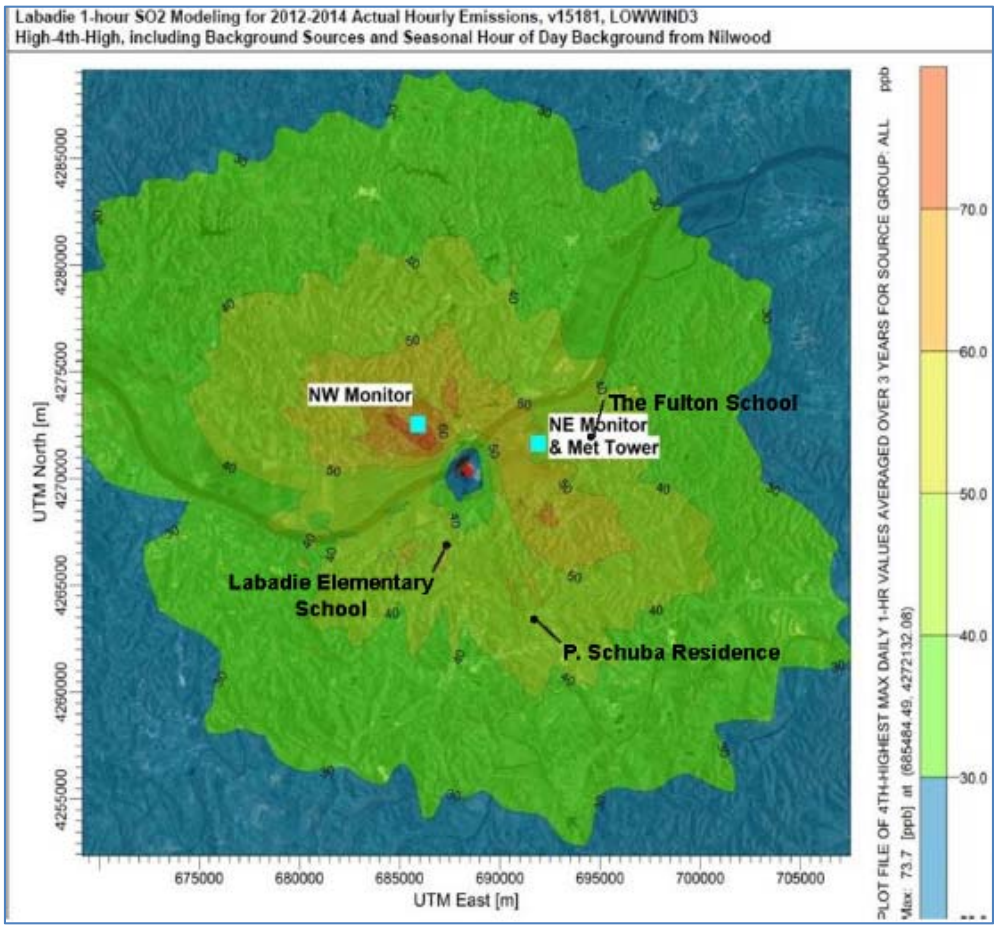
8.1 COMMENTS RELATING TO MONITOR PLACEMENT AND HISTORICAL EMISSIONS

Sierra Club contends that the former MDNR Augusta monitor showed exceedances of the current SO_2 NAAQS for most of the years that it was operated and that MDNR failed to share that in its discussion of options.

Response: In accordance with the form of the NAAQS, the 99th percentile 1-hour SO_2 concentration, a near maximum value, was calculated using data from the former MDNR Augusta monitor during the last 3 years of operation (between September 1995 and August 1998). The 99th percentile 1-hour SO_2 concentration during this period was 69 ppb, which is below the current NAAQS. As discussed in **Section 6.2**, SO_2 emissions were significantly reduced during this period as a result of Labadie's switch to low-sulfur coal in response to the Clean Air Act's Acid Rain Phase 1 requirements. Only those SO_2 levels monitored after the switch to low-sulfur coal are relevant to current air quality conditions. It is ludicrous to suggest that SO_2 levels monitored before Labadie switched to low-sulfur coal is in any way representative of current conditions and, therefore, the MDNR was correct in focusing its discussion on SO_2 levels monitored during the last period of monitoring for the Augusta monitor.

Patricia Schuba, a resident of Franklin County who lives near the Labadie Energy Center, made comments on behalf of the Labadie Environmental Organization (LEO). Ms. Schuba contends that in living within "the impact zone" of the Labadie Energy Center, she has been exposed to high levels of SO_2, PM, and airborne mercury.

Response: The location of Ms. Schuba's residence as well as nearby schools have been plotted onto a map of SO_2 concentration isopleths and depicted below. As shown in the figure, the air dispersion modeling results indicate that 1-hour concentrations of SO_2 at these locations are expected to be in the 40-50 ppb range, well below the health-protective SO_2 NAAQS of 75 ppb.



Ms. Schuba also asserted unsubstantiated claims that emissions from the Labadie plant are responsible for the loss of 140 – 210 lives per year, citing to the EIP (2012) report for the proposition that the Plant is killing people.

Response: Claims regarding mortality due to power plant emissions are based on health impact estimates made by the CATF (CATF, 2014) and EIP (EIP, 2012). I address the deficiencies of such analyses in **Appendix C**.

Ms. Schuba also opined that SO_2 is not the only contaminant of concern from a health perspective.

Response: SO_2 can react with other pollutants to form $PM_{2.5}$ in the atmosphere. However, despite claims by the CATF and EIP that the great majority of the impact of power plants is due to $PM_{2.5}$ formation from gaseous pollutants, the increment of secondary $PM_{2.5}$ theoretically contributed by CFPPs is small by comparison to $PM_{2.5}$ exposures that we all experience from everyday sources (primarily indoors) such as cooking, burning candles, commuting via bus or subway, or walking vigorously (Gradient, 2015; Levy, Dumyahn, & Spengler, 2002; Levy, Spengler, Hlinka, Sullivan, & Moon, 2002).

Given the many sources of $PM_{2.5}$, including natural sources in the environment, it can be concluded that direct emissions of $PM_{2.5}$ from CFPPs and the formation of $PM_{2.5}$ from other gaseous pollutants emitted from CFPPs contribute a miniscule portion of our everyday $PM_{2.5}$ exposures.

9.0 REFERENCES

Abt. (2010). *Technical Support Document for the Power Plant Impact Estimator Software Tool.*

AECOM. (2015). *Analysis of S02 NAAQS Compliance for the Labadie Energy Center.*

Amdur, M., Melvin, W., & Drinker, P. (1953). Effects of inhalation of Sulphur dioxide by man. *Lancet, 265*, 758–759.

Anderson, H. (1997). Air pollution and trends in asthma. In D. Chadwick, & G. Cardew (Eds.), *The Rising Trends in Asthma* (pp. 190-207). New York: John Wiley and Sons.

Anderson, H., Butland, B., van Donkelaar, A., Brauer, M., Strachan, D., & al, e. (2012). Satellite-based estimates of ambient air pollution and global variations in childhood asthma prevalence. *Environ Health Perspect, 120*(9), 1333-1339.

Belanger, K., Beckett, W., Triche, E., Bracken, M., Holford, T., Ren, P., . . . Platts-Mills, T. (2003). Symptoms of wheeze and persistent cough in the first year of life: associations with indoor allergens, air contaminants, and maternal history of asthma. *Am J Epidemiol, 158*(3), 195-202.

Carr, W., Zeitel, L., & Weiss, K. (1992). Variations in asthma hospitalization and deaths in New York City. *Am J Public Health, 82*, 59-65.

CATF. (2010). *Clean Air Task Force. The Toll From Coal An Updated Assessment of Death and Disease from Americas Dirtiest Energy Source.*

CATF. (2014, August 31). *Death and Disease from Power Plants.* Retrieved from http://www.catf.us/fossil/problems/power_plants//

CDC. (2012). *Centers for Disease Control and Prevention. National Surveillance of Asthma: United States, 2001–2010. Series 3, No. 35.*

De Palo, V., Mayo, P., & Friedman, P. R. (1994). Demographic influences on asthma hospital admission rates in New York City. *Chest, 106*, 447-451.

EIP. (2012). *Environmental Integrity Project. Net Loss: Comparing the Cost of Pollution vs. the Value of Electricity from 51 Coal-Fired Plants.*

EPA. (2008). *Integrated science assessment for sulfur oxides — health criteria. EPA/600/R-08/047F.*

EPA. (2015, August 2). *Air Trends*. Retrieved from United States Environmental Protection Agency: http://www.epa.gov/airtrends/sulfur.html.

EPA. (2015). *User's Manual for the Co-Benefits Risk Assessment (COBRA) Screening Model. Version: 2.7.*

Frank, N., Amdur, M., Worcester, J., & Whittenberger, J. (1962). Effects of acute controlled exposure to SO2 on respiratory mechanics in healthy male adults. *J Appl Physiol, 17*, 252–258.

Goodman, J., Dodge, D., & Bailey, L. (2010). A framework for assessing causality and adverse effects in humans with a case study of sulfur dioxide. *Reg Toxicol Pharmacol, 58*, 308–322.

Gottlieb, D., Beiser, A., & O'Connor, G. (1995). Poverty, race, and medication use are correlates of asthma hospitalization rates. A small area analysis in Boston. *Chest, 108*(1), 28-35.

Gradient. (2015). *A Case Study: The Public Health Consequences of Air Emissions from Coal-Fired Power Plants in the St. Louis Area.*

Gupta, R., Zhang, X., Sharp, L., Shannon, J., & Weiss, K. (2008). Geographic variability in childhood asthma prevalence in Chicago. *J Allergy Clin Immunol, 121*(3), 639-645.

HEI. (2009). *Health Effects Institute. Extended Follow-Up and Spatial Analysis of the American Cancer Society Study Linking Particulate Air Pollution and Mortality." HEI Research Report 140.*

IOM. (2000). *Institute of Medicine. Clearing the Air: Asthma and Indoor Air Exposures.* National Academy Press. Retrieved from http://www.nap.edu/openbook.php?isbn=0309064961

ISAAC. (1998). International Study of Asthma and Allergies in Childhood. Worldwide variation in prevalence of symptoms of asthma, allergic rhinoconjuncitivitis, and atopic eczema: ISAAC. *Lancet, 351*, 1225-1232.

Johns, D., & Linn, W. (2011). A review of controlled human SO2 exposure studies contributing to the US EPA integrated science assessment for sulfur oxides. *Inhal Toxicol, 23*(1), 33–43.

Lawther, P. (1955). Effect of inhalation of sulphur dioxide on respiration and pulse-rate in normal subjects. *Lancet, 269*, 745–748.

Leaderer, B., Belanger, K., Triche, E., Holford, T., Gold, D., Kim, Y., . . . Bracken, M. (2002). Dust mite, cockroach, cat, and dog allergen concentrations in homes of asthmatic children in the northeastern United States: Impact of socioeconomic factors and population density. *Leaderer et al., 2002. Dust mite, cockroach, cat, and dog allergen concentrations in homes of asthmatic children in the northeastern United States: Impact of socioeconomic factors and population density. Environ Health Perspect 110(4):419-25, 110*(4), 419-425.

Levy, J., Dumyahn, T., & Spengler, J. (2002). Levy, JI; Dumyahn, T; Spengler, JD. 2002b. "Particulate matter and polycyclic aromatic hydrocarbon concentrations in indoor and outdoor microenvironments in Boston, Massachusetts. *J Exp Anal Environ Epidem, 12*, 104-114.

Levy, J., Spengler, J., Hlinka, D., Sullivan, D., & Moon, D. (2002). Using CALPUFF to evaluate the impacts of power plant emissions in Illinois: Model sensitivity and implications. *Atmos Environ, 36*, 1063-1075.

Linn, W., Avol, E., Peng, R., Shamoo, D., & Hackney, J. (1987). Replicated dose response study of sulfur dioxide effects in normal, atopic, and asthmatic volunteers. *Am Rev Respir Dis, 136*, 1127–1134.

Linn, W., Avol, E., Shamoo, D., Peng, R., Spier, C., Smith, M., & Hackney, J. (1988). Effect of metaproterenol sulfate on mild asthmatics' response to sulfur dioxide exposure and exercise. *Arch Environ Health, 43*, 399–406.

Linn, W., Fischer, D., Shamoo, D., Spier, C. V., Anzar, U., & Hackney, J. (1985). Controlled exposures of volunteers with chronic obstructive pulmonary disease to sulfur dioxide. *Environ Res, 37*, 445–451.

Linn, W., Shamoo, D., Peng, R., Clark, K., Avol, E., & Hackney, J. (1990). Responses to sulfur dioxide and exercise by medication-dependent asthmatics: effect of varying medication levels. *Arch Environ Health, 45*, 24–30.

Linn, W., Venet, T., Shamoo, D., Valencia, M., Anzar, U., Spier, C., & Hackney, J. (1983). Linn, Venet, Shamoo, Valencia, Anzar, Spier, Hackney, 1983. Respiratory effects of sulfur dioxide in heavily exercising asthmatics. Am Rev Respir Dis 127:278–283. *Am Rev Respir Dis, 127*, 278–283.

Liu, M., & Moore, G. (1984). *Diagnostic validation ol plume models al a plalns site. EPRI Report No. EA-3077, Research Project 1616-9.*

Manfreda, J., Becker, A., Wang, P., Roos, L., & Anthonisen, N. (1993). Trends in physician-diagnosed asthma prevalence in Manitoba between 1980 and 1990. *Chest, 103*, 151-157.

Marcus, P., & Braman, S. (2010). International Classification of Disease Coding for Obstructive Lung Disease: Does It Reflect Appropriate Clinical Documentation? *Chest*, Chest 138(1):188–192.

MDHSS. (2010). *Missouri Asthma Surveillance Report: The Burden of Asthma in Missouri.* Retrieved from http://health.mo.gov/living/healthcondiseases/chronic/asthma/pdf/burdenreport.pdf

Nadel, J., Salem, H., Tamplin, B., & Tokiwa, Y. (1965). Mechanism of bronchoconstriction during inhalation of sulfur dioxide. *J Appl Physiol, 20*, 164–167.

NAS. (2011). *National Academy of Sciences. Reference Guide on Epidemiology. Third Edition.* Washington DC: National Academies Press. Retrieved from http://www.fjc.gov/public/pdf.nsf/lookup/SciMan3D01.pdf/$file/SciMan3D01.pdf

Peat, J., & Li, J. (1999). Reversing the trend: Reducing the prevalence of asthma. *J Allergy Clin Immunol, 103*(1), 1-10.

Pope, C., Burnett, R., Thun, M., Calle, E., Krewski, D., & al., e. (2002). Lung cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution. *JAMA, 287*(9), 1132-1141.

Reichel, G. (1972). The effect of sulfur dioxide on the airway resistance of man. . *Report on the 12th annual meeting of the German Society for Industrial Medicine, Dortmund, Germany, October 25–28 as cited in Johns and Linn, 2011.*

Schwartz, J., Coull, B., Laden, F., & Ryan, L. (2008). The effect of dose and timing of dose on the association between airborne particles and survival. *Environ Health Perspect, 116*(1), 64-69.

Teach, S., Crain, E., Quint, D., Hylan, M., & Joseph, J. (2006). Indoor environmental exposures among children with asthma seen in an urban emergency department. *Pediatrics, 117*(4 Pt 2:S), 152-158.

Weir, F., & Bromberg, P. (1972). *Further investigation of the effects of sulfur dioxide on human subjects. Project No. CAWC S-15. .* Washington DC. : American Petroleum Institute. Retrieved from http://global.ihs.com/search_res.cfm?MID=W097&input_doc_number=API%2026-60022

Weir, F., & Bromberg, P. (1973). *Effects of sulfur dioxide on human subjects exhibiting peripheral airway impairment. Project No. CAWC S-15.* Washington, DC.: American Petroleum Institute. Retrieved from http://global.ihs.com/search_res.cfm?MID=W097&input_doc_number=API%2026-6002

WHO. (2006). *Air Quality Guidelines Global Update 2005.*

APPENDIX A

RESUME

LUCY H. FRAISER, PH.D., DABT
Principal

AREAS OF EXPERTISE

- Toxicological Evaluations
- Risk Assessments
- Risk Communication
- Litigation Support
- Agency Negotiations
- Development of Innovative Risk-Based Approaches
- Exposure Modeling

EDUCATION

Ph.D., Toxicology, *University of Texas at Austin, 1992*

B.A. Psychology, *University of Texas at Austin, 1985*

REGISTRATIONS / AFFILIATIONS / CERTIFICATIONS

Diplomate of the American Board of Toxicology

American College of Toxicology

National Society of Toxicology

Lone Star Society of Toxicology

National Member, Air & Waste Management Association

Dr. Lucy Fraiser is a board certified toxicologist with over 24 years of experience in the areas of exposure and risk assessment, health effects and toxicology evaluations, development of quantitative toxicity criteria, development of risk-based air quality guidelines and soil cleanup criteria, and risk communication. While Dr. Fraiser works with all environmental media, she specializes in air quality health evaluations, including assessment of whether criteria pollutant emissions cause or contribute to a condition of air pollution and determination of the likelihood that air toxics will adversely impact health or welfare.

Dr. Fraiser has worked in both the public and private sectors over the last 24 years. She has conducted and managed multi-pathway exposure and human health risk assessments for a wide variety of environmental pollutants and sources. Dr. Fraiser has, on many occasions, examined the scientific foundation on which exposure assumptions and toxicity criteria are based on behalf of private and public sector clients and trade organizations. Her leading work on these issues has resulted in corrections to regulatory guidance and risk-based criteria on a number of occasions. She has conducted hundreds of exposure assessments for chemicals used in pharmaceutical laboratories and industrial processes, chemicals applied to control pests and unwanted vegetation, and chemicals released as unwanted by-products of chemical and product manufacturing, combustion of fossil and waste-derived fuels, generation of electricity, petroleum refining, smelting, rock crushing, and activities at military installations.

Litigation Experience

Dr. Fraiser has been qualified as an expert, deposed, and has provided expert testimony in contested case hearings, criminal case hearings, Federal Civil suits, and toxic tort litigation on numerous occasions. She has testified before the Texas State Legislature, in public meetings, and before numerous state regulatory agencies on behalf of commercial clients. Dr. Fraiser also conducted a televised press conference on behalf of a state and a national trade organization regarding mercury emissions from power plants.

Dr. Fraiser recently provided critical expert testimony in a high-profile toxic tort case involving a flaring event at a multi-national petrochemical company that resulted in a jury verdict for the defense. She also recently provided critical testimony in a citizen suit against a Texas energy company in which a judge from the Western District of Texas ruled from the bench that there were no violations of the Clean Air Act and later ordered the Plaintiff to pay $6.4 million in defense attorneys' fees. Dr. Fraiser also recently provided critical expert testimony in another citizen suit against a Texas petrochemical company involving excess air emission and maintenance, startup, and shutdown events. The federal cases

involved alleged violations of opacity standards, National Ambient Air Quality Standards, and in the case of the petrochemical plant, screening levels for compounds considered to be hazardous air pollutants.

She has also provided testimony on potential risks associated with permitting of rock crushers (silica, limestone, PM10/2.5), a concrete batch plant (silica, PM10/2.5), hazardous waste combustion units (polycyclic aromatic hydrocarbons, polychlorinated biphenyls (PCBs), dioxins), and a copper smelter (PM10/2.5, NO2, SO2, sulfuric acid, arsenic, lead, and cadmium). Dr. Fraiser has also developed opinions in cases that did not go to hearing regarding the likelihood that exposure to H2S/SO2 from a from a Sulfur Recovery Unit release was sufficient to cause known health effects, the potential for health effects associated with relatively short-term exposure to benzene concentrations in drinking water above the Maximum Contaminant Level, and potential risks associated with lead and total petroleum hydrocarbon (TPH) levels detected in street sweepings.

Regulatory Experience

As a Senior Toxicologist with the TCEQ, Dr. Fraiser conducted and managed risk assessments for incinerators and industrial boilers seeking permits to burn hazardous waste, provided support to the US Environmental Protection Agency (EPA) as they formulated national policies related to combustion risk assessment, provided critical input into the development of protective concentrations under the TRRP, served as an external peer reviewer for risk assessment guidance documents developed by EPA Region 6 and adopted as national guidance, and represented the Agency on EPA workgroups and in contested case hearings.

Dr. Fraiser recently provided comments to EPA on behalf of commercial clients questioning the extent to which health studies support the need for a tighter ozone NAAQS. She also provided comments on the Boiler MACT Health-Based Emissions Limitations on behalf of a trade organization. In the past, she has developed technical comments on EPA Risk Assessment Protocols for Hazardous Waste Combustion Facilities on behalf of the Louisiana Chemical Association and the Cement Kiln Recycling Coalition, and completed formal technical comments on behalf of a power generation client on a risk-based program intended to significantly reduce levels of toxic air contaminants in Kentucky.

Air Quality Health Impact Evaluations

Dr. Fraiser was the health risk assessment advisor for a study recently completed on behalf of the Electric Power Research Institute (EPRI) that evaluated the potential health risk from emissions of coal fired power plants throughout the U.S. She recently served as project manager responsible for multi-pathway risk assessment updates for a specialty chemical company to support permitting activity that reflected the installation of new sulfur dioxide (SO2) abatement equipment, served as the risk assessment team lead for a vapor intrusion evaluation using crawl-space soil vapor and ambient air samples collected beneath and near a house in the vicinity of a crude oil release, and performed a health risk assessment using indoor and ambient air samples from a manufacturing facility.

Dr. Fraiser has conducted or served as task leader on more than two dozen human health risk assessments conducted in support of Resource Conservation Recovery Act (RCRA) Part B permit applications for hazardous waste combustion units at chemical plants, waste management facilities, army depots, and cement kilns.

Risk-Based Corrective Action and Risk Assessment

Dr. Fraiser has conducted and/or served as task leader for over 75 human health risk assessments and/or risk-based corrective action (RBCA) evaluations in support of RCRA closures or under the Comprehensive Environmental Response, Compensation, and Liability Act for both commercial companies and government clients.

Dr. Fraiser has substantial experience performing risk evaluations under the Texas Risk Reduction Rule and the Texas Risk Reduction Program (TRRP), as well as other state RBCA programs. She has completed and received Texas Commission on Environmental Quality (TCEQ) approval for several Affected Property Assessment Reports and has provided support on the successful completion of several Response Action Completion Reports.

Dr. Fraiser recently completed a multi-media human health risk assessment for high school at which placement of fill material to build up the area for sports fields resulted in PCB contamination. She also recently completed a toxicity assessment and fish cooking loss study for dioxins and PCBs for a contaminated river segment in the northeast.

Toxicological Evaluations and Risk-Based Regulatory Criteria Development

Dr. Fraiser has developed numerous health-based criteria for compounds lacking published values using toxicity studies, structure activity relationships, and her knowledge of pharmacokinetics. She has developed risk-based regulatory criteria including emergency response planning guidelines, inhalation reference concentrations, water quality criteria, and acceptable ambient air levels, including Effects Screening Levels (ESLs), for a number of compounds. Based on her understanding of the human health underpinnings of federal regulations and state corrective action and air quality guidelines, Dr. Fraiser has assisted many clients wishing to challenge health-based criteria during public comment periods and in identifying adjustments to existing criteria.

Publications, Presentations and Training Courses

Fraiser L. EPA May Go Beyond Law and Science in Setting NAAQS. Natural Gas & Electricity, 30(3):1-8. October, 2014.

Fraiser L., and Karen Olson. Ozone NAAQS – Where is it Headed? Texas Association of Business, Austin TX. July 24, 2014.

Fraiser L. Ozone NAAQS – Where is it Headed? Houston Regional Monitoring Association, Houston, TX. July 9, 2014.

Fraiser L., and Davis B. Ozone NAAQS – Where is it Headed? Clean Air Force of Central Texas, Austin TX. April 24, 2014.

Fraiser L., and Karen Olson. Ozone NAAQS – Where is it Headed? Winstead PC, Austin TX. May 27, 2014.

Fraiser L., and Sullivan, T. Ozone NAAQS – Where is it Headed? Texas Pipeline Association, Austin TX. April 9, 2014.

Fraiser, L. Recent Reductions in NAAQS – Good Science or Perpetuation of Dogma on Health Consequences of Low-Level Air Pollutants? Energy Utility Environment Conference, Phoenix AZ. February 3 -5, 2014.

Fraiser, L.H. and Bradley, L.J.N. Key Decisions in Establishing National Ambient Air Quality Standards. 52nd Annual Meeting of the Society of Toxicology. San Antonio, Texas. March 10 – 14, 2013.

Fraiser, L.H. Health Basis for EPA's 1-Hr SO2 NAAQS. Alamo Chapter AWMA Meeting, January 10, 2013.

Ruffle, B., Fraiser, L., Kaczmar, S., Schew, W. Update on Cooking Loss Factors for PCDD/PCDFs, PCBs and Chlorinated Pesticides. Passaic River Symposium V. Passaic River Institute of Montclair State University. October 19, 2012.

Fraiser, L.H. and Vosnakis, K.A.S. Evolution of PCB Regulations and Toxicity Assessment: Impact on Environmental Management. 27th Annual International Conference on Soils, Sediments, Water and Energy, Amherst, Massachusetts. October 17 – 19, 2011.

Fraiser, L. Toxicology & Risk Assessment in the News: Recent EPA Proposals with Broad Implications. Invited Presented at the Gulf Coast Air & Waste Management Association Meeting. Houston, Texas. June 08, 2010.

Fraiser, L.H. Toxicology & Risk Assessment in the News: Recent EPA Proposals with Broad Implications. Houston Air & Waste Management Association. June 2010.

Fraiser, L.H., Quintin, A. Durocher, K. Szembek, C. Heinold, D. EPRI Human Health and Environmental Risk Assessment Process. February 18, 2010.

Fraiser, L.H. Trends in International Risk-Based Screening Levels (RBSLs). Society of Toxicology and Chemistry, New Orleans, Louisiana. November 19 – 23, 2009.

Fraiser, L.H. Risk Assessment: How it Can Inform Site Closure Decisions. Invited Short Course presented to the Department of Environment Malaysia, Kuala Lumpur. March 4 – 5, 2009.

Fraiser, L.H. Incinerator Risk Assessment: Principles and Practices, Hong Kong. Regional Conference on Sustainable Waste Management in Carbon-Conscious Cities. December 2008.

Site-Specific Risk Assessments, RCRA Omnibus Provision and Combining Risk Burns and Comprehensive Performance Tests. MACT EEE EPA Training Workshop, Dallas, TX. November 3 – 8, 2008.

Fraiser, L.H. Involvement of Local Governments in Air Toxics Regulation. Texas Chemical Council/ Association of Chemical Industry of Texas's EH&S Seminar Moody Gardens Hotel, Galveston Texas. June 10, 2008.

Fraiser, L.H., and Chaudhuri, I. Short-Term Toxicity Benchmark for Nickel Oxide. 42nd Annual Society of Toxicology Meeting. March 9 – 14, 2002. Salt Lake City, Utah.

Fraiser, L.H., and Ruffle, B. "Chemical Regulations with Business Implications." Environmental Protection. June, 2002.

Fraiser, L.H., and Chaudhuri, I. Short-Term Toxicity Benchmark for Nickel Oxide. International Conference on Incineration & Thermal Treatment Technologies Proceedings. May 13 -17, 2002. New Orleans, Louisiana.

Fraiser, L.H., and Chaudhuri, I. Short-Term Toxicity Benchmark for Nickel Oxide. Proceedings of the Air & Waste Management Association. April 16 - 19, 2002. St. Louis, Missouri.

Fraiser, L.H., Chaudhuri, I, and Smith, D. EPA's Dioxin Reassessment – Potential Impacts to the Regulated Community. Proceedings of the Air & Waste Management Association. June 24 - 28, 2001. Orlando, Florida.

Fraiser, L.H., Roeck, D., and Smith, D. New Developments in Dioxin Regulation – Potential Impacts on the Regulated Community. International Conference on Incineration & Thermal Treatment Technologies Proceedings. May 14 -18, 2001. Philadelphia, Pennsylvania.

Fraiser, L.H., Roeck, D., and Smith, D. Current Environment of Hazardous Waste Combustion. International Conference on Incineration & Thermal Treatment Technologies Proceedings. May 14 -18, 2001. Philadelphia, Pennsylvania.

Fraiser, L.H., and Pope, P.G. Hazardous Waste Combustion Risk Assessment — Artifact or True Risk? International Conference on Incineration & Thermal Treatment Technologies Proceedings. May 8-12, 2000. Portland, Oregon.

Fraiser, L.H., and Lewis, D. Detection Limits: Practical Implications for Risk Assessments Conducted on Hazardous Waste Combustion Units. Presented before the Louisiana Chemical Association. September 9, 1999. Baton Rouge, Louisiana.

Fraiser, L.H., Tachovsky, J.A., King, M.L., McCoy, J.T., and Haws, L.C. Hazardous Waste Combustion Risk Assessment Experience in the State of Texas. International Conference on Incineration & Thermal Treatment Technologies Proceedings. pp. 189-196. May 11-15, 1998. Salt Lake City, Utah.

Fraiser, L., McCoy, J.T., Perry, C., King, M., and Haws, L.C. Screening Risk Analysis for the Bayer Corporation Facility in Baytown, Texas. TNRCC publication number AS-120, AS-120A, and AS-120B. November 1996.

Fraiser, L., Lund, L., Tyndall, K., King, M., Schultz, D., and Haws, L. Case Studies in Risk Assessment for Hazardous Waste Burning Cement Kilns in Waste Combustion in Boilers and Industrial Furnaces Proceedings. pp.208-225. March 26-27, 1996. Kansas City, Missouri.

Fraiser, L., Lund, L., Hueske, K., and Haws, L.C. Indirect Risk Assessment: Case Studies of Hazardous Waste Combustors. Toxicologist 30:6, 1996.

Fraiser, L., Lund, L., Hueske, K., King, M., and Haws, L.C. Screening Risk Analysis for the North Texas Cement Company (NTCC) Facility in Midlothian, Texas. TNRCC publication number AS-71, AS-71A, and AS-71B. January 31, 1996.

Fraiser, L., Lund, L., Hueske, K., King, M., and Haws, L.C. Screening Risk Analysis for the Texas Industries (TXI) Facility in Midlothian, Texas. TNRCC publication number AS-72, AS-72A, and AS-72B. November 2, 1995.

Ramu, K., Fraiser, L., Mamiya, B., Ahmed, T., and Kehrer, J.P. Acrolein Mercapturates: Synthesis, Characterization, and Assessment of Their Role in the Bladder Toxicity of Cyclophosphamide. Chem. Res. Toxicol. 8:515-524, 1995.

Fraiser, L., and Kehrer, J.P. Effect of Indomethacin, Aspirin, Nordihydroguairetic Acid, and Piperonly Butoxide on Cyclophosphamide-Induced Bladder Damage. Drug Chem. Toxicol. 16(2):117-133, 1993.

Fraiser, L., Barnett, J.W., and Hixson, E.J. 'Toxicity Equivalents for Chlorinated Hydrocarbon Pesticides Lacking EPA-Verified Toxicity Values.' Toxicologist 14: 1540, 1994.

Kanekal, S., Fraiser, L., and Kehrer, J.P. Pharmacokinetics, Metabolism, and Lung Toxicity of Cyclophosphamide in C57/Bl6 and ICR Mice. Toxicol. Appl. Pharmacol. 114:1-8, 1992.

Fraiser, L., and Kehrer, J.P. Murine Strain Differences in Bladder Toxicity of Cyclophosphamide. Toxicol. 75:257-272, 1992.

Fraiser, L., Kanekal, S., and Kehrer, J.P. Cyclophospharnide Toxicity: Characterizing and Avoiding the Problem. Drugs. 42(5):781 -795, 1991.

APPENDIX B

DETAILS ON THE ESTABLISHMENT OF THE 1-HOUR PRIMARY SO_2 NAAQS LEVEL AND FORM

DETAILS ON THE ESTABLISHMENT OF THE 1-HOUR PRIMARY SO2 NAAQS LEVEL AND FORM

B.1 EPA's Short-Term SO_2 Exposure Threshold Level

There are many controlled human studies that have exposed asthmatic test populations to SO_2 and that have measured small lung function decrements in the asthmatic population, particularly at higher than normal exertion levels. However, most fail to show a statistically significant responses, and even in asthmatics (a sensitive subpopulation), responses are only seen at relatively high concentrations, usually 400 ppb or more, over a 5 to 10-minute period. According to the World Health Organization (WHO), the mean response in asthmatics at 400 ppb over a 5 to 10-minute exposure has been definite though small, whereas at 200 ppb, any change has been minimal and similar in magnitude to effects of exercise alone in clean air.[8]

Despite the conclusions of the WHO, the fact that a single study[9] reported statistically significant increases in respiratory symptoms below a concentration of 400 ppb, and no studies reported clinically relevant decreases in lung function below 400 ppb,[10] EPA identified a short-term exposure threshold for SO_2 of 200 ppb in the most recent decision on the SO_2 NAAQS.[11] One study[12] did report statistically significant lung function declines at 250 ppb, but the change was not large enough to be considered clinically relevant (i.e., increase in specific airway resistance [sRaw] of 100%) and the participants in the study were also required to engage in a higher level of exertion (i.e., ventilation rate of 50 – 60 L/min) than generally used (usually ≈ 40 L/min) in most other studies.

EPA's *Integrated Science Assessment (ISA) for Sulfur Oxides – Health Criteria (Final Report)*[13] (hereafter referred to as the ISA) (Section 4.2.2) indicates that studies have consistently demonstrated that exposure to SO_2 concentrations as low as 200-300 ppb for 5-10 minutes can result in moderate or greater decrements in lung function, evidenced by a ≥15% decline in forced expiratory volume in one second (FEV_1) and/or ≥ 100% increase in sRaw, in a significant percentage of exercising asthmatics. However, lung function decrements have not been consistently shown at 200 – 300 ppb range. In fact, there is only one study that shows a 15% decrease in FEV_1 and that same study shows a 15% increase in FEV_1 in an equal number of test subjects.[14] Furthermore, lung function decrements observed following exposures at these levels have not been shown to be statistically significant at the group mean level.

[8] WHO, 2006. World Health Organization. Air Quality Guidelines Global Update 2005.

[9] Linn, Venet, Shamoo, Valencia, Anzar, Spier, Hackney, 1983. Respiratory effects of sulfur dioxide in heavily exercising asthmatics. *Am Rev Respir Dis* 127:278–283.

[10] Goodman, Dodge, and Bailey, 2010. A framework for assessing causality and adverse effects in humans with a case study of sulfur dioxide. *Reg Toxicol Pharmacol* 58:308–322.

[11] 75 CFR 35220, Jun 22, 2010.

[12] Bethel, Sheppard, Geffroy, Tam, Nadel, and Boushey, 1985. Effect of 0.25 ppm sulfur dioxide on airway resistance in freely breathing, heavily exercising, asthmatic subjects. *Am Rev Respir Dis* 131(4):659–661.

[13] EPA, 2008. Integrated Science Assessment (ISA) for Sulfur Oxides – Health Criteria (Final Report). EPA/600/R-08/047F.

[14] Linn, 2010. A critical review of selected documents concerning proposed revision of the National Ambient Air Quality Standard for sulfur dioxide. Prepared for American Petroleum Institute.

Statistical significance is a key consideration for determining whether an exposure and effect are associated. If the difference between exposed and unexposed groups is not statistically significant, then the exposure of interest was either insufficient to cause the adverse effect (i.e., the effects are caused by something other than the exposure of interest) or the study does not have enough power (i.e., test population was too small, an insufficient number of exposure doses were tested) to establish an association. Because biological effects can be caused by a number of factors in any particular person, causality cannot be inferred simply because an individual has experienced an adverse effect following exposure. Isolated effects (occurring in very few study subjects) and independent effects (occurring in the absence of other effects that are expected via the same mode of action) occur inconsistently and are, thus, more likely to reflect biological effects from another cause or a measurement error than to be exposure-related (Goodman et al., 2010).

The lung function decrements reported by EPA after exposure to 200 ppb SO_2 do not necessarily indicate an effect from SO_2 exposure, any more than lung function improvements of equal magnitude in the same number of individuals (5) signifies a beneficial effect of SO_2. It is unlikely that SO_2 is a causal factor for these effects (decrease or increase in FEV_1) and that instead, these findings simply represent the type of variability typically seen in lung function amongst the test population.

B.1.1 Controlled Exposure Studies Evaluated in Support of the 1-Hour NAAQS

Table 9-3 of EPA's *Risk and Exposure Assessment to Support the Review of the SO_2 Primary National Ambient Air Quality Standards: Final Report*[15] (hereafter referred to as the REA) and Table 3-1 of the ISA indicate that there is only limited evidence of SO_2-induced increases in respiratory symptoms in some asthmatics in the 200 to 300 ppb SO_2 concentration range, stronger evidence with some statistically significant increases in respiratory symptoms at SO_2 concentrations ranging from 400 to 500 ppb, and clear and consistent increases in SO_2 induced respiratory symptoms at concentrations between 600 to 1,000 ppb. Controlled studies of asthmatics exposed to SO_2 for 5 to 10 minutes at increased ventilation evaluated by EPA as part of the ISA (EPA, 2008) are summarized in **Table B-1**.

[15] EPA, 2009. Risk and Exposure Assessment to Support the Review of the SO2 Primary National Ambient Air Quality Standards: Final Report. EPA-452/R-09-007.

TABLE B-1: CONTROLLED HUMAN EXPOSURE STUDIES RELIED UPON BY EPA IN ESTABLISHING THE 1-HOUR SO2 NAAQS THRESHOLD LEVEL

Study	*N*	SO2 Exposure (ppb)	Ventilation Rate (L/min)	Statistically Significant Lung Function Changes	Clinically Relevant Lung Function Changes	Significantly Increased Respiratory Symptoms	NOAEL	LOAEL
Roger et al. (1985)	28	0, 250, 500, 1000	40	500, 1000	1000	1000	500	1000
Bethel et al. (1985)	19	0, 250	50-60	250	None	Symptoms not evaluated	250	None
Kehrl et al. (1987)	9 10	0, 250 0, 1000	80-90 41	None 1000	1000	Symptoms not evaluated	None	1000
Linn et al. (1987)	40	0, 200, 400, 600	40	Not reported	400, 600	Not reported	200	400
Linn et al. (1988)	20	0, 300, 600	50	Not reported	Insufficient data	Not reported	Unknown	Unknown
Linn et al. (1990)	21	0, 300, 600	50	Not reported	Insufficient data	Not reported	Unknown	Unknown
Magnussen et al. (1990)	46	0, 500	30[a]	500	500	Symptoms not evaluated	None	500
Schacter et al. (1984)	10	0, 250, 500, 750, 1000	35	750, 1000	750, 1000	Not reported	500	750
Balmes et al. (1987)	8	0, 500, 100	60[a]	500, 1000	500, 1000	Not reported	None	500
Linn et al. (1983)	23	0, 200, 400, 600	48	400, 600	600	200, 400, 600	None	200
Linn et al. (1984)	14	0, 600	50	600	600	600	None	600
Gong et al. (1995)	14	0, 500, 1000	30, 36, or 43	Not reported	Insufficient data	Not reported	Unknown	Unknown
Horstman et al. (1988)	12	0, 1000	40	1000	1000	1000	None	1000

Source: Goodman, Dodge, and Bailey, 2010. A framework for assessing causality and adverse effects in humans with a case study of sulfur dioxide. *Reg Toxicol Pharmacol* 58:308-322.

As shown in **Table B-1**, the only controlled studies in which a statistically significant and clinically relevant lung function decrement accompanied by significantly increased respiratory symptoms were observed included Roger et al. (1985)[16], Linn et al. (1983)[17], Linn et al. (1984)[18] and Horstman et al. (1988)[19]. However, the combination of lung function decrement and increased respiratory symptoms did not occur in the 200 to 300 ppb range in any of these studies. However, EPA reasoned that it is highly likely that these decrements in lung function would result in increased medication use and a disruption of normal activities for a significant percentage of these asthmatics to support its decision to develop a new 1-hour SO_2 NAAQS in 2010 (section 4.3 of REA). The ISA describes the controlled human exposure studies as being the "definitive evidence" for its causal determination between SO_2 exposure and short-term respiratory morbidity (section 5.2).

[16] Roger, Kehrl, Hazucha, Horstman, 1985. Bronchoconstriction in asthmatics exposed to sulfur dioxide during repeated exercise. J Appl Physiol 59:784–791.

[17] Linn, Venet, Shamoo, Valencia, Anzar, Spier, Hackney, 1983. Respiratory effects of sulfur dioxide in heavily exercising asthmatics. Am Rev Respir Dis 127:278–283.

[18] Linn, Avol, Shamoo, Venet, Anderson, Whynot, Hackney, 1984. Asthmatics' responses to 6-hr sulfur dioxide exposures on two successive days. Arch Environ Health 39:313–319.

[19]

B.1.2 Epidemiological Studies Evaluated in Support of the 1-Hour NAAQS

There is a relatively small body of epidemiologic evidence describing positive associations between 1-hour maximum SO_2 levels and respiratory symptoms as well as hospital admissions and Emergency Department (ED) visits for all respiratory causes and asthma.

Ten key epidemiological SO_2 studies conducted in the US were relied upon by EPA in their evaluation of the need for a 1-hour NAAQS for SO_2. Those studies are summarized in **Table B-2**.

TABLE B-2: EPIDEMIOLOGY STUDIES RELIED UPON BY EPA IN ESTABLISHING SUPPORT FOR THE 1-HOUR SO_2 NAAQS THRESHOLD LEVEL

Study	Outcome	Location	99th percentile 1-h max SO_2[a] (ppb)	Pollutants in model	Unit SO_2 Increase	SO_2 RR	95% CI	Notes
Wilson et al. (2005)	Daily ER visits for all respiratory effects and asthma	Portland, ME	47	SO_2	10 μg/m³	1.03	1.01, 1.04	Portland (all respiratory)
		Manchester, NH	69		(3.8 ppb)	1.04	1.00, 1.07	Portland (asthma)
						1.00	0.99, 1.02	Manchester (all respiratory)
						1.02	0.99, 1.06	Manchester (asthma)
Lin et al. (2004)	Childhood asthma hospitalizations	Bronx, NY	119	SO_2	10 ppb	1.19 (OR)	1.11, 1.29	
Jaffe et al. (2003)	Asthma ER visits	Cincinnati, OH	457	SO_2	50 μg/m³ (19 ppb)	1.21[b]	1.09, 1.35	Cincinnati
		Cleveland, OH	211			1.06	0.93, 1.21	Cleveland
		Columbus, OH	51			1.26	0.75, 2.13	Columbus
Sheppard (2003)	Non-elderly hospital admissions for asthma (re-evaluation of)	Seattle, WA	84	SO_2	4.9 ppb	1.01	0.98, 1.03	
Peel et al. (2005)	ER visits for respiratory effects, including asthma, chronic obstructive pulmonary disease (COPD), upper respiratory infection, and pneumonia	Atlanta, GA	81	SO_2	20 ppb	1.008	0.997, 1.019	
Tolbert et al. (2007)	ER visits for respiratory effects, including asthma, COPD, pneumonia, and bronchitis	Atlanta, GA	76	SO_2	16 ppb	1.003	0.997, 1.009	
Schwartz et al., 1996	Daily counts of respiratory related mortality and hospital admissions of elderly	Cleveland, OH	170	SO_2	38 ppb	1.03	0.99, 1.06	
Ito et al. (2007)	ER visits for asthma	New York City	82	SO_2 SO_2, NO_2	6 ppb	1.20 NS	1.13, 1.28 0.9, 1.1	
Schwartz (1995)	Respiratory hospital admissions	New Haven, CT	150	SO_2	50 μg/m³	1.03	1.02, 1.05	New Haven
		Tacoma, WA	100	SO_2	(19 ppb)	1.06	1.01, 1.12	Tacoma
				SO_2, O_3		1.02	0.96, 1.08	New Haven
				SO_2, O_3		0.93	0.83, 1.04	Tacoma
		South Bronx, NY	78	SO_2	10 ppb	1.11	1.06, 1.17	Bronx
NYSDOH (2006)	Asthma ER visits	Manhattan, NY	80	SO_2, O_3		1.11	1.05, 1.17	Bronx
				SO_2, $PM_{2.5}$		1.11	1.04, 1.18	Bronx
				SO_2, NO_2		1.11	1.04, 1.17	Bronx
				SO_2		0.99	0.88, 1.11	Manhattan
				SO_2, O_3		0.99	0.88, 1.12	Manhattan
				SO_2, $PM_{2.5}$		0.97	0.85, 1.11	Manhattan
				SO_2, NO_2		1.01	0.87, 1.16	Manhattan

Source: Goodman, Dodge, and Bailey, 2010. A framework for assessing causality and adverse effects in humans with a case study of sulfur dioxide. *Reg Toxicol Pharmacol* 58:308-322.

While the observational epidemiological studies of SO_2 were designed to address whether SO_2 can cause an increase in adverse health effects at the population level, they do not provide strong evidence for an association between peak ambient SO_2 exposure and lung function in either children or adults (see pg. 3-31 of the ISA).

Determining whether results of epidemiology studies are statistically significant is similar requires some understanding of the risk statistics used. Relative risks (RRs) are used to compare the difference in results between two groups and odds ratios (ORs) compare the odds that an outcome will occur given a particular exposure to the odds of the outcome occurring in the absence of that exposure. Confidence intervals (CIs) for relative risks and odds ratios provide both the risk measure and a range within which the risk or odds likely would fall if the study were repeated numerous times. A relative risk of 1 means there is no difference in risk between the two groups (i.e., no association or no increased risk). Therefore, a relative risk of 1.8 indicates an 80% increased relative risk of disease and a relative risk of 0.8 indicates a decreased risk of 20%. The odds ratio is essentially equivalent to the relative risk, so an odds ratio of 1 means that

exposure does not affect the odds of the outcome. Therefore, if the confidence interval contains "1", it is not statistically significant.

As can be seen in **Table B-2**, more studies than not have failed to find statistically significant associations between long-term and short-term SO_2 concentrations and adverse health outcomes (i.e., most CIs contain 1). Of the 10 epidemiological studies, most found either no association or very small positive associations (i.e., less than 10% increase in relative risk). The highest relative risks are reported by Ito et al. (2007) [20], Lin et al. (2004)[21] and Jaffee et al. (2003),[22] although even those studies only indicate approximately 20% increase in relative risk.

Among the studies for which weak positive associations were observed, conclusions were either: 1) based only on results from single-pollutant models (i.e., multi-pollutant models were not applied to address potential confounding by other pollutants); or 2) were based on results from single-pollutant models that were not statistically significant in multi-pollutant models. [23] Only two studies provided evidence of statistically significant associations in multi-pollutant models (Bronx, NYDOH, 2006[24] and NYC, Ito, 2007).

EPA used the 1-hour daily maximum air quality data from epidemiology studies presented in Figures 5-1 to 5-5 of the REA to inform both the upper and lower ranges of alternative SO_2 standards for analysis in the REA. However, despite statements that the new 1-hour SO_2 NAAQS is informed by both clinical and epidemiological studies showing an association between short-term exposures to SO_2 and adverse respiratory effects, in its REA, EPA did not ultimately find the overall breadth of the epidemiological evidence robust enough to support a quantitative assessment of risk (pg. 58 of the REA) because of the limited number of studies focused on SO_2-concentration-response relationships, lack of statistically significant findings, and the fact that inclusion of other pollutants in multi-pollutant models resulted in a loss of statistical significance for the SO_2 effect estimate in about half of the studies, indicating that an independent effect of SO_2 on ED visits and/or hospitalizations was not consistently observed.

B.2 EPA's Risk and Exposure Assessment

EPA conducted a series of three analyses to estimate risks associated with 5-minute SO_2 exposures ranging from 100-400 ppb in exercising asthmatics in the REA:

[20] Ito, Thurston, and Silverman, 2007. Characterization of PM2.5, gaseous pollutants, and meteorological interactions in the context of time-series health effects models. *J Expo Sci Environ Epidemiol* 17 (Suppl. 2), S45–S60.

[21] Lin, Hwang, Pantea, Kielb, and Fitzgerald, 2004. Childhood asthma hospitalizations and ambient air sulfur dioxide concentrations in Bronx County, New York. *Arch Environ Health* 59(5):266–275.

[22] Jaffe, Singer, and Rimm, 2003. Air pollution and emergency department visits for asthma among Ohio Medicaid recipients, 1991–1996. *Environ Res* 91:21–28.

[23] Goodman, Dodge, and Bailey, 2010. A framework for assessing causality and adverse effects in humans with a case study of sulfur dioxide. Reg Toxicol Pharmacol 58:308-322.

[24] NYSDOH, 2006. New York State, Department of Health. A study of ambient air contaminants and asthma in New York City. Part A: a comparison of ambient air quality in the Bronx and Manhattan. Part B: air contaminants and emergency department visits for asthma in the Bronx and Manhattan (Final). Report to Agency for Toxic Substances and Disease Registry (ATSDR); New York State, Energy Research and Development Authority. NTIS PB2006-113523, July, 260p.

1) the first analysis estimated the number of days per year that measured or statistically estimated 5-minute daily maximum SO_2 concentrations equaled or exceeded health benchmark values of 100, 200, 300 and 400 ppb;

2) the second analysis involved exposure analysis case studies conducted in the St. Louis modeling domain and Greene County Missouri to provide estimates of the number and percent of asthmatics residing within 20 kilometers (km) of SO_2 sources that experience 5-minute exposures to 100, 200, 300, and 400 ppb SO_2, while at elevated ventilation rates; and

3) the third analysis was a quantitative risk assessment to estimate health risks for the number and percent of asthmatics estimated to experience moderate or greater lung function responses.

The third approach combined results from the exposure analysis (i.e., the number of exposed total asthmatics or asthmatic children in St. Louis and Green County Missouri while at moderate or greater exertion) with exposure-response functions derived from individual level data from controlled human exposure studies to estimate the percentage and number of exposed asthmatics and asthmatic children in St. Louis and Greene County Missouri likely to experience a moderate or greater lung function response (i.e., decrements in lung function defined in terms of forced expiratory volume (FEV_1) and specific airway resistance (sRAW). These results are particularly relevant here because they were conducted in Missouri.

B.2.1 Study Areas

The selection of areas to include in the exposure analysis considered the availability of ambient monitoring, the presence of significant and diverse SO_2 emission sources, population demographics, and results of the ambient air quality characterization. Missouri was one of only a few states that reported both 5-minute maximum and continuous 5-minute SO_2 ambient monitoring data (14 total monitors) and had over thirty 1-hour SO_2 monitors in operation at some point during the period from 1997 to 2007. Two counties in Missouri were modeled, St. Louis and Green, which included the greater St. Louis and Springfield Metropolitan Statistical Areas (MSAs), respectively. Because of the complexity of the modeling analysis, the modeling domain was limited to three (those directly surrounding the city of St. Louis) of the 16 counties in the St. Louis MSA: St. Louis City, St. Louis County, and St. Charles County. Calendar year 2002 was simulated for both modeling domains to characterize the most recent year of emissions data available for the study locations.

For the analysis, major facilities were defined as those with an SO_2 emission total exceeding 1,000 tons per year in 2002. This resulted in the identification of 11 (combined) stacks in Greene County and 38 (combined) stacks in St. Louis, with an additional 45 (combined) stacks identified across the state border that could influence concentrations in St. Louis. Activity from the Port of St. Louis was modeled as fourteen area sources along the waterfront in the St. Louis analysis. Non-point sources, constituting industrial, commercial and institutional facilities, were also modeled.

B.2.2 Exposure Analysis

The exposure assessment included the total population residing in each modeled area and susceptible subpopulations including: asthmatic children (5-18 years) and all asthmatics (all ages). The proportion of the population of children characterized as being asthmatic was estimated by statistics on national asthma prevalence rates recently used in the NAAQS review for ozone.[25] EPA indicates that these data were used rather than the aggregate data available at the Missouri county level, to retain the variability in asthma prevalence observed with children of different ages. Adult asthma prevalence rates were estimated by gender and for each particular modeling domain based on Missouri regional data.[26]

The Air Pollutants Exposure (APEX) model, an EPA human exposure model, was used to estimate 5-minute population exposures using census block level hourly SO_2 concentrations estimated by AERMOD. Population demographics were drawn from the year 2000 Census at the tract, block-group, or block-level, and a national commuting database based on 2000 census data provides home-to-work commuting flows.

APEX simulates the movement of individuals through time and space and estimates their exposure to a given pollutant in indoor, outdoor, and in-vehicle microenvironments. Daily activity patterns for individuals in a study area were obtained from detailed diaries that are compiled in the Consolidated Human Activity Database (CHAD).

Asthmatic exposures were characterized only when the individual was at moderate or greater exertion levels during the exposure events. Exposure profiles were used to calculate the number of days per year an individual had at least one 5-minute exposure above the potential health effect benchmark levels of 100, 200, 300, and 400 ppb. Exposures were calculated in APEX by identifying concentrations in the microenvironments visited by the person according to the composite diary. Estimated micro-environmental concentrations account for the contribution of ambient (outdoor) pollutant concentration and influential factors, such as the penetration rate into indoor microenvironments, air exchange rates, decay/deposition rates, proximity to important outdoor sources, and indoor source emissions.

B.2.3 Risk Characterization

Two types of risk measures were generated for the risk assessment:

1) estimates of the number and percentage of all asthmatics (or asthmatic children) experiencing one or more occurrences of a defined lung function response associated with 5-minute exposures to SO_2 while engaged in moderate or greater exertion; and

[25] EPA, 2007. Ozone Population Exposure Analysis for Selected Urban Areas. EPA-452/R-07-010. Available at: http://epa.gov/ttn/naaqs/standards/ozone/s_o3_cr_td.html.

[26] Missouri Department of Health. (2002). Health Risk Behaviors of Adult Missourians, 2002 Annual Report, Behavioral Risk Factor Surveillance System. Division of Community and Public Health, Bureau of Health Informatics, Available at: http://www.dhss.mo.gov/BRFSS/2002AnnualReport.pdf.

2) the number of occurrences of the lung function response in asthmatics (or asthmatic children) in a year associated with 5-minute exposures at moderate or greater exertion.

In the final SO_2 rule,[27] the EPA Administrator concluded that the St. Louis exposure analysis indicated that a 1-hour standard at 100 ppb (25 ppb higher than the current NAAQS) would still be estimated to protect greater than 99% of asthmatic children at moderate or greater exertion from experiencing at least one 5-minute SO_2 exposure equal to or greater than 400 ppb per year, and about 97% of these children from exposures equal to or greater than 200 ppb. This conclusion is based on the discussion provided on page 393 of the REA and is illustrated in Table 8-19 of the REA, which is reproduced below.[28]

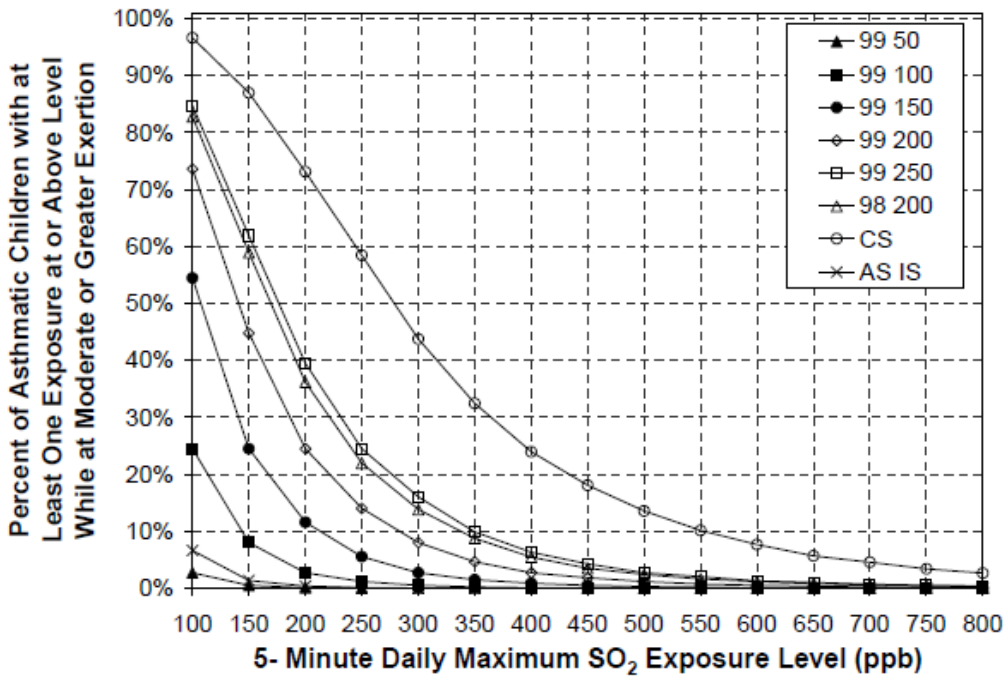


Figure 8-19. Percent of all asthmatics (top) and asthmatic children (bottom) experiencing at least one day with a 5-minute SO_2 exposure above selected benchmark levels in St. Louis, year 2002 air quality *as is* and adjusted to just meeting the current and potential alternative standards.

Source: EPA, 2009. Risk and Exposure Assessment to Support the Review of the SO_2 Primary National Ambient Air Quality Standards.

The line with the squares represents the percentage of exercising asthmatics with at least one 5-minute exposure at or above the levels indicated on the horizontal axis of the figure per year, if the NAAQS were set at an SO_2 level of 100 ppb (99th percentile). The line with the triangles represents the same, if the NAAQS were set a level of 50 ppb. As can be clearly seen by interpolating between those two lines (line with squares = 100 ppb and line with triangles = 50

[27] 75 FR 35520, Jun 22, 2010.

[28] EPA, 2009. U.S. Environmental Protection Agency. Risk and Exposure Assessment to Support the Review of the SO_2 Primary National Ambient Air Quality Standards. EPA-452/R-09-007.

ppb), at the current SO_2 NAAQS (75 ppb), the percentage of exercising asthmatics in St. Louis that are exposed to a 5-minute SO_2 concentration of 400 ppb or greater at least once is limited to much less than 1% (close to 0%).

There are several things to consider in determining the implications of the results from the St. Louis analysis. First, while aggregate data for Missouri (by county) was used in estimating the asthma prevalence in adults for St. Louis, EPA used national asthma prevalence rates in children, which resulted in higher asthma prevalence estimates than would have been estimated using Missouri data alone (i.e., 9.2% vs 8.8% based on 2002 data).[29] This approach overestimated the number of asthmatics in St. Louis and since the risk assessment is entirely focused on responses in asthmatics, it overestimated overall risk. In addition, the risk assessment emphasizes single exposures (i.e., at least one) to 5-minute concentrations above various benchmarks, when in fact, there is no evidence that a single exposure to 400 ppb SO_2 (or even 1,000 ppb) would have any lasting or detrimental effects on asthmatics or any other segment of the population. Finally, as discussed in the section on controlled human exposure studies, at 200 ppb SO_2, lung function changes are minimal and similar in magnitude to effects of exercise alone in clean air. As a result, many have argued that the 1-hour SO_2 standard should not have taken into account limiting 5-minute peaks as low as 200 ppb.

B.3 More Scientifically Supportable Short-Term Exposure Threshold

Primary NAAQS standards are established to provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. "The legislative history of Section 109 indicates that a primary standard is to be set at ''the maximum permissible ambient air level * * *which will protect the health of any [sensitive] group of the population,'' and that for this purpose ''reference should be made to a representative sample of persons comprising the sensitive group rather than to a single person in such a group.''[30] Therefore, clinically relevant and statistically significant health effects observed in a representative sample of persons comprising the sensitive group should be used as the bases for primary standards, rather than those observed in a single individual in a sensitive subpopulation.

Many who commented on the rule, as well as state and non-state petitioners in litigation[31] over the rule, argued that the short-term exposure threshold for SO_2 should have been established at a concentration at least as high as 400 ppb, rather than 200 ppb. Even at 400 ppb, effects are transient, reversible, and of low severity.

B.4 Form and Level of the 1-Hour SO_2 NAAQS

NAAQS standards are established for use in evaluating area-wide concentrations of SO_2, not concentrations measured at discrete locations. Site-to-site correlations of monitored SO_2 concentrations can vary from very low to very high values, suggesting that the concentration of

[29] *Ibid*, p. 222.
[30] 75 CFR 35220 (Jun 22, 2010), footnote 1.
[31] USCA Case #10-1252, 2012.

SO_2 measured at any given monitoring site, may not be highly correlated with the average community concentration in some areas. There is always a random component to instrumental measurement error and the practice of averaging across multiple ambient monitors in a region helps to reduce the instrument measurement error. For this reason, compliance with NAAQS is often based on a statistical form.

B.4.1 Form

The form of the 1-hour Primary SO_2 NAAQS was established as the 3-year average of the 99th percentile (in most locations analyzed, the 99th percentile corresponds to the 4th highest daily maximum concentration in a year)[32] of the yearly distribution of 1-hour daily maximum concentrations. The form of the 1-hour SO_2 NAAQS was based on two studies[33] evaluated in the ISA, which reported an increase in SO_2-related respiratory health effects at the upper end (above 90th percentile values) of the distribution of ambient area-wide SO_2 concentrations (Section 5.3, p. 5–9 of the ISA) and the conclusion that a 99th percentile form for the 1-hour SO_2 NAAQS would be effective at limiting 5-minute peak SO_2 concentrations.

Using data from a small number of monitors that voluntarily report 5-minute data, EPA demonstrated that there is a high correlation between the 5-minute maximum level and the corresponding 1-hour average SO_2 concentration (section 2.5.2 of the REA) and used this information to support that a 1-hour standard, if set at the appropriate level and form, can limit peak (5-minute) exposures.

Therefore, even though the SO_2 NAAQS does not have a 5-minute averaging time, the form and level were established specifically to limit 5-minute peak concentrations (section 10.5.3 and Figures 7–27 and 7–28 of the REA). EPA concluded that a concentration-based NAAQS that is averaged over a three year period better reflects the continuum of health risks of increasing SO_2 concentrations by weighting years when 1-hour daily maximum SO_2 concentrations are well above the level of the standard more heavily than those when 1-hour daily maximum SO_2 concentrations are just above the level of the standard.

B.4.2 Level

The highest 98th and 99th percentile 1-hour daily maximum air quality levels were found in analyses conducted in the cities of Cincinnati (Figure 5-2 of the REA), Cleveland (Figures 5-2 and 5-4 of the REA) and New Haven (Figure 5-4 of the REA) and these studies were reported to have shown positive associations with respiratory related hospital admissions or ED visits during time periods when 98th and 99th percentile 1-hour daily maximum SO_2 concentrations ranged from 126 ppb to 457 ppb. On the bases of these epidemiological studies, and the clinical studies discussed previously, EPA analyzed SO_2 levels ranging from 50 ppb to 250 ppb as possible levels for an

[32] 75 CFR 35520, June 22, 2010.

[33] Schwartz, 1995. Short term fluctuations in air pollution and hospital admissions of the elderly for respiratory disease. *Thorax* 50:531-538 and Lin, Hwang, Pantea, Kielb, and Fitzgerald, 2004. Childhood asthma hospitalizations and ambient air sulfur dioxide concentrations in Bronx County, New York. *Arch Environ Health* 59:266-275.

hourly NAAQS that would protect against morbidity observed following peak (5-minute) exposures.

Because there were relatively few monitors that reported 5-minute SO_2 concentrations in the US (98 at the time of the SO_2 NAAQS review), a model was developed to estimate 5-minute maximum SO_2 concentrations from comprehensive 1-hour SO_2 ambient monitoring data (more than 800 monitors). The approach was based on monitored hourly SO_2 concentration levels and the variability observed at the monitors reporting both the 5-minute maximum and 1-hour average SO_2 concentrations.

EPA proposed to set the level of this new 1-hour standard within the range of 50 to 100 ppb and solicited comment on standard levels as high as 150 ppb. EPA's REA concluded that the level for the 1-hour NAAQS would need to be based on a weight-of-evidence approach, given the different types of information (controlled human exposures and epidemiological studies), with the following options:

1. Emphasize Epidemiological Study Results
    a. 99th percentile 1-hour daily maximum standard in the lower end of the proposed range for consideration (50 ppb – 100 ppb)
    b. In consideration of the fact that the strongest epidemiologic evidence of an association between ambient SO_2 and ED visits and hospitalizations is in cities where 99th percentile 1-hour daily maximum SO_2 concentrations ranged from about 75 to150 ppb, a 99th percentile 1-hour daily maximum standard in the upper end of the proposed range for consideration could be justified (100 ppb – 150 ppb)

2. Emphasize Controlled Human Study Results
    a. Based on the presumption that participants in human exposure studies do not represent the most SO_2 sensitive individuals, consideration could be given to a 99th percentile 1-hour daily maximum standard that provides increased protection against peak concentrations lower than 200 ppb to provide a margin of safety for these SO_2 sensitive individuals (50 – 100 ppb)
    b. Based on the fact that statistical significance is not seen and lung function decrements are not routinely accompanied by respiratory symptoms until SO_2 concentrations of at least 400 ppb are reached, it could be argued that the upper end of this range of alternative standard levels could be sufficient to protect public health (100 ppb – 150 ppb)

EPA rejected an alternate standard as high as 150 ppb based on the conclusion that it would not adequately limit 5-minute SO_2 exposures ≥ 200 ppb. This is based on findings from the St. Louis exposure analysis, for which EPA estimated that at a 1-hour daily maximum of 150 ppb would only protect 88% of asthmatic children at moderate or greater exertion from experiencing at least one SO_2 exposure ≥ 200 ppb per year (Figure 8-19 of the REA). If on the other hand, one accepts that 400 ppb represents a more appropriate exposure threshold, then based on the St. Louis exposure analysis, a 99th percentile 1-hour daily maximum of 150 ppb would protect > 99% of asthmatics, or asthmatic children at elevated ventilation rates from experiencing at least one 5-

minute SO_2 exposure ≥ 400 ppb. In addition, the estimated median percentage of exposed asthmatics at elevated ventilation rates expected to experience lung function decrement (≥ 100% increase in sRaw) at least once per year ranges from 2.9% to 3.6% for asthmatics (4.6% to 5.4% for asthmatic children), depending on the model used. By comparison, at a 1-hour daily maximum of 50 to 100 ppb, the estimated median percentage of exposed asthmatics at elevated ventilation rates expected to experience lung function decrement at least once per year ranges from 0.3% to 1.3% at 50 ppb and 0.7% 1.9% at 100 ppb.

Given a 1-hour daily maximum of 50 or 100 ppb, the 40 county air quality analysis estimated at most zero to 2 days per year when statistically estimated 5-minute daily maximum SO_2 concentrations would be ≥ 400 ppb. On the other hand, a 99th percentile 1-hour daily maximum standard of 150 ppb would be estimated to result in at most 7 days/year where 5-minute maximum SO_2concentrations were ≥ 400 ppb

Taken together, this information supports that limiting the 99th percentile 1-hour daily maximum to 150 ppb could similarly limit 5-minute SO_2 exposures ≥ 400 ppb when compared to standards in the range of 50-100 ppb and that in establishing the NAAQS at 75 ppb, EPA set an extremely stringent standard.

APPENDIX C

ISSUES ASSOCIATED WITH THE CLEAN AIR TASK FORCE (CATF) AND ENVIRONMENTAL INTEGRITY PROJECT (EIP) MODELS

ISSUES ASSOCIATED WITH THE CATF AND EIP MODELS

The underlying model used in the health impact analyses performed by the Clean Air Task Force (CATF) and the Environmental Integrity Project (EIP), the Climatological Regional Dispersion Model (CRDM), uses outdated algorithms and assumptions that are not in line with state-of-practice dispersion modeling approaches (both short-range and long-range transport and dispersion) that have been developed since the 1970's. The model does not fully account for the complexities of formation and deposition of secondary particulates during local and regional transport and dispersion within the atmosphere. Even the EPA[34] states that "Because of limited validation studies of the Source-Receptor (S-R) Matrix, it should be treated as a screening model that provides a crude estimate of the likely impact of a change in emissions on ambient $PM_{2.5}$ levels." EPA further states that "Relative to more sophisticated and resource-intensive three-dimensional modeling approaches, the CRDM does not fully account for all the complex chemical interactions that take place in the atmosphere in the secondary formation of $PM_{2.5}$. Instead it relies on more simplistic species dispersion-transport mechanisms supplemented with chemical conversion at the receptor location." Finally, EPA concludes that that "More sophisticated atmospheric dispersion models should be used to obtain detailed estimates of ambient air quality changes."

However, the issues associated with the health impact assessments conducted by groups like the CATF and EIP are not isolated to the air dispersion modeling. These groups are often not transparent with regard to the many inputs that are used in the analyses and on which the results are critically dependent. Because of the simplistic algorithms used, the $PM_{2.5}$ attributed to specific sources is likely overstated, perhaps dramatically. Moreover, the likelihood that distant populations are *actually* exposed is not even contemplated by the models. Instead, the standard presumption is that entire populations of counties are exposed to estimated outdoor concentrations of $PM_{2.5}$ that may or may not reach the hypothetical populations and may not be formed in the first place.

Details of the issues identified with the CATF and EIP models based on available information, many of which have been identified by others[35], include but are not limited to:

- Model Results are Highly Dependent on Emission Inventory Used
  - In calibration exercises, model estimates of annual concentrations at county centroids were compared to actual annual concentrations, from spatially-interpolated ambient monitor values, at county centroids. The county centroid values for model and monitor values, each, were averaged across the state to provide state values.
  - In a calibration exercise conducted by Abt Associates (2010) that used the 2001 emission inventory developed for the Clean Air Interstate Rule (CAIR) Rule and 2002 ambient monitoring data, the model was found to overestimate monitored concentrations for all states

[34] EPA, 2015. User's Manual for the Co-Benefits Risk Assessment (COBRA) Screening Model – Version 2.7.
[35] A Case Study: The Public Health Consequences of Air Emissions from Coal-Fired Power Plants in the St. Louis Area. http://www.americaspower.org/sites/default/files/FinalGradientReport_090115.pdf.

- In a calibration exercise conducted by EPA (EPA, 2015), in which the 2005 emissions inventory developed for the Mercury Air Toxics Standard (MATS) Rule and 2005 ambient monitoring data, the model was found to underestimate monitored concentrations for 40 out of the 49 contiguous states
- The results of the calibration exercises seem to critically depend on the emissions inventory used

- Simplistic Assumptions About Air Chemistry Results in Unrepresentative $PM_{2.5}$ Concentrations and Likely Overestimates Amount of $PM_{2.5}$ Attributable to Specific Sources
  - Ammonium nitrate and ammonium sulfate result from reactions among several precursor species
  - Ingredients for $PM_{2.5}$ (sulfate, nitrate, ammonium, VOC aerosols, and direct $PM_{2.5}$), which derive from many different source types (not just CFPPs) are summed to get a total for each county
  - Ammonium reacts preferentially with sulfates to form ammonium sulfates
    - For every mole of sulfate, two moles of ammonium are required
    - If there is little ammonium, sulfate is assumed to form ammonium bisulfate with leftover particulate sulfate
    - If there is an intermediate amount of ammonium, sulfate is assumed to form a combination of ammonium bisulfate and ammonium sulfate
    - If there is a lot of ammonium, sulfate is assumed to form ammonium sulfate
  - Ammonium nitrate formation is assumed only when there is excess ammonium present, and only under low temperature conditions
    - One mole of ammonium reacts with one mole of nitrate to produce ammonium nitrate
  - Organic VOCs and directly emitted $PM_{2.5}$ are added to the ammonium sulfate, ammonium bisulfate, sulfate, and ammonium nitrate to calculate overall concentration of $PM_{2.5}$
  - This approach likely overestimates the $PM_{2.5}$ attributed to specific sources because secondarily formed $PM_{2.5}$ would be completely attributable to a specific CFPP only if all the necessary precursor compounds are present in the county of interest and from the same CFPP to which impacts are attributed

- The Bases for the 2012 CATF Health Impact Estimates on the CATF Website Are Unclear
  - According to the Technical Support Document for the Power Plant Impact Estimate Tool (Abt, 2010) prepared for CATF, the EPA Multipollutant Analysis baseline scenario and the control scenario of the CAIR were used to forecast 2010, 2015 and 2020 emissions and impact levels (see Section A.2 of Appendix A)
  - However, section A.4 of Appendix A of the Technical Support Document (Abt, 2010) indicates that a 2001 emission inventory developed for the CAIR Rule was used to perform the model calibration comparing model levels to 2002 monitoring data
  - It can only be assumed that an approach similar to that discussed in the Technical Support Document (Abt, 2010) was used to estimate the 2012 health impact estimates currently provided on the CATF website (CATF, 2014), but the specifics are unclear, particularly regarding the emission inventory used

- The Majority of Impacts Are Estimated at Locations Distant from Modeled Plants

- This fact is rarely appreciated by citizens living near the modeled plants
- Likelihood that distant populations are *actually* exposed is not evaluated
  - Instead, the standard presumption is that entire populations of counties are exposed to estimated outdoor concentrations of $PM_{2.5}$ that may or may not reach the hypothetical populations and may not be formed in the first place
    - Majority of directly emitted $PM_{2.5}$ and $PM_{2.5}$ formed from other gaseous pollutants will not reach the populations assumed to be exposed because
      - they are modeled to a single hypothetical point at the center of each county, and
      - people spend approximately 90% of their time indoors, where concentrations of outdoor pollutants are generally much lower
  - Unconstrained $PM_{2.5}$ formation from emissions of gaseous species is assumed even though the conditions (temperature, humidity, season) for formation may not be favorable

- Transfer Coefficients Are Gross Oversimplifications
  - Transfer coefficients for each source modeled are used to calculate the proportion of directly emitted $PM_{2.5}$ emissions and $PM_{2.5}$ precursor species (e.g., SO_2, NOx, VOCs) emissions from each source
  - Both CATF and EIP transfer coefficients were derived from a single year (1990) of meteorological data for only 100 meteorological stations
    - These data cannot be expected to be representative of conditions for each specific locale or year being modeled (e.g., each St. Louis-area county in 2011 or 2012)
    - Variability in local weather conditions from those reflected in the data for a distant weather station, as well as variability from year to year, can be a significant source of uncertainty

- Hypothetical Impacts Are *Estimated* Under Assumption that Statistical Correlations from Epidemiology Studies Are *Causal* and Not Subject to Confounding, Bias, or Measurement Error
  - See discussion of substantial confounding/bias in epidemiology studies in **Section 3.2.1**
  - As previously discussed, it is widely acknowledged that causal inferences cannot be made from epidemiology studies (see discussion on limitations of epidemiology studies for making causal inferences in **Section 3.2.1**)
  - There are numerous issues associated with the epidemiology studies used by CATF and EIP, many of which likely lead to gross overestimates of health impacts, that should be considered when interpreting the hypothetical health impact assessments (see Gradient report (2015) for a discussion of those issues)

- Health Impacts from Labadie Energy Center Alleged by CATF (2014) and EIP (2012) Are Wildly Divergent
  - Details of the CATF 2014 (estimates for 2012 on CATF website) methodology are not publically available but the CATF 2010 report describes the epidemiology studies relied upon and it is assumed that those same studies were used in the CATF 2014 estimates
  - EIP (2012) calculated larger impacts, as compared to CATF (2014), using different epidemiology studies and a different emission inventory from the CATF studies

- The wildly divergent effect estimates attributed by the CATF (2014) and EIP (2012) to the Labadie plant highlight how dramatically different assumptions and the use of different epidemiology studies and emission inventories can affect the health impact estimates
- Hypothetical health impacts estimated using models such as those employed by CATF (2014) and EIP (2012) are highly uncertain and easily manipulated through choice of input parameters

A Case Study: The Public Health Consequences of Air Emissions from Coal-Fired Power Plants in the St. Louis Area

Prepared for
American Coalition for Clean Coal Electricity (ACCCE)

Prepared by
Christopher M. Long, Sc.D., DABT
Peter A. Valberg, Ph.D.

September 1, 2015

GRADIENT
www.gradientcorp.com
20 University Road
Cambridge, MA 02138
617-395-5000

Table of Contents

Page

Executive Summary ES-1

1 Air quality in the St. Louis CBSA is similar to, and often better than, that of other regions of the U.S. 1

2 Air quality in the St. Louis Area has shown significant improvement in recent years, with air pollutant levels at almost all monitoring locations now in compliance with the health-protective NAAQS 8

3 Expected incremental ambient $PM_{2.5}$ air quality impacts due to air emissions from the four Ameren CFPPs are small compared to everyday ambient $PM_{2.5}$ exposure levels in the St. Louis Area 14

4 Total personal exposures to air pollutants, including $PM_{2.5}$, NO_x, and ozone, will generally be dominated by contributions from other common indoor and outdoor sources rather than by contributions from CFPPs 19
- 4.1 $PM_{2.5}$ 20
- 4.2 NO_x 23
- 4.3 O_3 25

5 Hypothetical health impacts calculated for CFPP air emissions are unreliable because of many hidden assumptions, uncertainties, and limitations 27
- 5.1 Hypothetical health impact assessments conducted by NGOs 27
- 5.2 Health impacts modeling by CATF and EIP targets specific sources 29
- 5.3 Limitations associated with health impact calculations 30
  - 5.3.1 Uncertainties in the emissions and $PM_{2.5}$ concentration estimates 31
  - 5.3.2 Uncertainties with health risk estimates 32
    - 5.3.2.1 Mortality 32
    - 5.3.2.2 Morbidity 36
  - 5.3.3 Uncertainties with health effects valuation 36
- 5.4 Recent epidemiologic studies continue to call into question the causal connection between small increments in ambient $PM_{2.5}$ and premature mortality 37
- 5.5 Experimental data do not support ambient $PM_{2.5}$ causing mortality 38
- 5.6 Comprehensive risk evaluations of hazardous air pollutant (HAP) emissions from U.S. coal-fired power plants do not provide support for significant health risks from primary PM emissions from CFPPs 39

6 Asthma is a complex, multi-factorial disease, with a multitude of known triggers and risk factors. Scientific studies provide evidence that asthma prevalence and morbidity are more closely linked to allergic status, lifestyle factors, and indoor air pollution than to indicators of outdoor air pollution. 40

7 References 58

List of Tables

Table 2.1 Selected $PM_{2.5}$, O_3, SO_2, and NO_2 Monitors in the St. Louis Area

Table 3.1 Comparison of Plant Specifications and Emissions for the Four Ameren St. Louis-area CFPPs *versus* the Nine Chicago-area CFPPs Included in the Levy *et al*. (2002a) Modeling Study

Table 3.2 Published Model-predicted Ground-level $PM_{2.5}$ Concentrations for Groups of U.S. CFPPs

Table 4.1 Average Airborne Particle Levels During Typical Indoor Activities Compared to the Estimated Incremental Annual Average $PM_{2.5}$ Concentration from St. Louis-area Power Plants

Table 5.1 Examples of the Translation of $PM_{2.5}$ Concentration Increments into Hypothetical Health Impacts Nationwide and Their Monetary Value

Table 5.2 CATF (2014) Overall Hypothetical Health Impacts of All U.S. CFPPs within the St. Louis-area Counties Containing the Ameren CFPPs

List of Figures

Figure 1.1 Locations of the Four St. Louis-area Ameren Coal-fired Power Plants (CFPPs)

Figure 1.2 2011-2013 Design Values for 24-Hour $PM_{2.5}$ Concentrations for the St. Louis CBSA *vs*. Other Major U.S. CBSAs

Figure 1.3 2011-2013 Design Values for Annual Average $PM_{2.5}$ Concentrations for the St. Louis CBSA *vs*. Other Major U.S. CBSAs

Figure 1.4 2011-2013 Design Values for Daily Maximum 8-Hour O_3 Concentrations for the St. Louis CBSA *vs*. Other Major U.S. CBSAs

Figure 1.5 2011-2013 Design Values for 1-Hour SO_2 Concentrations for the St. Louis CBSA *vs*. Other Major U.S. CBSAs

Figure 1.6 2011-2013 Design Values for 1-Hour NO_2 Concentrations for the St. Louis CBSA *vs*. Other Major U.S. CBSAs

Figure 1.7 2011-2013 Design Values for Annual Average NO_2 Concentrations for the St. Louis CBSA *vs*. Other Major U.S. CBSAs

Figure 1.8 8-Hour Ozone NAAQS Nonattainment Areas (2008 NAAQS)

Figure 2.1 2000-2013 Time Series of 98th Percentile 24-Hour $PM_{2.5}$ Concentrations for One "Suburban/Rural" and Four "Urban" Monitors Representative of the St. Louis CBSA

Figure 2.2 2000-2013 Time Series of Annual Average $PM_{2.5}$ Concentrations for One "Suburban/Rural" and Four "Urban" Monitors Representative of the St. Louis CBSA

Figure 2.3 2000-2013 Time Series of Annual 4th Highest Daily Maximum O_3 Concentrations for Two "Suburban/Rural" and Three "Urban" Monitors Representative of the St. Louis CBSA

Figure 2.4 2000-2013 Time Series of 98th Percentile 1-Hour SO_2 Concentrations for One "Suburban/Rural" and Four "Urban" Monitors Representative of the St. Louis CBSA

Figure 2.5 2000-2013 Time Series of 98th Percentile 1-Hour NO_2 Concentrations for Two "Suburban/Rural" and Three "Urban" Monitors Representative of the St. Louis CBSA

Figure 3.1 Comparison of the Estimated Incremental Annual Average $PM_{2.5}$ Impact of the Four Ameren St. Louis-area CFPPs *vs*. Total All-Source Measured $PM_{2.5}$ Levels at St. Louis-area Air Quality Monitors

Figure 4.1 Mean Measurements of $PM_{2.5}$ Levels ($\mu g/m^3$) in Various Everyday Locations in Comparison to the Estimated Incremental Annual Average $PM_{2.5}$ Impact of the Four Ameren CFPPs in the St. Louis Area

Figure 4.2 Estimated Incremental Annual Average $PM_{2.5}$ Impact of the Four Ameren CFPPs in the St. Louis Area (red dotted line) *vs*. Everyday Indoor and Outdoor $PM_{2.5}$ Exposure Levels in a Boston-area Residential Home (black solid and dashed lines, respectively)

Figure 4.3 Mean NO_2 Concentrations Measured in Various Exposure Microenvironments

Figure 6.1 National-scale Trends in Several Criteria Air Pollutants with National-scale Trends in Asthma Prevalence for both Adults and Children

Figure 6.2 Childhood Asthma Prevalence in Chicago Neighborhoods (adapted from Gupta *et al*., 2008)

Figure 6.3 St. Louis-area $PM_{2.5}$ Levels Have Dropped by More than 25% While Adult and Pediatric Asthma Prevalence in the St. Louis Region Has Remained Relatively Unchanged

Figure 6.4 St. Louis-area $PM_{2.5}$ Levels Have Dropped by More than 25% While All-age Asthma Inpatient Hospitalization Rates in St. Louis City Have Slightly Increased

Figure 6.5 St. Louis-area $PM_{2.5}$ Levels Have Dropped by More than 25% While Rates of All-age Asthma ER Visits Have Remained Steady

Figure 6.6 St. Louis-area $PM_{2.5}$ Levels Have Dropped by More than 25% While Pediatric Asthma Inpatient Hospitalization Rates in St. Louis City Have Remained Relatively Unchanged

Figure 6.7 St. Louis-area $PM_{2.5}$ Levels Have Dropped by More than 25% While Rates of Pediatric Asthma ER Visits Have Remained Relatively Unchanged

Figure 6.8 Despite Being Located Within the Same Airshed, Rates of Total All-age Asthma Inpatients Hospitalizations Vary Significantly by Zip Code in the St. Louis City Area

Figure 6.9 Despite Being Located Within the Same Airshed, Rates of Total All-age Asthma Emergency Room (ER) Visits Vary Significantly by Zip Code in the St. Louis City Area

Figure 6.10 Despite Being Located Within the Same Airshed, Rates of Pediatric Asthma Emergency Room (ER) Visits Vary Significantly by Zip Code in the St. Louis City Area

About Gradient

Gradient is an environmental and risk science consulting firm, nationally renowned for its specialties in toxicology, epidemiology, human health and ecological risk assessment, environmental/forensic chemistry, contaminant fate and transport modeling, risk-based remedial alternatives assessment, and the application of database management and Geographic Information Systems (GIS) tools for addressing environmental contamination. Since 1985, Gradient's staff scientists have served a combination of private and public sector clients, bringing sound science and creative solutions to a variety of complex and challenging environmental issues. Certified as a Women's Business Enterprise by the Center for Women and Enterprise, a regional partner of the Women's Business Enterprise National Council (WBENC), Gradient has its principal office in Cambridge, Massachusetts, and a second main office in Seattle, Washington.

Dr. Christopher Long is a principal scientist at Gradient and an expert in air pollution exposure assessment and inhalation risk assessment. Since joining Gradient 15 years ago, he has worked on a wide variety of indoor and outdoor air quality projects, assessing both potential exposures and health risks to numerous airborne substances that include airborne particulate matter (PM), diesel exhaust, engineered nanomaterials, asbestos, gaseous criteria pollutants, and a variety of air toxics. Prior to joining Gradient, he received a doctorate in Environmental Health from the Harvard School of Public Health, where he conducted a research study to characterize particulate matter mass concentrations, size distributions, and chemical composition inside and outside residential homes. He has prepared approximately 25 peer-reviewed journal articles or book chapters in the general areas of indoor and outdoor air pollution and exposure/risk assessment. He is certified as a Diplomate of the American Board of Toxicology (DABT) and is an Associate Editor for the Journal of Exposure Science and Environmental Epidemiology (JESEE).

Dr. Peter Valberg is a Principal at Gradient and an expert in human health risk assessment (HHRA), inhalation toxicology, and modeling of human exposure to environmental chemicals. He has 30 years of experience on the faculty of the Harvard School of Public Health and with health-risk assessment projects at Gradient. He has provided air quality and health risk expertise to the Department of Justice, the United States Environmental Protection Agency (US EPA), and the National Academy of Sciences. He is the author of more than 100 peer-reviewed scientific publications on biological effects of environmental exposures on humans and animals. His health risk assessment expertise covers air pollutants, chemical exposures, and radionuclides, with recent project work and publications addressing the health impacts of airborne particulate matter (PM), diesel exhaust, metals, and organics. He is often called upon to prepare and interpret health risk findings for a variety of audiences, and he regularly interprets and applies scientific research results to the regulatory, litigation, and public policy arenas. He holds advanced degrees from Harvard University in physics and human physiology, and he is a Fellow of the Academy of Toxicological Sciences (FATS).

Executive Summary

Gradient was asked to conduct a case study assessment of air quality and public health claims related to stack emissions from certain coal-fired power plants (CFPPs). Four Ameren Missouri CFPPs in the St. Louis area were selected for the case study assessment, including the 2,407-MW Labadie Plant in Franklin County, MO; the 839-MW Meramec Plant in St. Louis County, MO; the 1,204-MW Rush Island Plant in Jefferson County, MO; and the 986-MW Sioux Plant in St. Charles County, MO. Consistent with recent allegations of public health impacts from coal-fired power plant emissions (*e.g.*, CATF, 2014; EIP, 2012), our analysis is primarily focused on the incremental impact of the Ameren CFPP emissions on levels of airborne particulate matter (PM), and specifically fine particulate matter ($PM_{2.5}$).[1] In addition, we analyzed air quality data for several additional criteria air pollutants – ozone (O_3), nitrogen dioxide (NO_2),[2] and sulfur dioxide (SO_2) – that are either directly emitted by coal-fired power plants (NO_2, SO_2) or that can be formed from coal-fired power plant emissions (O_3), and that have been linked with air pollution health effects.

Our evaluation can be summarized by the following six main findings, which are expanded upon in the corresponding sections of this report:

1. Air quality in the St. Louis Core Based Statistical Area (CBSA) is similar to, and often better than, that of other regions of the U.S. (Section 1)
2. Air quality in the St. Louis Area has shown significant improvement in recent years, with air pollutant levels at almost all monitoring locations now in compliance with the health-protective NAAQS. (Section 2)
3. Expected incremental ambient $PM_{2.5}$ air quality impacts due to air emissions from the four Ameren CFPPs are small compared to everyday ambient $PM_{2.5}$ exposure levels in the St. Louis Area. (Section 3).
4. Total personal exposures to air pollutants will generally be dominated by contributions from other common indoor and outdoor sources rather than by contributions from local CFPPs. (Section 4)
5. Hypothetical health impacts calculated for Ameren CFPP air emissions are unreliable because of many hidden assumptions, uncertainties, and limitations. (Section 5)
6. Asthma is a complex, multi-factorial disease, with a multitude of known triggers and risk factors. Scientific studies provide evidence that asthma prevalence (that is, the percentage of people with doctor-diagnosed asthma) and morbidity are more closely linked to allergic status, lifestyle factors, and indoor air pollution than to indicators of outdoor air pollution exposure. In fact,

[1] $PM_{2.5}$, also referred to as "fine" PM, is a commonly used indicator of respirable particles that is defined as including particles with aerodynamic diameters of 2.5 μm and smaller (a μm is one-millionth of a meter). Based on the current recognition that $PM_{2.5}$ better represents the particle sizes that can penetrate deep into the lungs and elicit adverse health effects, the current U.S. EPA NAAQS for PM are focused on $PM_{2.5}$. Currently, the PM NAAQS include an annual average $PM_{2.5}$ standard of 12 $\mu g/m^3$ and a 24-hour $PM_{2.5}$ standard of 35 $\mu g/m^3$. In addition, there remains a 24-hour standard (150 $\mu g/m^3$) for PM_{10} from the prior time period (1987 to 1997) when the PM NAAQS were focused on PM_{10} (*i.e.*, particles with aerodynamic diameters of 10 μm and smaller).

[2] NO_2 has been adopted by U.S. EPA as the indicator for the criteria air pollutant oxides of nitrogen (NO_x) that consist of all oxidized nitrogen compounds, including gases such as NO_2 and nitric oxide (NO). NO_x also reacts with other species forming particulate matter. The NAAQS for NO_x is thus specified in terms of NO_2, and NO_2 is more routinely monitored than other NO_x species.

ambient air pollutant emissions and concentrations have decreased significantly over the past several decades while the prevalence of asthma has increased, providing support for the conclusion that factors other than exposure to outdoor air pollutants are more important risk factors underlying the trends in increased asthma prevalence. (Section 6)

As a centerpiece to our analysis, we relied upon actual air-quality measurement data for the St. Louis area, making comparisons with data for other urban areas and with the health-based U.S. EPA National Ambient Air Quality Standards (NAAQS) to discern if there are potential public health impacts of the Ameren CFPP stack emissions. In data comparisons that are provided in Sections 1 and 2, we evaluated both historical and recent monitoring data against today's health-protective primary NAAQS, which are required to be set at levels that protect even the most sensitive groups from air pollution health effects. Ambient air monitoring data are a useful screening tool for assessing the public health impacts of air pollution sources such as coal-fired power plants, but importantly, measured concentrations reflect not only the air quality impacts of specific local sources such as the Ameren CFPPs, but also the combined air quality contributions of a variety of local and distant natural and anthropogenic air pollutant sources. As a result, in Section 3, we estimated the incremental $PM_{2.5}$ air quality impacts of the four Ameren St. Louis-area CFPPs and compared this estimate to the total, all-source measured $PM_{2.5}$ levels at St. Louis-area air quality monitors; our findings indicate that the CFPPs contribute a very small portion to overall $PM_{2.5}$ levels in St. Louis.

We examined carefully the reliability of health impact analyses that purport to quantify excess morbidity and mortality associated with CFPP stack emissions, focusing specifically on the Clean Air Task Force (CATF) and the Environmental Integrity Project (EIP) model calculations, which included the Ameren CFPPs as examples. As discussed in Section 5, rather than relying on actual data, these model calculations have projected health claims that are hypothetical and overstated. We highlight why these projections are not reliable because of the underlying assumptions, methods, and data inputs. We discuss several recent epidemiologic studies that call into question the causal connection between small increments in ambient $PM_{2.5}$ and premature mortality, including the Cox and Popken (2015) study that cautioned, "[Our] findings suggest that predicted substantial human longevity benefits resulting from reducing $PM_{2.5}$ and ozone may not occur, or may be smaller than previously estimated." Overall, we concluded that, when compliance with the $PM_{2.5}$ NAAQS and the uncertainties in the modeling approach and its estimated impacts are properly considered, it becomes clear that the health effects calculated by environmental organizations for Ameren power plant emissions are theoretical and may well be zero.

Other sections in the report provide background information on typical everyday air pollution exposures that derive from common indoor sources, other outdoor sources, and personal sources (Section 4); and on what is known regarding agents that cause or trigger asthma (Section 6).

Each subsequent section of this report summarizes the key scientific data underlying our six main findings. For each finding, we provide comments, graphs, and/or tables that explain the basis for the finding. We also include key references for the data sources that underlie our analyses. As the following materials show, our findings are supported by a body of scientific evidence, including actual measurement data and scientific data from peer-reviewed research literature, governmental reports, and technical analyses. This work was sponsored by the American Coalition for Clean Coal Electricity (ACCCE).

1 Air quality in the St. Louis CBSA is similar to, and often better than, that of other regions of the U.S.

For the case study analysis of the air quality impacts of Ameren's four St. Louis-area coal-fired power plants (CFPPs), we compared air monitoring data from central-site ambient monitors in the St. Louis Core Based Statistical Area (CBSA)[3] to the corresponding data for other urban CBSAs across the country. Ambient monitors within the entire St. Louis CBSA were included in our assessment given the location of the four Ameren CFPPs in four counties surrounding the City of St. Louis (see Figure 1.1 showing the locations of Labadie Plant in Franklin County, MO; the Meramec Plant in St. Louis County, MO; the Rush Island Plant in Jefferson County, MO; and the Sioux Plant in St. Charles County, MO). The St. Louis CBSA consists of the city of St. Louis, seven nearby counties in Missouri (Franklin, Jefferson, Lincoln, St. Charles, St. Louis, Warren, and Washington), and eight nearby counties in Illinois (Bond, Calhoun, Clinton, Jersey, Macoupin, Madison, Monroe, and St. Clair).

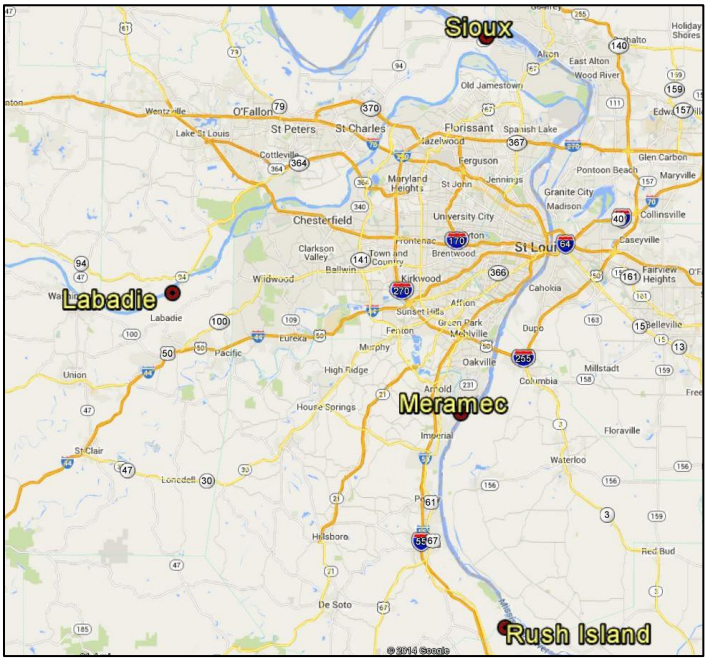


Figure 1.1 Locations of the Four St. Louis-area Ameren Coal-fired Power Plants (CFPPs)

Focusing on four U.S. EPA criteria air pollutants that are related to CFPP stack air emissions (fine particulate matter-$PM_{2.5}$, ozone-O_3, sulfur dioxide-SO_2, and nitrogen dioxide-NO_2), Figures 1.2 through 1.7 compare ambient air quality levels in the St. Louis CBSA to levels in the Chicago, Cleveland, Cincinnati, Houston, Los Angeles, Phoenix, and Pittsburgh CBSAs. As provided in 2013 design value reports obtained from the U.S. EPA Air Trends website,[4] data shown in the figures reflect the highest

[3] A CBSA is defined by the Office of Management and Budget (OMB) as a region with at least one core urbanized area having a population at or above 10,000 and a surrounding area with a high degree of social and economic integration based on community ties (OMB, 2010).
[4] http://www.epa.gov/airtrends/values.html.

reported valid three-year (2011-2013) design values at any of the monitoring sites located within the respective CBSAs.[5] In other words, the data represent upper-bounds of air quality levels in each CBSA for data statistics matching the corresponding form of the U.S. EPA primary (health-based) NAAQS for each pollutant: for $PM_{2.5}$, annual average (mean) concentrations and 98th percentiles of 24-hour concentrations; for O_3, 4th highest daily maximums of 8-hour concentrations; for SO_2, 99th percentiles of 1-hour concentrations; and for NO_2, 98th percentiles of 1-hour concentrations and annual average (mean) concentrations.

As shown in Figures 1.2 through 1.7 below, air quality in the St. Louis CBSA is either similar to or better than that of many other major CBSAs across the United States. In addition, Figures 1.2 and 1.3 indicate that 24-hour and annual average $PM_{2.5}$ levels in the St. Louis CBSA are below the NAAQS, while Figures 1.6 and 1.7 indicate that 1-hour and annual average NO_2 levels in the St. Louis CBSA are well below the respective NAAQS. Regarding annual $PM_{2.5}$, the U.S. EPA lowered the annual $PM_{2.5}$ NAAQS from 15 $\mu g/m^3$ to 12 $\mu g/m^3$ (micrograms per cubic meter) in December 2012, and just recently announced in December 2014 its final area designations for the 2012 annual $PM_{2.5}$ NAAQS.[6] While the St. Louis area was not among the 14 areas in six states that were designated by U.S. EPA as "nonattainment," it was designated as "unclassifiable" due to insufficient quality-assured data to determine compliance with the NAAQS for the Illinois portion of the area that has typically provided the highest design values in the area. Although a number of counties in the St. Louis CBSA were formerly designated as "nonattainment" for the 1997 annual $PM_{2.5}$ NAAQS of 15 $\mu g/m^3$, Figure 1.3 shows that annual $PM_{2.5}$ concentrations in the St. Louis CBSA are now well below 15 $\mu g/m^3$, and are in fact also below 12 $\mu g/m^3$. In support of this, the Missouri Department of Natural Resources (MoDNR) has concluded that all monitors in Missouri are also now in attainment with the 2012 annual $PM_{2.5}$ NAAQS, with design values still trending downward (Moore, 2014).

For the one case where the 2011-2013 design values in the figures exceed the corresponding NAAQS (Figures 1.4 showing 8-Hour O_3 concentrations), data for all other cities are also above the NAAQS. This is further illustrated by Figure 1.8 that shows that nonattainment of the current 8-hour O_3 NAAQS is a regional problem for many parts of the country, including in the Northwest, Midwest, Texas, and California, and is not unique to the St. Louis area.

For 1-hour SO_2 levels, Figure 1.5 contains two bars for the St. Louis CBSA, both of which are below the 1-hour SO_2 NAAQS. The higher of the two values is based on SO_2 data for the Herculaneum (MO) area that is the former home to the last operating primary lead smelter in the U.S., the Doe Run smelter. Importantly, the Doe Run smelter, which was not only a major SO_2 emission source but also a major source of air lead emissions, closed at the end of 2013. An estimated 2013-2015 design value is shown for the Herculaneum monitor given that the 2011-2013 design value of 192 ppb was driven by SO_2 emissions from the former smelter; moreover, the 2011-2013 design value for the Herculaneum monitor was classified by US EPA as invalid due to the occurrence of monitoring quarters not meeting minimum data completeness criteria. Since the closure of the Doe Run smelter, SO_2 levels at the Herculaneum monitoring site have dropped significantly below the SO_2 NAAQS. For example, in 2014, the 99th percentile of 1-hour SO_2 concentrations at the Herculaneum monitoring site was 18 ppb and thus well below the 2011-2013 invalid design value of 192 ppb. For unofficial data through April 13, 2015 available on the U.S. AirData website[7], the maximum 1-hour SO_2 concentration is just 19 ppb; if SO_2 concentrations are assumed to remain similar for the remainder of 2015 at the Herculaneum monitoring

[5] There were a couple of cases where no valid 2011-2013 design values were available for a CBSA and only an invalid design value was provided in the US EPA design value report (1-hour NO_2 concentrations for the Chicago CBSA and 1-hour SO_2 concentrations for the Herculaneum area within the St. Louis CBSA). It is our understanding that these design values were classified as invalid due to the occurrence of monitoring quarters not meeting minimum data completeness criteria.
[6] http://www.epa.gov/airquality/particlepollution/designations/2012standards/regs.htm.
[7] http://www.epa.gov/airdata/

site, its 2013-2015 1-hour SO_2 design value would be approximately 60 ppb. Given these trends, it is thus expected that SO_2 concentrations in this area will continue to meet the SO_2 NAAQS given that the Doe Run smelter was the primary contributor to elevated SO_2 concentrations measured at the Herculaneum air monitors (MoDNR, undated). As illustrated by the second bar which is based on the highest 1-hour SO_2 design value for all other monitors in the St. Louis CBSA, SO_2 levels in Herculaneum are not representative of SO_2 levels in other parts of the St. Louis CBSA. In fact, outside of Herculaneum, 1-hour SO_2 levels are well below the NAAQS and lower than the levels in a number of the comparison CBSAs.

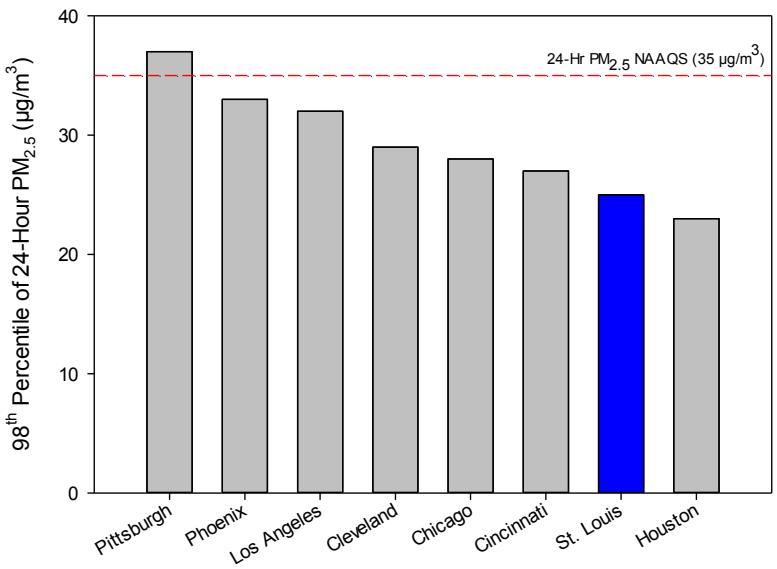


Figure 1.2 2011-2013 Design Values for 24-Hour $PM_{2.5}$ Concentrations for the St. Louis CBSA *vs*. Other Major U.S. CBSAs

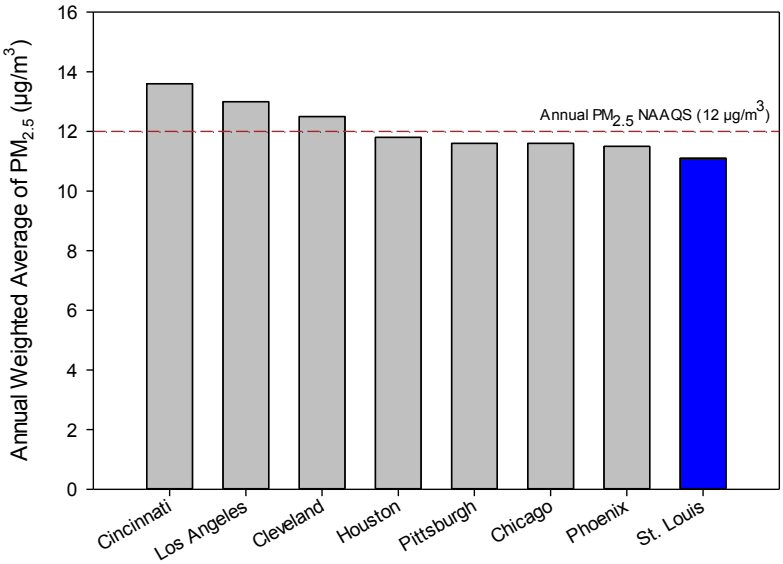


Figure 1.3 2011-2013 Design Values for Annual Average $PM_{2.5}$ Concentrations for the St. Louis CBSA *vs*. Other Major U.S. CBSAs

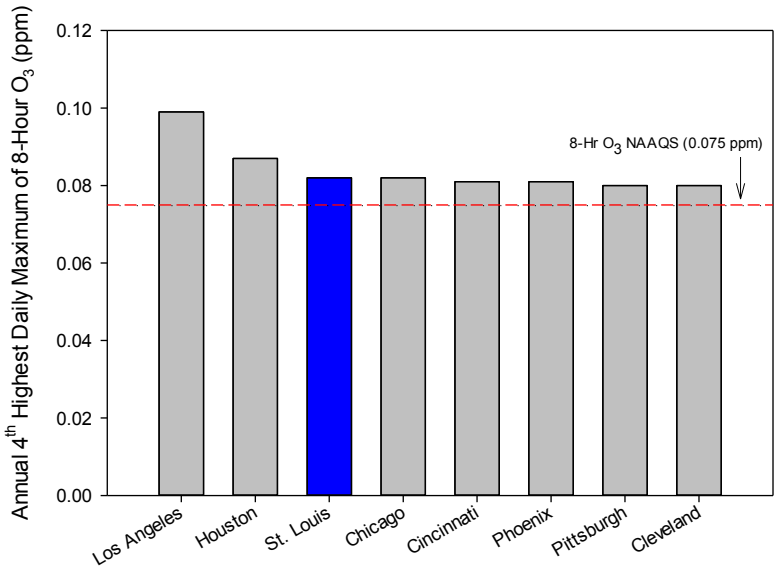


Figure 1.4 2011-2013 Design Values for Daily Maximum 8-Hour O_3 Concentrations for the St. Louis CBSA *vs*. Other Major U.S. CBSAs

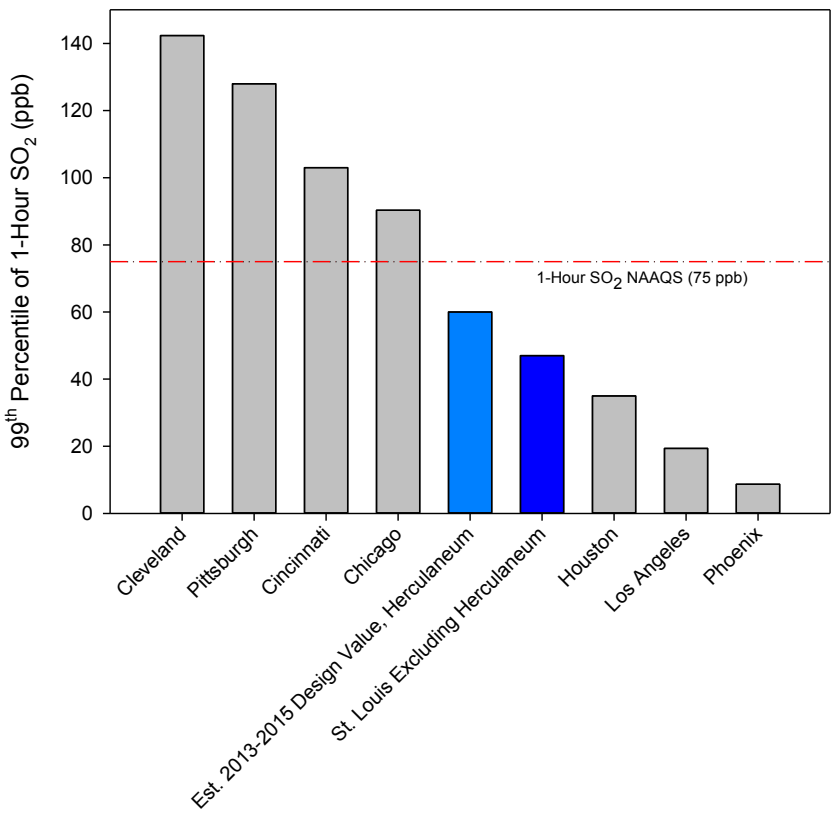


Figure 1.5 2011-2013 Design Values for 1-Hour SO_2 Concentrations for the St. Louis CBSA *vs*. Other Major U.S. CBSAs. Two bars are shown for the St. Louis CBSA, including one (Est. 2013-2015 Design Value, Herculaneum) that is based solely on data for the SO_2 monitor in Herculaneum (MO) and the other (St. Louis Excluding Herculaneum) that reflects all other SO_2 monitors in the St. Louis CBSA. An estimated 2013-2015 design value is shown for the Herculaneum monitor given that the 2011-2013 design value of 192 ppb was driven by SO_2 emissions from the Doe Run smelter that closed at the end of 2013; moreover, the 2011-2013 design value for the Herculaneum monitor was classified by US EPA as invalid due to the occurrence of monitoring quarters not meeting minimum data completeness criteria. The 2013-2015 estimated design value reflects the lower SO_2 concentrations that are now present in this area. As discussed in the text, a 2013-2015 design value of approximately 60 ppb is estimated using 2013-2014 official measurements and assuming that first quarter 2015 unofficial measurements will be representative of the entirety of 2015.

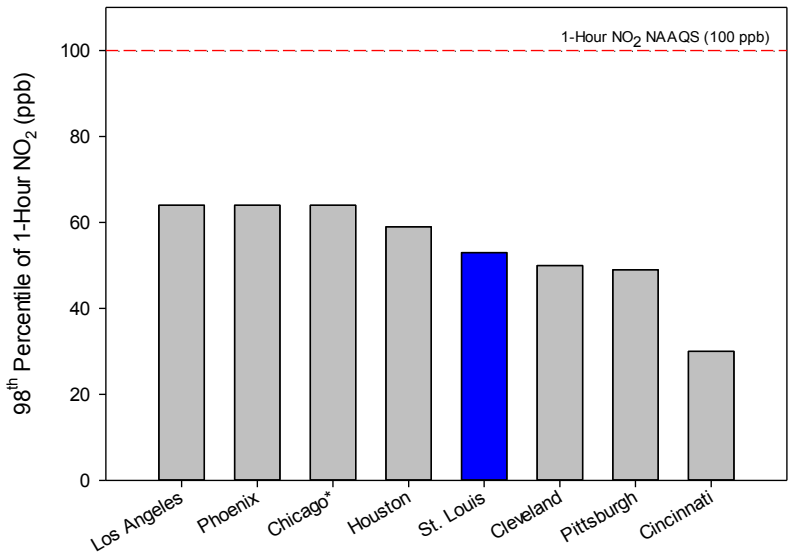


Figure 1.6 2011-2013 Design Values for 1-Hour NO_2 Concentrations for the St. Louis CBSA *vs*. Other Major U.S. CBSAs. The asterisk indicates that no valid design values were available for the Chicago CBSA and the highest invalid design value was used in the figure. Invalid design values do not meet U.S. EPA's criteria for data completeness (sometimes for just a single quarter where there are incomplete data), but they are still included in U.S. EPA design value reports.

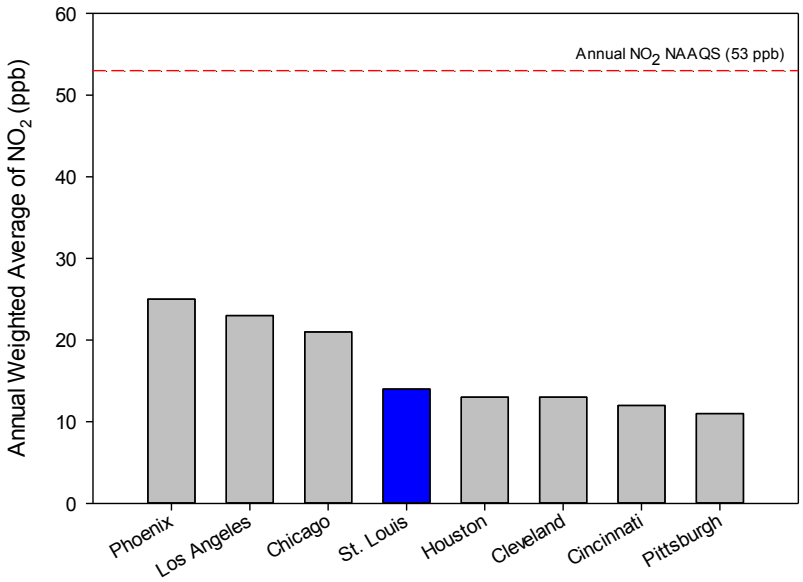


Figure 1.7 2011-2013 Design Values for Annual Average NO_2 Concentrations for the St. Louis CBSA *vs*. Other Major U.S. CBSAs

Figure 1.8 8-Hour Ozone NAAQS Nonattainment Areas (2008 NAAQS). Map from U.S. EPA (2015).

2 Air quality in the St. Louis Area has shown significant improvement in recent years, with air pollutant levels at almost all monitoring locations now in compliance with the health-protective NAAQS

As required by the Clean Air Act to help protect the public health from ambient air pollution, U.S. EPA has developed health-based ambient air quality standards known as the primary NAAQS.[8] According to the U.S. EPA NAAQS website,[9] primary NAAQS are limits that are set "to protect public health, including the health of 'sensitive' populations such as asthmatics, children, and the elderly." U.S. EPA currently has NAAQS for six air pollutants (also known as criteria air pollutants) due to the geographic scope of their occurrence and their public health significance – particulate matter (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), ozone (O_3), lead (Pb), and carbon monoxide (CO). The primary NAAQS are intended to be protective of the public health of exposed populations, including sensitive subpopulations (*e.g.*, asthmatics, children, and the elderly), with an adequate margin of safety.

The Clean Air Act requires that U.S. EPA periodically review and, if appropriate, revise existing criteria and NAAQS every five years to ensure that they are current and based on the latest scientific knowledge. Most primary NAAQS have been revised in recent years, with movement towards increasingly lower and more stringent standards. For example, on December 14, 2012, U.S. EPA completed its last review of the PM NAAQS, issuing a final rule that lowered the $PM_{2.5}$ annual NAAQS from 15 $\mu g/m^3$ to a level of 12 $\mu g/m^3$. At this time, U.S. EPA retained the 24-hour $PM_{2.5}$ standard of 35 $\mu g/m^3$ without any change. U.S. EPA last made major changes to the NO_2 and SO_2 NAAQS in June 2010, promulgating new primary 1-hour NAAQS of 100 ppb and 75 ppb, respectively. Most recently, on November 25, 2014, U.S. EPA announced its proposed changes to the O_3 NAAQS, which include revising the current (primary and secondary) 8-hour O_3 standard of 75 ppb down to the range of 65 to 70 ppb. U.S. EPA is scheduled to issue a final decision on its O_3 standard by October 1, 2015.

Figures 2.1 through 2.5 show trends in $PM_{2.5}$, O_3, SO_2, and NO_2 levels measured since 2000 for a subset of the central-site ambient monitors in the St. Louis area. Data were obtained from the U.S. EPA AirData website.[10] Specifically, these figures provide data for two different sets of ambient monitors: (1) five monitors in or near the downtown St. Louis City area that are more centrally located in heavily-populated, urban neighborhoods, and (2) three additional monitors that are generally located in more suburban or rural areas. In the figures, the "urban" monitors are denoted with a solid line and circular icon, while the "suburban/rural" monitors are denoted with a dashed line and triangular icon. Whether considered to be more urban or suburban/rural, each of the monitors in these figures was selected specifically because they provide a long, useful record of data for the criteria air pollutants of interest (see Table 2.1).

[8] Note that U.S. EPA has also developed secondary NAAQS for each of the criteria air pollutants that are intended to protect public welfare, addressing public welfare effects that include decreased visibility and damage to animals, crops, vegetation, and buildings.
[9] http://www.epa.gov/ttn/naaqs/.
[10] http://www.epa.gov/airdata/.

Figures 2.1 through 2.5 provide evidence of significant improvements to air quality in the St. Louis area. Downward trends in ambient concentrations are most apparent for $PM_{2.5}$ and SO_2, although modest declines are also present for O_3 and NO_2. For these monitoring locations, levels of the four criteria air pollutants have decreased over time to the point where the most recent complete year of data (2013) shows levels that are all below the current NAAQS. As indicated by the upper-bound monitoring data for the St. Louis CBSA provided in Section 1, there remain monitoring locations in the St. Louis area that have three-year (2011-2013) design values above the NAAQS for O_3 (8-hour concentrations. However, at many monitoring locations including those in population centers in the urban St. Louis area, levels of the other criteria air pollutants have significantly decreased in recent years to concentrations in compliance with the health-protective NAAQS.

As indicated earlier, the "urban" monitors in the figures are denoted with a solid line and circular icon, while the "suburban/rural" monitors are denoted with a dashed line and triangular icon. Although the "suburban/rural" monitors generally have lower pollutant levels than the "urban" monitors, Figures 2.1 through 2.5 show similar time trends for the two types of monitors, especially for the cases of $PM_{2.5}$ and O_3. These similar time trends suggest that the sources of these pollutants may be regional as opposed to local. While many of the "urban" monitors frequently have higher pollutant levels than the "suburban/rural" monitors (*e.g.*, NO_2 in Figure 2.5), this is likely due in large part to greater traffic-related air quality impacts as well as the greater density of other local air pollution sources.

Table 2.1 Selected $PM_{2.5}$, O_3, SO_2, and NO_2 Monitors in the St. Louis Area

Pollutant	AQS Site ID	State Name	County Name	City Name	Local Site Name	Available Years
$PM_{2.5}$	29-510-0085	Missouri	Saint Louis	Saint Louis	Blair Street	1999-Present
	17-163-0010; 17-163-9010	Illinois	Saint Clair	NA	IEPA - RAPS Trailer aka St. Louis - Midwest Supersite	1999-Present
	29-189-3001	Missouri	Saint Louis	Ladue	Ladue	2009-Present
	29-510-0086	Missouri	Saint Louis	Saint Louis	Margaretta Category B Core Slam PM2.5	1999-2007
	29-510-0007	Missouri	Saint Louis	Saint Louis	South Broadway	2000-Present
	29-186-0006	Missouri	Sainte Genevieve	Sainte Genevieve	Ste Genevieve - PM2.5 Core Slams	1999-2009

Pollutant	AQS Site ID	State Name	County Name	City Name	Local Site Name	Available Years
O_3	29-510-0085	Missouri	Saint Louis	Saint Louis	Blair Street	2005-Present
	29-186-0005	Missouri	Sainte Genevieve	NA	Bonne Terre	1996-2013
	17-163-0010; 17-163-9010	Illinois	Saint Clair	NA	IEPA- RAPS Trailer aka St. Louis - Midwest Supersite	1990-Present
	29-189-3001	Missouri	Saint Louis	Ladue	Ladue	1990-2004
	29-510-0086	Missouri	Saint Louis	Saint Louis	Margaretta Category B Core Slam PM2.5	2000-2008
	29-189-0014	Missouri	Saint Louis	Maryland Heights	Maryland Heights	2005-2013
	29-510-0007	Missouri	Saint Louis	Saint Louis	South Broadway	1990-2003
SO_2	29-510-0085	Missouri	Saint Louis	Saint Louis	Blair Street	2010-Present
	17-163-0010; 17-163-9010	Illinois	Saint Clair	NA	IEPA- RAPS Trailer aka St. Louis - Midwest Supersite	1990-Present
	29-189-3001	Missouri	Saint Louis	Ladue	Ladue	1990-2010
	29-510-0086	Missouri	Saint Louis	Saint Louis	Margaretta Category B Core Slam PM2.5	2000-Present
	29-189-0014	Missouri	Saint Louis	Maryland Heights	Maryland Heights	2005-2010
	29-510-0007	Missouri	Saint Louis	Saint Louis	South Broadway	1990-2010
NO_2	29-510-0085	Missouri	Saint Louis	Saint Louis	Blair Street	2013-Present
	29-186-0005	Missouri	Sainte Genevieve	NA	Bonne Terre	1996-2010
	17-163-0010; 17-163-9010	Illinois	Saint Clair	NA	IEPA- RAPS Trailer aka St. Louis - Midwest Supersite	1990-Present
	29-189-3001	Missouri	Saint Louis	Ladue	Ladue	1990-2010
	29-510-0086	Missouri	Saint Louis	Saint Louis	Margaretta Category B Core Slam PM2.5	2000-Present
	29-189-0014	Missouri	Saint Louis	Maryland Heights	Maryland Heights	2005-2010

Note:
Source: U.S. EPA AirData website.

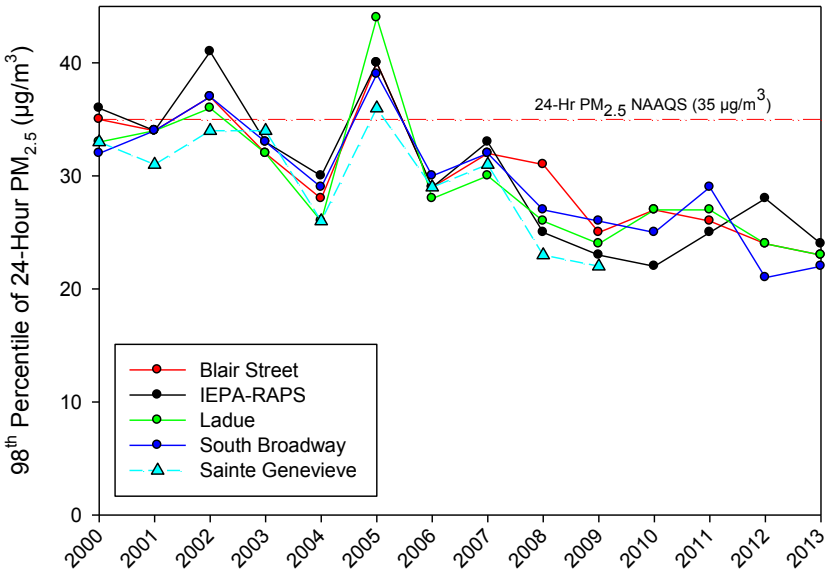


Figure 2.1 2000-2013 Time Series of 98th Percentile 24-Hour $PM_{2.5}$ Concentrations for One "Suburban/Rural" and Four "Urban" Monitors Representative of the St. Louis CBSA

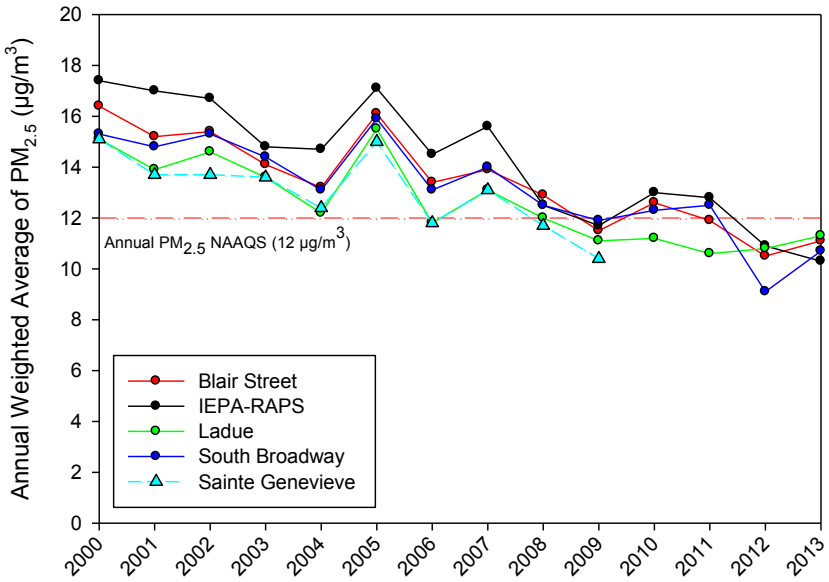


Figure 2.2 2000-2013 Time Series of Annual Average $PM_{2.5}$ Concentrations for One "Suburban/Rural" and Four "Urban" Monitors Representative of the St. Louis CBSA

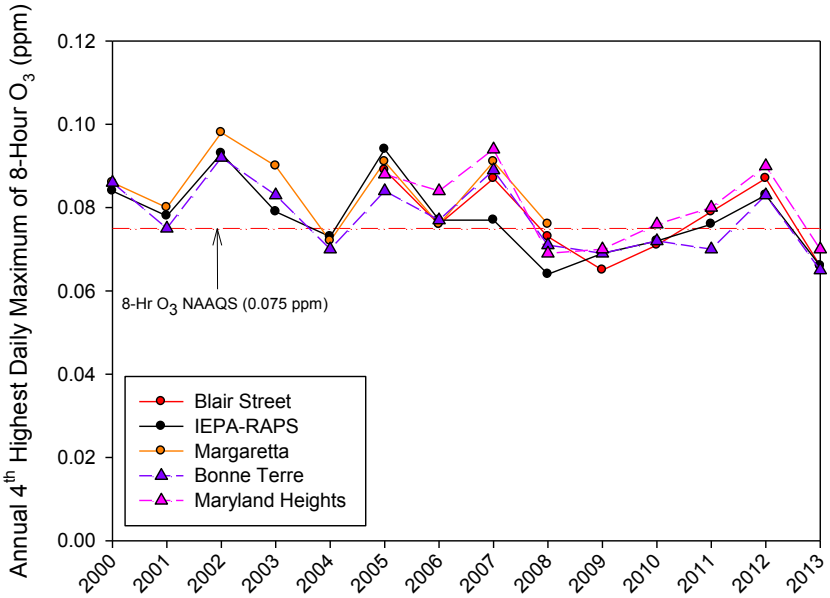


Figure 2.3 2000-2013 Time Series of Annual 4th Highest Daily Maximum O_3 Concentrations for Two "Suburban/Rural" and Three "Urban" Monitors Representative of the St. Louis CBSA

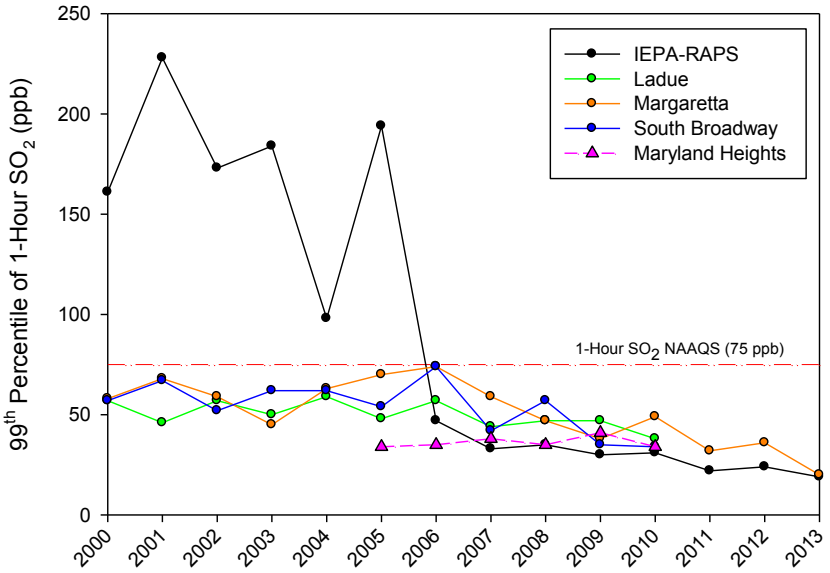


Figure 2.4 2000-2013 Time Series of 98th Percentile 1-Hour SO_2 Concentrations for One "Suburban/Rural" and Four "Urban" Monitors Representative of the St. Louis CBSA

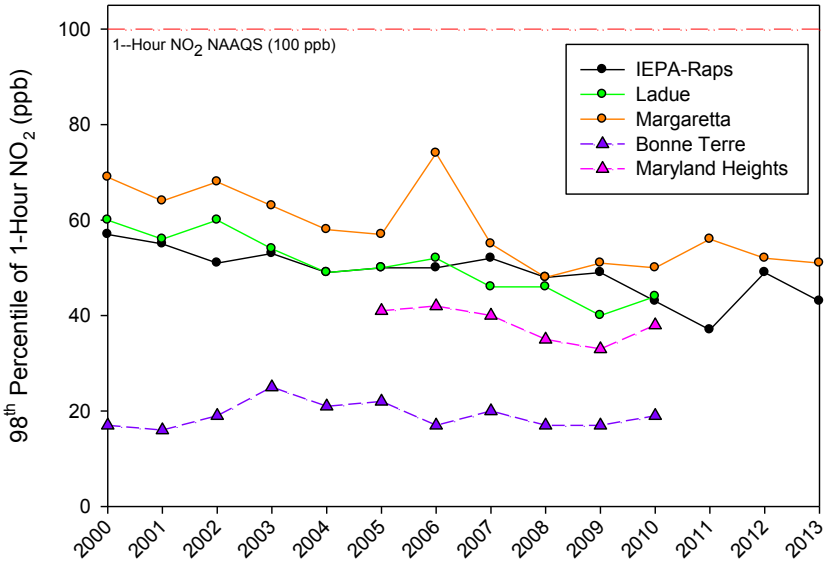


Figure 2.5 2000-2013 Time Series of 98th Percentile 1-Hour NO_2 Concentrations for Two "Suburban/Rural" and Three "Urban" Monitors Representative of the St. Louis CBSA

3 Expected incremental ambient $PM_{2.5}$ air quality impacts due to air emissions from the four Ameren CFPPs are small compared to everyday ambient $PM_{2.5}$ exposure levels in the St. Louis Area

Fine particulate matter, also known as $PM_{2.5}$, is ubiquitous in ambient (outdoor) air due to a large number of common natural and anthropogenic sources that include windblown dust, volcanoes, forest fires, bioaerosols, vehicle exhaust, tire wear particles, road debris, and power plant and other industrial emissions. Because coal-fired power plants such as the Ameren CFPPs are but one of many common sources of ambient $PM_{2.5}$ in urban areas such as St. Louis, it is useful to understand how the incremental ambient $PM_{2.5}$ impacts due to air emissions from the four Ameren CFPPs compare to everyday ambient $PM_{2.5}$ exposure levels in the St. Louis area. Air modeling is a commonly used tool for quantifying the incremental ambient $PM_{2.5}$ impacts from specific sources, such as coal-fired power plants. While $PM_{2.5}$ air modeling studies are typically available for newer power plants due to their preparation as part of today's air permitting process, it is our understanding that $PM_{2.5}$ air modeling studies have not been conducted for the four St. Louis-area CFPPs because they were not necessary for demonstrating attainment with the $PM_{2.5}$ NAAQS.

Given the lack of $PM_{2.5}$ air modeling data to predict incremental ambient $PM_{2.5}$ impacts of the four Ameren CFPPs, we explored whether the numerous published $PM_{2.5}$ source apportionment studies that have been conducted in the St. Louis area (*e.g.*, Amato and Hopke, 2012; Wang *et al*., 2009; Lee and Hopke, 2006; U.S. EPA, 2003) could provide information specific to the $PM_{2.5}$ impacts of the Ameren CFPPs. However, while some of these studies reported findings indicating $PM_{2.5}$ source contributions due to coal combustion (*e.g.*, Wang *et al*., 2009; Lee and Hopke, 2006; U.S. EPA, 2003), they could not distinguish $PM_{2.5}$ mass contributions of specific CFPPs.

We also sought to identify air modeling studies conducted for other U.S. coal-fired power plants that could be used to estimate the approximate incremental $PM_{2.5}$ impacts of the four Ameren CFPPs. Although relatively few air modeling studies of $PM_{2.5}$ impacts have been published for U.S. CFPPs, we identified the Levy *et al*. (2002a) air modeling study of the $PM_{2.5}$ impacts of nine older Chicago-area power plants as providing modeling results of relevance to the $PM_{2.5}$ impacts of the four Ameren St. Louis-area CFPPs. Levy *et al*. (2002a) used the U.S. EPA regulatory air dispersion model CALPUFF to predict the $PM_{2.5}$ impacts of both primary $PM_{2.5}$ emissions and atmospheric secondary formation of sulfate and nitrate particles from SO_2 and NO_x emissions, respectively. There is certainly some uncertainty in using air modeling results for Chicago-area CFPPs to represent the $PM_{2.5}$ impacts of the four Ameren St. Louis-area CFPPs, but as shown in Table 3.1, it is reasonable to assume that the Levy *et al*. (2002a) modeling results likely reflect overestimates of the $PM_{2.5}$ impacts of the four Ameren St. Louis-area CFPPs given that the nine Chicago-area CFPPs included in the Levy *et al*. modeling study total higher amounts of primary $PM_{2.5}$, SO_2, and NO_x emissions. In particular, the combined as-modeled emissions for the nine Chicago-area CFPPs in the Levy *et al*. study were more than 1.5, 2, and 4 times higher than the combined 2013 emissions of primary $PM_{2.5}$, SO_2, and NO_x, respectively, for the four Ameren CFPPs. Moreover, similarities in other factors that influence ground-level air pollutant concentrations from sources such as tall power plant stacks, including meteorological conditions and

terrain, provide support for the use of the Chicago-area CFPPs to represent the local $PM_{2.5}$ impacts of the four Ameren St. Louis-area CFPPs. While the Chicago-area CFPPs are somewhat more geographically dispersed than the St. Louis-area CFPPs, other factors including the taller stack heights and lesser emissions of the St. Louis-area CFPPs are expected to result in the Levy *et al*. (2002a) $PM_{2.5}$ impacts being overestimates of the local $PM_{2.5}$ impacts of the four Ameren St. Louis-area CFPPs.

As discussed in Levy *et al*. (2002a), they predicted maximum annual average impacts from all nine plants of 0.3, 0.2, and 0.2 $\mu g/m^3$ for primary $PM_{2.5}$, secondary sulfates, and secondary nitrates, respectively, in their modeling domain that encompassed much of the Midwest. If to be conservative, these maximum impacts are totaled (which they should not be because they all occurred at different locations, although all in the Chicago-Peoria region where many of the CFPPs were clustered), a maximum annual average $PM_{2.5}$ air quality impact of approximately 0.7 $\mu g/m^3$ is obtained. Table 3.2 shows that the Levy *et al*. (2002a) maximum model-predicted $PM_{2.5}$ concentrations for the nine Chicago-area CFPPs are similar to maximum model-predicted $PM_{2.5}$ concentrations (reflecting primary $PM_{2.5}$ concentrations as well as concentrations of secondary sulfate and nitrate $PM_{2.5}$) that these same investigators reported for a group of seven Atlanta-area CFPPs with a significantly greater combined capacity (>13,000 MW *versus* >7,500 MW). Albeit a county-average concentration rather than a maximum concentration, Perkins *et al*. (2009) reported a smaller model-predicted $PM_{2.5}$ concentration of 0.16 $\mu g/m^3$ for both primary $PM_{2.5}$ emissions and secondarily formed $PM_{2.5}$ from stack emissions of 3 coal-fired power plants and 18 gas-fired power plants in the San Antonio (Texas) metropolitan area.

If a $PM_{2.5}$ concentration of 0.7 $\mu g/m^3$ is conservatively assumed to represent the incremental $PM_{2.5}$ impacts of the four Ameren St. Louis-area CFPPs, it can be compared to total, all-source $PM_{2.5}$ concentrations measured at St. Louis-area monitors to provide perspectives on the incremental $PM_{2.5}$ impacts of the CFPPs relative to background ambient $PM_{2.5}$ from other local and regional sources. In 2013, annual average $PM_{2.5}$ concentrations for air quality monitors within the St. Louis CBSA ranged from 9.6 $\mu g/m^3$ (for the Forest Park monitor at 96 Forest Park in St. Louis) to 11.3 $\mu g/m^3$ (for both the Ladue monitor at 73 Hunter Avenue in Ladue, MO; and for the Branch St. monitor at 100 Branch Street in St. Louis).[11] As shown in Figure 3.1 below, 0.7 $\mu g/m^3$ thus corresponds to 6.2% to 7.2% of the $PM_{2.5}$ levels measured at St. Louis-area $PM_{2.5}$ monitors in 2013, suggesting that *greater than 90% of the airborne ambient $PM_{2.5}$ in the St. Louis-area is from other sources* (*e.g.*, vehicle exhaust, local industrial and commercial sources including smelters and steel mills, windblown dust, and regionally transported $PM_{2.5}$, such as from Ohio River Valley power plants and Midwestern agricultural farming). In summary, while the Levy *et al*. (2002a) maximum model-predicted $PM_{2.5}$ concentrations for the nine Chicago-area CFPPs are only highly approximate estimates and very likely overestimates of the incremental $PM_{2.5}$ impacts of the four Ameren St. Louis-area CFPPs, it would appear reasonable to conclude that *air emissions from the Ameren CFPPs are only relatively minor contributors to airborne ambient $PM_{2.5}$ levels in the St. Louis area*. In other words, it is expected that ambient $PM_{2.5}$ levels at St. Louis-area air quality monitors would not be significantly different if the four Ameren CFPPs were not in existence.

[11] 2013 $PM_{2.5}$ data from Monitor Values Report obtained from the U.S. EPA AirData website (http://www.epa.gov/airdata/ad_rep_mon.html) for the St. Louis CBSA.

Table 3.1 Comparison of Plant Specifications and Emissions for the Four Ameren St. Louis-area CFPPs *versus* the Nine Chicago-area CFPPs Included in the Levy *et al*. (2002a) Modeling Study

Power Plants		Total Capacity (MW)	Heat Input (Million BTU)	Primary $PM_{2.5}$ Emissions (tons)		SO_2 Emissions (tons)	NOx Emissions (tons)
				Filterable	Condensable		
Ameren St. Louis-area Power Plants[1,2]	Labadie	2407	159,859,424	1,838	879	38,384	7,474
	Meramec	839	27,881,128	105	78	5,962	2,088
	Rush Island	1204	74,341,112	818	256	19,587	3,067
	Sioux	986	49,307,431	64	160	2,799	6,004
	Total	5436	311,389,094	2,825	1,374	66,733	18,633
Levy *et al.* (2002a) Modeled Chicago-area Power Plants[3]	Crawford	597.6	26,569,896	160	132	8,468	4,454
	E.D. Edwards	780.3	38,313,345	66	2,862	51,601	9,082
	Fisk	374.1	18,901,367	108	94	5,269	3,490
	Hennepin	306.3	19,210,906	201	97	6,820	3,833
	Joliet 29	1320	57,434,963	361	291	17,379	9,092
	Joliet 9	360.4	15,430,328	149	76	4,739	5,543
	Powerton	1785.6	70,942,171	434	354	19,423	26,898
	Waukegan	802.7	48,501,637	402	291	18,327	5,984
	Will County	1268.9	56,498,731	222	222	19,180	11,243
	Total	7596	351,803,344	2,102	4,419	151,205	79,620

Notes:
(1) With the exception of the primary $PM_{2.5}$ emissions data, 2013 data for the four Ameren St. Louis-area power plants were obtained from the U.S. EPA Clean Air Markets Database (CAMD).
(2) Primary $PM_{2.5}$ emissions data were obtained from Ameren and are mainly for the 2010-2011 timeframe. They are considered to be generally representative of primary $PM_{2.5}$ emissions from the four power plants.
(3) All data for the nine Chicago-area power plants were obtained from Levy *et al.* (2002a), with the emissions data representing annual average emissions that were used in the air modeling analysis. As described in Levy *et al.* (2002a), the plant capacity and heat input data are for 1998, while the emissions data are estimates of expected annual emissions for 2000.

Table 3.2 Published Model-predicted Ground-level $PM_{2.5}$ Concentrations for Groups of U.S. CFPPs

Source	Number of Modeled CFPPs	Plant Location(s)	Plant Capacity	Model-predicted Ground-level Annual Average $PM_{2.5}$ Air Conc. ($\mu g/m^3$)[1]
Levy *et al.* (2002a)	9	Illinois, in close proximity to or upwind of the Chicago area	>7,500 MW total nameplate capacity	0.7, including both primary and secondary $PM_{2.5}$
Levy *et al.* (2003)	7	Georgia, in the Atlanta area	>13,000 MW total nameplate capacity	0.6-0.9 depending on the air modeling approach, including both primary and secondary $PM_{2.5}$
Perkins *et al.* (2009)	3 coal plants/units (and 18 gas plants/units)	Bexar County, Texas, in the San Antonio metropolitan area	1,425 MW capacity for 3 coal plants/units (and ~2,300 MW capacity for 18 gas plants/units)	0.16 for year 2002 emissions, including both primary and secondary $PM_{2.5}$

Notes:
MW = megawatt; NA = not available, $PM_{2.5}$ = fine particulate matter (up to 2.5 µm in diameter).
(1) The Levy *et al.* (2002a, 2003) $PM_{2.5}$ results are for maximum impacted model receptor locations, while the Perkins *et al.* (2009) $PM_{2.5}$ results are county-average impacts.

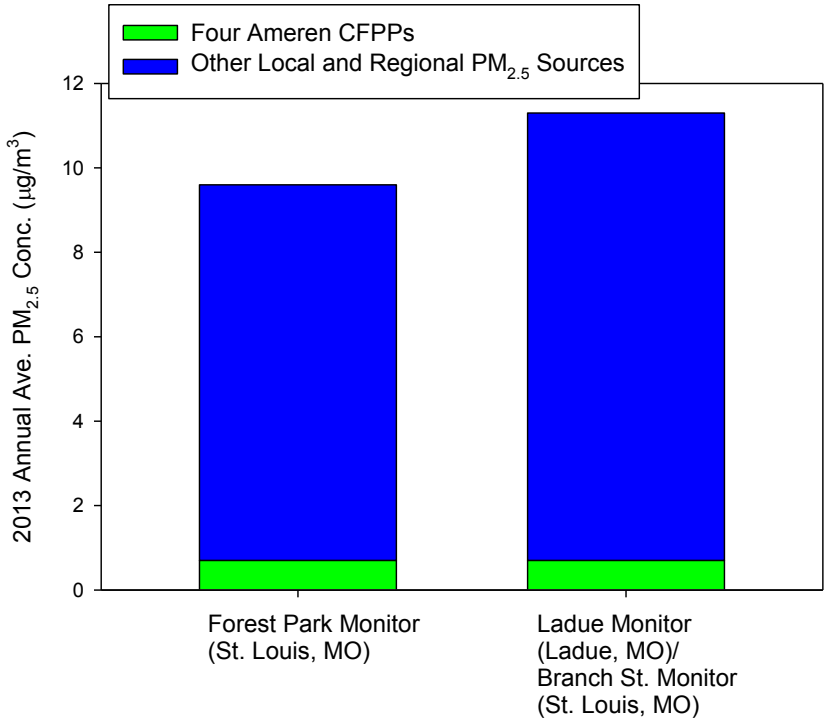


Figure 3.1 Comparison of the Estimated Incremental Annual Average $PM_{2.5}$ Impact of the Four Ameren St. Louis-area CFPPs *vs*. Total All-Source Measured $PM_{2.5}$ Levels at St. Louis-area Air Quality Monitors

4 Total personal exposures to air pollutants, including $PM_{2.5}$, NO_x, and ozone, will generally be dominated by contributions from other common indoor and outdoor sources rather than by contributions from CFPPs

The various air pollutants associated with CFPP stack emissions, including those that are directly emitted by CFPPs (*e.g.*, primary $PM_{2.5}$, NO_x, SO_2, CO) as well as those for which CFPP stack emissions contribute to secondary formation in the atmosphere (*e.g.*, O_3, sulfate and nitrate $PM_{2.5}$), are all generated (either directly or indirectly) by other outdoor combustion sources that include on-road and non-road mobile sources, industrial processes, fires, volcanoes, geothermal hot springs, lightning, and natural gas- and oil-fired boilers. In addition, breathing indoor air is well recognized to be a major source of our everyday exposures to a variety of air pollutants, including criteria air pollutants such as $PM_{2.5}$, NO_x, and O_3 (Spengler *et al*., 2001). This is both because we spend the majority of our time indoors,[12] and because there are a number of common indoor sources of air pollutants. As discussed below, both $PM_{2.5}$ and NO_x are produced indoors by common combustion appliances and sources (gas ranges, wood stoves, kerosene heaters, fireplaces, candles and tobacco smoke). There are fewer indoor O_3 sources, although O_3 is emitted as an intentional or unintentional by-product by some consumer products (*e.g.*, ionizing air cleaners, electrostatic precipitators, and office printing / copy equipment). O_3 can also be formed indoors *via* chemical reactions. Overall, it is well-documented that indoor concentrations of numerous air pollutants are often greater than outdoor concentrations, in part because pollutants from indoor sources can build up and remain confined within indoor spaces over extended periods of time (Long *et al*., 2000).

With a focus on $PM_{2.5}$, NO_x, and O_3, we provide below an overview of common exposure sources in order to illustrate that total personal exposures to these criteria air pollutants will generally be dominated by contributions from common indoor and outdoor sources other than by contributions from local CFPPs. Moreover, as discussed below, indoor levels of pollutants of ambient origin (*i.e.*, $PM_{2.5}$ and NO_x emitted by power plants, O_3 formed in power plant plumes) are often significantly reduced compared to outdoor levels due to infiltration and deposition losses during transport indoors, where most human exposure occurs. As a result, CFPP-related emissions are dispersed and concentrations significantly reduced by the time they reach ground-level and indoor environments where human exposure can occur; in contrast, other ground-level ambient sources (*e.g.*, mobile sources) and indoor sources can have a significantly higher exposure potential given that their emissions typically occur closer or in direct proximity to people breathing the air.

[12] U.S. EPA (2009) states that people spend roughly 90% of their time indoors.

4.1 $PM_{2.5}$

$PM_{2.5}$ is always present in both outdoor and indoor air due to a multitude of common sources. As discussed earlier, outdoor $PM_{2.5}$ has a diverse number of natural and human sources, including windblown dust, volcanoes, forest fires, bioaerosols, vehicle exhaust, tire wear particles, road debris, power plants, and commercial and industrial emissions. Indoors, we have routine exposures to $PM_{2.5}$ from a variety of ordinary personal and indoor sources. Each of us generates airborne $PM_{2.5}$ everyday through typical daily activities, such as cooking (baking, frying, grilling, barbecuing, toasting, *etc.*), dusting, vacuuming, folding clothes, making beds, mowing the lawn, driving a car, heating a home, smoking, burning candles, *etc.* Indoor $PM_{2.5}$ sources can be a large contributor to total personal $PM_{2.5}$ exposures, with U.S. EPA studies showing that cooking events can increase average $PM_{2.5}$ concentrations throughout the home by about 50 $\mu g/m^3$ (Wallace *et al*., 2004). Table 4.1 illustrates how common indoor $PM_{2.5}$ sources, such as cooking and cleaning activities, are capable of elevating short-term indoor $PM_{2.5}$ levels by tens to hundreds of $\mu g/m^3$.

Figures 4.1 and 4.2, which are adapted from the Levy *et al*. (2002b) and Long *et al*. (2000) studies, respectively, illustrate how we are all routinely exposed to elevated $PM_{2.5}$ levels in a number of everyday indoor and outdoor microenvironments, such as buses, subway cars and station platforms, food courts, restaurants, and our homes. For comparison, these figures also include the Section 3 estimates of the incremental annual average $PM_{2.5}$ impacts of the four Ameren CFPPs in the St. Louis-area. As indicated in these figures, $PM_{2.5}$ exposures from common indoor locales are expected to far exceed any $PM_{2.5}$ exposures associated with the four Ameren CFPPs.[13]

Table 4.1 Average Airborne Particle Levels During Typical Indoor Activities Compared to the Estimated Incremental Annual Average $PM_{2.5}$ Concentration from St. Louis-area Power Plants

Activity	Indoor Activity $PM_{2.5}$ Concentration ($\mu g/m^3$)	Section 3 Estimated Incremental Annual Average $PM_{2.5}$ Concentration from St. Louis-area Power Plants ($\mu g/m^3$)
Baking (gas)	101	**0.7**
Sautéing	66	**0.7**
Toasting	54	**0.7**
Frying	41	**0.7**
Stir-frying	37	**0.7**
Broiling	29	**0.7**
Burning candles	28	**0.7**
Dusting	23	**0.7**
Baking (electric)	15	**0.7**
Walking vigorously over carpet indoors	12	**0.7**
Cleaning with Pine Sol	11	**0.7**
Vacuuming	7	**0.7**

Note:
Indoor activity $PM_{2.5}$ data from Long *et al*. (2000).

[13] Although for different averaging periods, the short-term air exposure data for common indoor and outdoor microenvironments shown in Figures 4.1 and 4.2 can be compared to the estimated incremental annual average $PM_{2.5}$ impacts for the four Ameren St. Louis-area CFPPs given that these types of short-term exposures occur on a frequent, if not daily, basis.

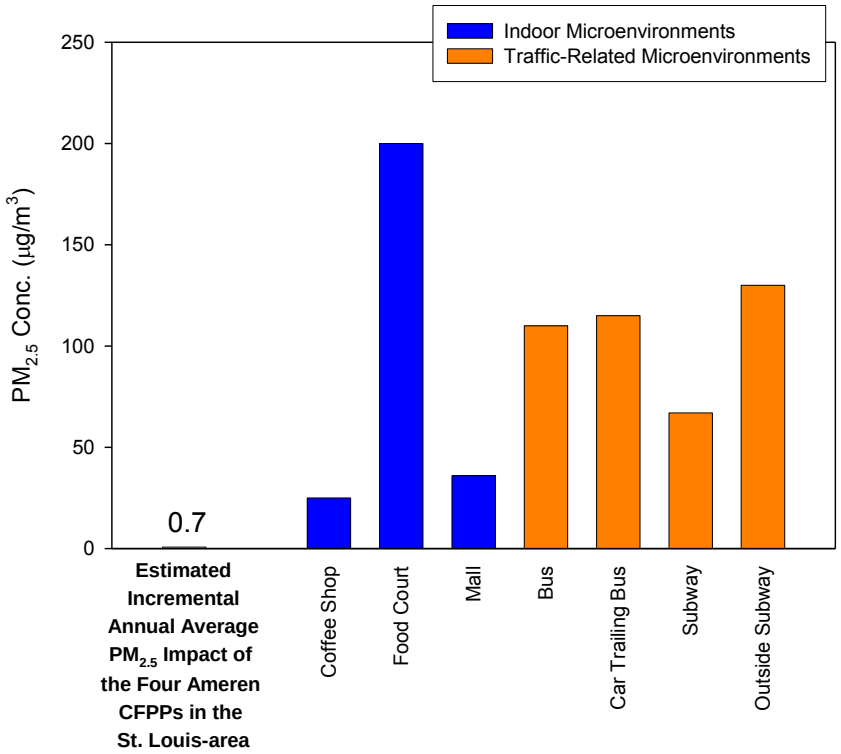


Figure 4.1 Mean Measurements of $PM_{2.5}$ Levels ($\mu g/m^3$) in Various Everyday Locations in Comparison to the Estimated Incremental Annual Average $PM_{2.5}$ Impact of the Four Ameren CFPPs in the St. Louis Area. $PM_{2.5}$ data for everyday locations from Levy *et al.* (2002b).

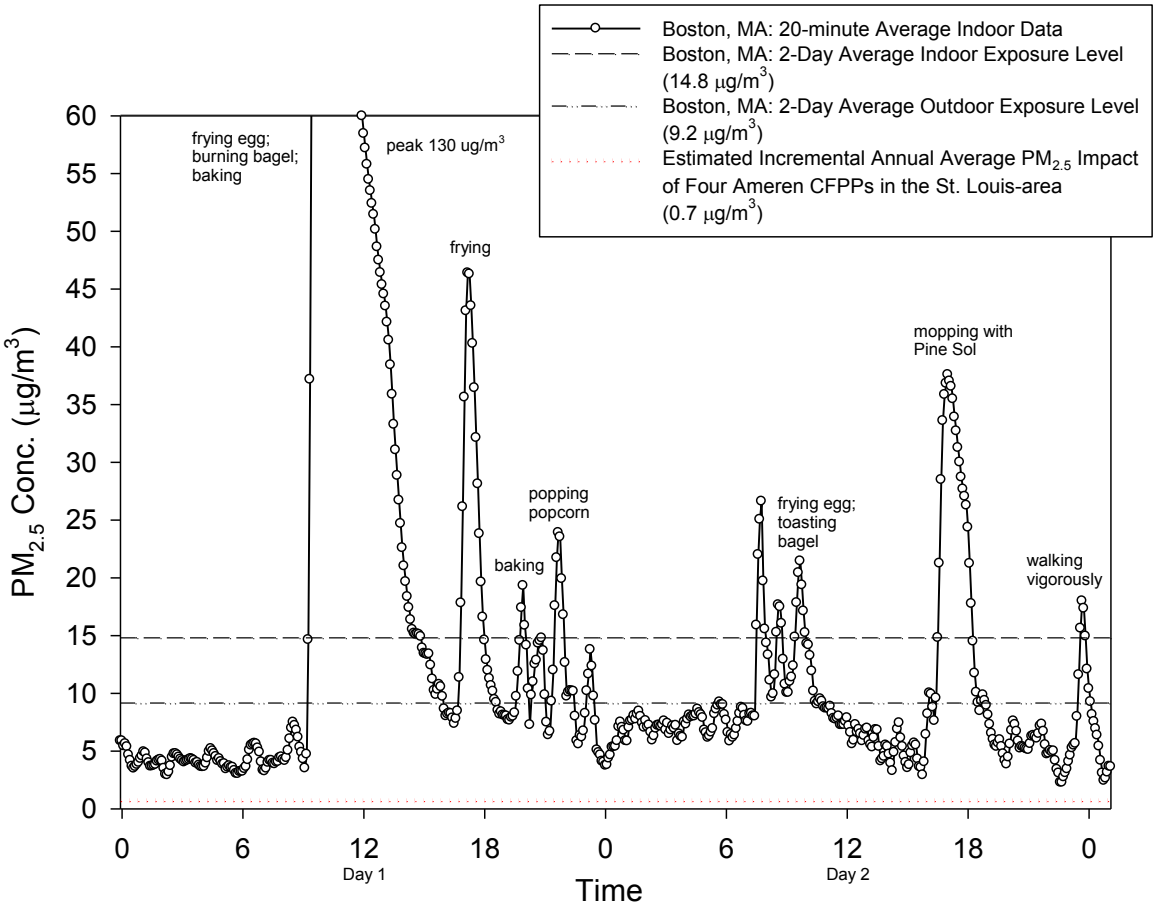


Figure 4.2 Estimated Incremental Annual Average $PM_{2.5}$ Impact of the Four Ameren CFPPs in the St. Louis Area (red dotted line) *vs*. Everyday Indoor and Outdoor $PM_{2.5}$ Exposure Levels in a Boston-area Residential Home (black solid and dashed lines, respectively). Boston indoor and outdoor $PM_{2.5}$ data from Long *et al*. (2000).

Personal outdoor activities can also be significant sources of $PM_{2.5}$ exposures. For examples, as part of the U.S. EPA Small Engine Exposure Study (SEES), Baldauf *et al.* (2006) conducted a series of measurements for $PM_{2.5}$ and other airborne contaminants (carbon monoxide [CO], aldehydes, VOCs) during personal outdoor activities such as use of gasoline-powered riding tractors, walk-behind lawn mowers, string trimmers, and chainsaws. Personal $PM_{2.5}$ concentrations measured during these test events ranged from 63 up to 3,809 μg/m^3. In addition, Quintana *et al*. (2001) reported that barbecuing was associated with an average increase in personal $PM_{2.5}$ exposure of 120 μg/m^3 over a 99-minute event period, while yard work was associated with an average increase in personal $PM_{2.5}$ exposure of 72 μg/m^3 over a 177-minute event period.

Moreover, it bears mentioning that indoor concentrations of $PM_{2.5}$ of ambient origin are often substantially reduced compared to outdoor $PM_{2.5}$ concentrations due to particle losses that occur during transport across the building shell and from indoor deposition (Diapouli *et al*., 2013; Clark *et al*., 2010; Sarnat *et al*., 2006; Wallace and Williams, 2005). In other words, exposures to $PM_{2.5}$ of ambient origin, such as $PM_{2.5}$ associated with CFPP emissions, are generally reduced for people indoors as compared to outdoors. Research has demonstrated that particle losses due to transport across the building shell and from indoor deposition are dependent on building characteristics (*e.g.*, ventilation conditions, age of construction, building size, type of heating and cooling system). Sarnat *et al.* (2006) estimated an average

$PM_{2.5}$ infiltration factor of 0.48 (*i.e.*, 48% of ambient airborne $PM_{2.5}$ penetrated into indoor spaces and remained airborne indoors) based on a study of 17 homes in Los Angeles, CA; similarly, Clark *et al.* (2010) estimated an average $PM_{2.5}$ infiltration factor of 0.52 for their study of Toronto homes. Studies such as Wallace and Williams (2005), Allen *et al*. (2003), and Long *et al*. (2001) have reported evidence that the greatest reductions in ambient particle infiltration typically occur for homes under low ventilation conditions – *i.e.*, tightly-sealed homes with closed windows and doors, such as for homes that use central air-conditioning systems in the summertime and for "winterized" homes in colder climates. For example, Allen *et al*. (2003) reported a mean $PM_{2.5}$ infiltration factor of 0.53 for Seattle homes during the heating season as compared to a mean of 0.79 during the non-heating season when windows and doors are typically opened to promote ventilation.

4.2 NO_x

As discussed in HEI (2010) and U.S. EPA (2008, 2013a), engine exhaust fumes from both on-road and non-road vehicles are the largest sources of NO_x emissions nationwide; for example, based on data from the 2008 National Emission Inventory, U.S. EPA (2013a) reported that highway and off-highway vehicles contributed 39% and 19%, respectively, of total NO_x emissions, as compared to 17% for fuel combustion by utilities. In urban areas, highway vehicles are dominant contributors of ambient NO_2 concentrations, such that NO_2 has been proposed as a surrogate for traffic emissions. Figure 4.3, which is based on data and a similar figure in HEI (2010), illustrates the significance of traffic emissions as sources of ambient NO_2 concentrations, showing that higher average NO_2 concentrations have generally been measured inside vehicles and at roadside locations as compared to other monitoring locations. U.S. EPA (2008) summarized findings from a body of studies suggesting that traffic-related NO_2 exposures, both from commuting activities and from living near heavily-trafficked roads, can dominate total personal NO_2 exposures.

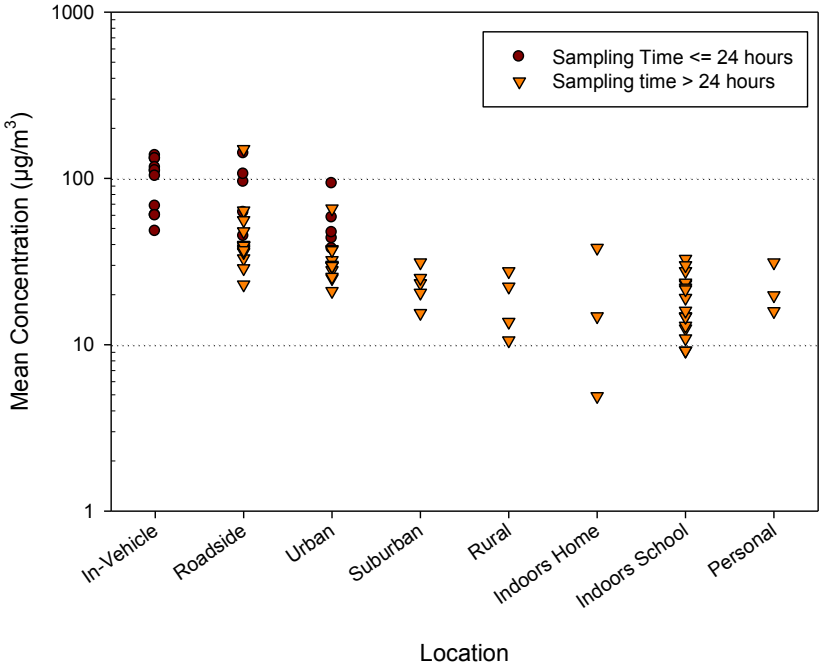


Figure 4.3 Mean NO_2 Concentrations Measured in Various Exposure Microenvironments. Figure adapted from HEI (2010). As discussed in this report, data are primarily from traffic-pollution studies published since 1998.

NO_x can also have important indoor sources, such that indoor NO_2 concentrations can be significantly higher than outdoor NO_2 concentrations. Similar to $PM_{2.5}$, the relative impacts of indoor NO_x sources *versus* ambient NO_x are affected by losses of ambient NO_x during transport indoors; as discussed in HEI (2010), study findings suggest that, in the absence of indoor sources, indoor NO_2 concentrations are approximately 50% of outdoor NO_2 concentrations. NO_x is emitted indoors by a variety of common combustion sources, including indoor combustion sources, such as gas cooking appliances (*e.g.*, natural gas cooking burners), oil furnaces, kerosene space heaters, wood-burning and natural gas fireplaces, wood stoves, candle burning, and smoking. For homes with attached garages and other structures, motor vehicles and generators can be sources of indoor NO_x.

As discussed in U.S. EPA (2008), a number of studies have demonstrated the significance of gas cooking appliances as sources of indoor NO_x exposure, with findings showing that indoor NO_2 concentrations are approximately 50 to 400% higher in homes with gas-cooking appliances than homes with electric cooking appliances. ARCADIS (2001) measured indoor NO_2 concentrations associated with simulated cooking and oven-cleaning activities using gas appliances in a small test house, reporting that average concentrations during the cooking periods ranged from 24-216 µg/m^3 (13-115 ppb) and that average NO_2 concentrations exceeded 750 µg/m^3 (400 ppb) in three rooms (kitchen, adjacent living room, bedroom) of the test house during five-hour oven self-cleaning tests. More recently, using a simulation model designed to predict time-dependent pollutant concentrations associated with residential natural gas cooking burners in Southern California homes, Logue *et al*. (2014) estimated average contributions of 25 to 39% for natural gas cooking burners to total weekly average NO_2 concentrations inside modeled homes across the four seasons. Other studies have characterized the impacts of unvented or inadequately vented gas appliances, such as gas hot water heaters and gas fireplaces, on indoor NO_2 concentrations (U.S. EPA, 2008).

4.3 O_3

Ozone exposure derives from a multitude of everyday sources, including some common indoor sources. Outdoors, ozone is rarely emitted directly; *i.e.*, ozone is not emitted from the stacks of coal-fired power plants such as the four Ameren St. Louis-area CFPPs, nor by motor vehicles. Instead, it is formed in the atmosphere *via* the action of sunlight on substances in the air emitted by a number of sources that include vehicle and engine exhaust, industrial facilities, combustion from power plants, gasoline vapors, biogenic sources, and chemical solvents. Most ambient ozone is formed when certain substances react with each other in the presence of sunlight (*e.g.*, volatile organic compounds, or VOCs, reacting with nitrogen oxides, or NO_x). Although power plant plumes can be major sources of NO_x, they are not significant sources of the VOCs that are also needed for ozone formation; as a result, formation of ozone in areas influenced by power plant emissions is dependent on the availability of VOCs from other sources. Importantly, even in the absence of anthropogenic emissions, there would still be measurable ground-level ozone concentrations due to lightning and formation from natural precursors, as well as due to transport of stratospheric ozone down to the troposphere. For example, Emery *et al*. (2012) cited study findings indicating that stratosphere-troposphere exchange can contribute to multi-day ozone enhancements in the range of 50-65 ppb at remote western and northern U.S. sites.

As outside air infiltrates indoors, there are significant reductions in ozone levels compared to outdoor levels, due to the chemical reactivity of ozone (U.S. EPA, 2013b; McKone *et al*., 2009). Specifically, studies have shown that (in the absence of indoor sources) indoor ozone concentrations are typically 10 to 40% of outdoor concentrations (U.S. EPA, 2013b; McKone *et al*., 2009). Ozone penetration is dependent on a number of factors, including season, building ventilation rate, use of air conditioning, and microenvironment. In general, higher ozone penetration is typically observed in homes with open windows and doors, while tighter homes, and in particular those relying on central air conditioning systems, have been found to have lower ozone penetration. Lee *et al*. (1999) reported nearly ten times greater ozone penetration for 17 California homes with windows open and no air conditioner (AC) use compared to three homes with AC turned on. Ozone is also efficiently removed indoors through deposition on surfaces and *via* indoor chemical reactions, further reducing indoor concentrations compared to outdoor concentrations (Weschler, 2000; U.S. EPA, 2013b).

Aside from penetration of outdoor ozone into indoor spaces, O_3 exposure indoors derives from common consumer products. Indoor sources of O_3 include ozone generators (household air purifiers), ion generators and electrostatic air cleaners (precipitators),[14] photocopiers, fax machines, laser printers, computer monitors, and ink/bubble jet printers (Weschler, 2000; U.S. EPA, 2013b; ARB, 2005). ARB (2005) reports that the number of indoor direct-emitting ozone sources has increased within the last 10-15 years. For individuals in indoor environments where these consumer and office products are used, the O_3 emissions can elevate indoor and personal O_3 concentrations well above outdoor concentrations. For example, U.S. EPA-funded studies have measured O_3 emissions from office equipment, showing that emissions increase with improper maintenance (Leovic *et al*., 1996; 1998). Based on a 1994 literature survey of office equipment emissions, U.S. EPA (1995) reported that measurement studies of photocopier machines had observed maximum breathing-level concentrations ranging from <1 to 150 ppb in poorly ventilated rooms. U.S. EPA (1995) also reported indoor ozone concentrations of approximately 50 to 2,000 ppb for laser printer usage. Other tests conducted on four laser printers by Tuomi *et al*. (2000) yielded air concentrations of up to 180 ppb ozone.

[14] Ionic air cleaners are widely available in a variety of different designs, including larger units for household use; smaller units for use in bathrooms, refrigerators, and closets; units for cars; personal wearable units, or "personal air purifiers"; ionic brushes; shoe cleaners; and toothbrush disinfectors (Britigan *et al*., 2006).

Household ozone generators (marketed as air purifiers) intentionally emit ozone into indoor air with the goal of improving air quality. Also marketed as air purifiers, ion generators emit ozone as a by-product. A number of studies (Shaughnessy and Oatman, 1992; Chessor, 1998; Mason *et al*., 2000; Britigan *et al*., 2006; Waring and Siegel, 2011) have demonstrated that certain conditions cause such air purifiers to elevate indoor ozone concentrations to levels in the range of hundreds to thousands of ppb. For example, for experiments using a human-sized mannequin wearing a personal air purifier, Britigan *et al*. (2006) reported peak O_3 concentrations near the mannequin's mouth of 700 ppb.

5 Hypothetical health impacts calculated for CFPP air emissions are unreliable because of many hidden assumptions, uncertainties, and limitations

5.1 Hypothetical health impact assessments conducted by NGOs

Hypothetical health impact calculations offered by non-governmental organizations (NGOs) like the CATF purport to present calculations that assert health harms from specific local sources, *e.g.*, from fossil-fuel power plants. Two such projections have included, among other U.S. power plants, the four Ameren CFPPs near St. Louis. The Clean Air Task Force calculated the health and economic impacts of all coal-fired power plants, with updated results reflecting their estimated projection of 2012 air emissions (CATF, 2014). A similar analysis of 51 power plants was conducted by the Environmental Integrity Project (EIP, 2012).

The CATF model calculations projected yearly premature deaths, heart attacks, asthma attacks, hospital admissions, cases of chronic bronchitis, and asthma emergency room visits attributable to the four Ameren CFPPs, with total attributed health costs of over $1.3 billion (Table 5.1). The Table 5.1 numbers were obtained from the CATF website, which has an interactive map of the U.S., showing power plants and their associated impacts on health.[15] Similarly, EIP estimated costs from "premature deaths" associated with power plants across the U.S., including three of the Ameren Missouri Plants (Labadie, Meramec, and Rush Island, Table 5.1). Both analyses projected hypothetical health and economic impacts of power plant air emissions, specifically fine particulate matter, or $PM_{2.5}$, and gaseous precursors to $PM_{2.5}$ (SO_x and NO_x). However, as we will explain in our review of the methodology, the results in Table 5.1 are speculative and should not be interpreted as reliable or even realistic predictions of actual health outcomes.

Our critical evaluation of the underlying analyses demonstrates that the health claims reported in these model exercises are hypothetical and, at best, overstated. In this section, we highlight the issues associated with the assumptions, methods, and data inputs in these projections. Specifically, in Section 5.2, we summarize the methods used to derive health impact estimates. In Section 5.3, we discuss limitations of the analyses, and in Section 5.4 we point out that experimental, non-statistical lines of scientific evidence suggest that the projections in Table 5.1 are unsupported by laboratory and clinical data.

[15] http://www.catf.us/fossil/problems/power_plants/existing/.

Table 5.1 Examples of the Translation of $PM_{2.5}$ Concentration Increments into Hypothetical Health Impacts Nationwide and Their Monetary Value

Alleged Health Statistic	Labadie Power Plant				Meramec Power Plant				Rush Island Power Plant				Sioux Power Plant	
	CATF (2014)		EIP (2012)		CATF (2014)		EIP (2012)		CATF (2014)		EIP (2012)		CATF (2014)	
	N	*Cost**	*N*	*Cost**	*N*	*Cost**	*N*	*Cost**	*N*	*Cost**	*N*	*Cost**	*N*	Cost*
Deaths	78	570,000	140-290	1,200,000-2,400,000	32	230,000	57-110	470,000-950,000	40	290,000	66-130	550,000-1,100,000	19	190,000
Heart Attacks	120	13,000	--	--	49	5,400	--	--	61	6,700	--	--	29	4,300
Asthma Attacks	1,300	69	--	--	540	28	--	--	670	35	--	--	320	23
Hospital Admissions	56	1,300	--	--	23	530	--	--	28	660	--	--	14	430
Chronic Bronchitis	48	21,000	--	--	19	8,600	--	--	24	11,000	--	--	12	7,000
Asthma ER Visits	85	31	--	--	35	13	--	--	43	16	--	--	21	10

Notes:
N = model-estimated, hypothetical annual number per year for specific power plants across the entire U.S.
Cost* = model-calculated, attributed monetary value, in thousands of dollars, of the alleged health effects.

Table 5.2 CATF (2014) Overall Hypothetical Health Impacts of All U.S. CFPPs within the St. Louis-area Counties Containing the Ameren CFPPs[1]

Alleged Health Statistic	Franklin Co, MO (Location of Labadie Power Plant)		St. Louis Co, MO (Location of Meramec Power Plant)		Jefferson Co, MO (Location of Rush Island Power Plant)		St. Charles Co, MO (Location of Sioux Power Plant)	
	N	*Cost**	*N*	*Cost**	*N*	*Cost**	*N*	Cost*
Deaths	3	25,000	20	150,000	6	44,000	8	63,000
Heart Attacks	5	580	34	3,700	10	1,100	16	1,800
Asthma Attacks	56	3	310	16	110	6	190	10
Hospital Admissions	2	55	15	350	4	99	7	170
Chronic Bronchitis	2	920	12	5,400	4	1,900	7	3,000
Asthma ER Visits	4	1	22	22	8	3	13	5

Notes:
N = model-estimated, hypothetical annual number per year for all U.S. CFPPs in just the county of interest.
Cost* = model-calculated, attributed monetary value, in thousands of dollars, of the alleged health effects.
(1) No results provided for EIP (2012) because this study did not estimate health impacts specific to the St. Louis-area counties.

5.2 Health impacts modeling by CATF and EIP targets specific sources

CATF (2014) and EIP (2012) calculated hypothetical health impact numbers for power plants across the U.S., focusing on the small increments in ambient $PM_{2.5}$ attributable to the plants' air emissions. The model used requires 1) estimating air emissions from each power plant, 2) applying atmospheric dispersion models to estimate the increment in $PM_{2.5}$ at ground-level caused by air emissions, 3) assuming a causal basis for statistical associations between changing $PM_{2.5}$ levels to changing health statistics (*e.g.*, assuming that eliminating the $PM_{2.5}$ contributions from power plants will result in avoided deaths or hospitalizations), and 4) estimating the economic benefit from eliminating such calculated hospitalizations and deaths (*e.g.*, $/death or $/hospital admissions).

In the first step of the modeling approach, air emissions for directly emitted $PM_{2.5}$ and PM-forming pollutants (sulfur dioxide [SO_2], nitrogen oxides [NO_x], volatile organic compounds [VOCs], and ammonia [NH_3]) are estimated for the modeled years. In the approach taken by CATF, the emission estimates were derived using a 2001 emissions inventory, which provided input to the Integrated Planning Model (IPM) to forecast emissions in 2012. The emissions inventory generally includes a dataset of the major pollutants that can contribute to $PM_{2.5}$, including SO_2, NO_x, NH_3, VOCs, and direct emissions of $PM_{2.5}$. The IPM is a multi-regional, dynamic model developed by ICF International and used by U.S. EPA and various private clients to calculate how environmental policies alter air emissions in the 48 contiguous states and the District of Columbia. Details on the 2001 emissions inventory and IPM analyses that were used in the CATF assessment can be found in the CAIR technical support documentation (U.S. EPA, 2005). In contrast to the approach taken by CATF, EIP obtained emissions estimates of SO_2 and NO_2 from U.S. EPA's "Clean Air Markets" website for the 51 plants that were modeled in their study. Direct emissions of PM were obtained from annual emissions inventories reports that are provided to state agencies every year. Data for EIP's calculations were based on 2011 air emissions for most power plants.

In Step 2, the air emission estimates were used as inputs in an air quality dispersion model, the so-called source-receptor (S-R) matrix, along with transfer coefficients, to estimate ground-level $PM_{2.5}$ concentrations by county. The transfer coefficients, which were derived from 1990 meteorological data, were used to calculate the proportion of direct $PM_{2.5}$ emissions and $PM_{2.5}$ precursor species (*e.g.*, SO_2, NO_x, VOCs) emissions from each source that were transported to a single hypothetical point at the center of each county across the U.S. The gross oversimplifications inherent in this modeling approach are discussed below in Section 5.3.1.

In Step 3, increments in county level $PM_{2.5}$ concentrations resulting from power plant emissions were used to calculate the hypothetical changes in health statistics for the various health outcomes, under the assumption that the statistical correlations are causal and have zero confounding, bias, and measurement error. Specifically, county-by-county population data, baseline health incidence data, the incremental $PM_{2.5}$ data, and a $PM_{2.5}$ health-effect function were used as inputs to the health impact models. The health-effect function is derived from concentration-response associations observed in epidemiology studies that correlate health statistics with increments in $PM_{2.5}$ concentrations. The model calculates the "avoided health effects," or the health effects changes assumed to occur if the modeled power plant emissions were zeroed out (*i.e.*, eliminated).

In Step 4, the model-estimated changes in health statistics are then multiplied by a unit value that assigns a dollar amount to the avoided health impact (*e.g.*, $/hospital visit or $/death).

Two distinguishing aspects of "the model" used by CATF and EIP should be noted. One is that the majority of "impacts" are calculated to occur distant to the power plant location rather in local

communities nearby to power plants. Table 5.2 shows the local county "impacts" from all U.S. power plants including the local Ameren plants, and the numbers are much lower than the "nationwide" impacts in Table 5.1. These findings thus indicate that the majority of the hypothetical health impacts and associated costs predicted by the CATF (2014) and EIP (2012) studies do not occur locally in the St. Louis-area counties and instead predominantly occur in more distant counties and states.

In addition, the "model" calculates impacts for the small increment in ambient $PM_{2.5}$ attributable to coal-fired power plants *per se*, yet ignores the much larger proportion of ambient $PM_{2.5}$ due to all other sources, both local and distant. Sections 3 and 4 discussed people's total $PM_{2.5}$ exposure, and if total personal $PM_{2.5}$ concentrations were entered into the "model," the projected mortality "impacts" would amount to a significant fraction of all mortality from all causes. For example, based on health impact calculations made using U.S. EPA's Benefits Mapping and Analysis Program (BenMAP), Fann *et al*. (2012) reported findings indicating that ambient (outdoor) $PM_{2.5}$ causes 10% of all-cause mortality in Los Angeles County. Given that U.S. EPA researchers have reported data indicating that PM of ambient origin often contributes on the order of 50% or less of total personal $PM_{2.5}$ exposures (Williams, 2005; Burke *et al*., 2001), this suggests that 20% or more of all-cause mortality in Los Angeles County is attributable to $PM_{2.5}$ exposure, which would appear to be implausible.

5.3 Limitations associated with health impact calculations

Health impact "analyses" of this nature are complex and require the use of several diverse models, model inputs, and model assumptions, each of which has numerous uncertainties. That is, many of the model inputs and assumptions do not necessarily reflect actual conditions or real causal links, and therefore the end results cannot expected to be reliable and accurate when viewed in isolation for one scenario or one source type. The sources of uncertainty include the following: inaccurate or incomplete emission inventories; inaccurate air quality model inputs; limited meteorological data; unknown causal basis for the epidemiological input to the health impact functions; debatable monetary valuation of the hypothetical health effects; incomplete population estimates and baseline disease prevalence; inaccurate projection of the future state of the world (*i.e.*, regulations, technology, and human behavior). All of these dramatically reduce the stability and reliability of the model results. Impact analyses do <u>not</u> combine the uncertainties inherent to all the input variables and assumptions that enter into the calculation to derive an overall uncertainty of the final result. Were this error propagation done, the uncertainty interval of the final result can be expected to encompass the possibility of zero health impact (see discussion below).

In addition, as shown in Sections 1 and 2, the areas around St. Louis have $PM_{2.5}$ air quality that is in compliance with the health-protective NAAQS for $PM_{2.5}$. By definition, people in attainment areas are considered to not be at risk of adverse health effects due to ambient air pollution, yet CATF and EIP have calculated hypothetical health effects in this attainment area.

As discussed in more detail below, when compliance with the $PM_{2.5}$ NAAQS and the uncertainties in the modeling approach and its estimated impacts are properly considered, it becomes clear that the health effects calculated by environmental organizations for Ameren power plant emissions are theoretical and may well be zero. In fact, the expected lack of health effects is supported by the levels of $PM_{2.5}$ that have been measured in the vicinity of the Ameren facilities, which are in attainment of the health-protective $PM_{2.5}$ NAAQS (as was discussed in Section 2).

5.3.1 Uncertainties in the emissions and $PM_{2.5}$ concentration estimates

Critical inputs to the health impact modeling are the estimated air emissions. In the CATF analysis, the emission estimates were obtained from a dated emissions inventory (reflecting 2001 emissions) and a model was used to forecast emissions 10+ years later. Any uncertainty associated with such forecasting will impact the emissions estimates, including how well the model reflects changes in regulations, combustion technology, emissions controls, electricity demand, and human behavior. For example, energy forecasts do not account for economic recessions, which would generally lead to lower energy demands and decreased air emissions. Importantly, a 2001 inventory would not reflect significant investments in emissions controls at Ameren's plants that have been made since that time. In the EIP analysis, modeling was conducted based on more recent emissions inventories, and the model runs may therefore be less uncertain in this area than the CATF estimates.

A more important source of uncertainty is associated with how emission estimates are used to determine the relative contributions to county-level, ground-level $PM_{2.5}$ concentrations. In both the CATF and EIP analyses, the S-R matrix was used to estimate concentrations of $PM_{2.5}$ at each county center. Although the model projects ambient $PM_{2.5}$ increments from emissions of various PM-forming pollutants, it relies on overly simplified algorithms to predict the conversion of these pollutants to $PM_{2.5}$. The algorithm uses fixed transfer coefficients to calculate the annual average $PM_{2.5}$ concentrations at a single receptor in each county (a hypothetical monitor located at the center of the county) and the contribution of $PM_{2.5}$ precursor species from each emission source.

Because of the simplified nature of the source-receptor model, there is significant uncertainty in the estimated contributions from secondary formation of $PM_{2.5}$ (PM formed from precursor pollutants) to the total concentration of $PM_{2.5}$. The model fails to account for all the complex chemical interactions that take place in the atmosphere in the formation of secondary PM. For example, a study by Levy *et al*. (2003) compared results using an earlier version of the S-R matrix with those of a more sophisticated model (CALPUFF). The results of this study showed that, for northern Georgia, the models yielded similar results for $PM_{2.5}$ produced from SO_2 emissions, but not for $PM_{2.5}$ produced from NO_x emissions, likely due to differences in how the models quantified the conversion of NO_x to secondary $PM_{2.5}$. In addition, Levy *et al*. (2003) cautioned that the results of his study did not validate the accuracy of the S-R matrix, but rather showed the relationship between the S-R matrix and a more sophisticated model for a single location and time period. They noted that the results would likely vary depending on the location modeled because temperature, humidity, and season are important factors impacting the formation of secondary particles. Importantly, the Levy *et al*. (2003) study also demonstrated that the estimated health impacts to the surrounding community are minimal compared to health impacts from secondary formation of $PM_{2.5}$ calculated for hypothetical populations that are far removed from the source. As pointed out earlier, a significant fraction of the Ameren CFPP "impacts" derives from tiny $PM_{2.5}$ increments multiplied by large populations long distances away from the plants.

Meteorological parameters used in the air quality modeling are also important inputs, as they are used to develop the transfer coefficients used in the S-R Matrix model. Both CATF and EIP estimated meteorological inputs based on annual averages of data collected over a single year (1990) for just 100 weather stations across the U.S. The S-R Matrix model presumably used the 1990 annual average data for weather stations closest to each county center for which ambient $PM_{2.5}$ increments were estimated, but with such few weather stations and a single year of data, these data cannot be expected to be representative of conditions for each specific locale or year being modeled (*e.g.*, each St. Louis-area county in 2011 or 2012). This is an additional and potentially large source of uncertainty; that is, variability in local weather conditions from those reflected in the data for a distant weather station, as well as variability from year to year, can be significant. To accurately model any locale, such as St. Louis,

representative meteorological data are required; *i.e.*, the gross oversimplification of meteorological data in the S-R Matrix model is a potential source of inaccurate modeling output.

This was demonstrated in a calibration exercise in which Abt Associates (2010) applied the S-R matrix methodology to all $PM_{2.5}$ sources to predict county-level $PM_{2.5}$ concentrations, which were compared to measured data from monitors in each state. The S-R air dispersion model over-predicted $PM_{2.5}$ concentrations for all states, indicating that the S-R model likely significantly over-predicted concentrations of $PM_{2.5}$ associated with emissions from power plants. In addition, this test calibration was based on a comparison of only one year of measured $PM_{2.5}$ data. This calibration approach assumes that the ratio between the modeled projection and measured data in any given county is the same for each modeled year and for each modeled source. However, it is possible that this ratio changes year to year, which would have a very significant impact on the modeled estimates of secondary $PM_{2.5}$ concentrations in each county that are attributed to specific power plants.

There are also issues and uncertainties related to the methodology that CATF and EIP used to associate the modeled secondary $PM_{2.5}$ concentrations at each county location with the source of these precursor pollutants. Specifically, secondary $PM_{2.5}$ is formed from emissions of different gaseous compounds (*e.g.*, NO_x, SO_2, NH_3, and VOCs), and these air pollutants are associated with many different sources, including, but not limited to, power plants. Some forms of $PM_{2.5}$, such as ammonium nitrate and ammonium sulfate, result from reactions among several of these pollutants (*i.e.*, NH_3 and either NO_x or SO_2, respectively). Therefore, $PM_{2.5}$ that is attributed to a specific source would be formed only if all the necessary precursor compounds are present, including precursor pollutants that may not come from the same source. This is especially true for PM from NO_x emissions, because formation of ammonium nitrate is assumed only when there is excess ammonium present, and only under low temperature conditions. As such, the modeled $PM_{2.5}$ concentrations in each county that are attributed to a specific power plant are highly uncertain because the model assumes that all of the necessary precursor pollutants are present, or that conditions are favorable for $PM_{2.5}$ formation, when this may not be the case for a given county.

5.3.2 Uncertainties with health risk estimates

5.3.2.1 Mortality

CATF (2014) reported that model predictions of nationwide impacts for the four Ameren St. Louis-area CFPPs add up to 169 premature deaths each year (Table 5.1), based on projected 2012 conditions. Although we do not have details on the updated analysis conducted by CATF, it is likely that only the emissions estimates were changed and other aspects of the analyses remained the same as in prior analyses (CATF, 2010; Abt Associates, 2010), including the assumed "effect factor" for the mortality estimates. Specifically, in 2010, CATF calculated mortality from power plant emissions based on county all-cause mortality rates (for ages 30 years and older) and a mortality effect estimate derived from the epidemiology study by Pope *et al*. (2002) (Abt Associates, 2010). The widely cited study by Pope *et al*. (2002) is one of several large cohort studies that have investigated the associations between mortality and $PM_{2.5}$. The Pope study relies on a pre-existing cohort (called "CPS-II") recruited by the American Cancer Society (ACS), composed of self-nominated volunteers residing in over 150 cities (Jacobs *et al*., 2001).

As shown in Table 5.1, EIP calculated a larger number of deaths from each of the three Ameren plants it included in its analysis as compared to CATF, providing a range of deaths based on results from two epidemiology studies. The lower-bound estimate was based on the HEI (2009) study, which is a more recent follow-up study using the ACS CPS-II cohort, and the upper-bound estimate was based on the study by Schwartz *et al*. (2008). Schwartz *et al*. (2008) presents a follow-up of another large and often cited cohort study, the Harvard Six Cities cohort, which was originally conceived in the mid-1970s. In this study, over 8,000 adults ages 25-74 years were randomly selected from six cities across the U.S.

(Watertown, MA; Harriman, TN; St Louis, MO; Steubenville, OH; Portage, WI; and Topeka, KS), and followed until 1998. Compared to CPS-II, this study was much more limited in participant number and spatial coverage. The differences in the mortality "effect factors" from the two studies highlight how different model assumptions can impact risk estimates. Specifically, the choice of epidemiology study from which the "effect factor" is derived dramatically affects the resulting risk estimate. In addition, as discussed below, numerous issues with these epidemiology studies must be considered when interpreting the hypothetical health impact assessments. Many of these issues likely lead to grossly overestimated mortality estimates. These issues are briefly discussed below, but have been the topic of many reviews (*e.g.*, see Fewell *et al*., 2007; Gamble, 1998; Valberg and Watson, 1998; Gamble and Nicolich, 2000; Stieb *et al.*, 2002; Valberg, 2004; Koop and Tole, 2004; Moolgavkar, 2005, 2006; Phalen, 2002; Taubes, 1995; Keatinge, 2002; Keatinge and Donaldson, 2001, 2006).

The major (and unproven) assumption behind calculating mortality projections from observational epidemiology is that the reported statistically significant associations represent causality, *i.e.*, that exposure to increments in $PM_{2.5}$ levels *per se* causes clinical health effects, including death. Although the particular studies that were used in the models did report statistically significant associations between $PM_{2.5}$ and mortality, many other studies have shown no such effects (*e.g*., Chay *et al*., 2003; Beelen *et al*., 2008; Brunekreef *et al.*, 2009; Enstrom, 2005; Greven *et al*., 2011; Kloner *et al*. 2009; Lipfert *et al*., 2006; McDonnell *et al*., 2000; Vedal and Dutton, 2006; Zeger *et al*., 2008), indicating that there remains significant uncertainty regarding the causal linkage between ambient PM and mortality risk. In recent health effects evaluations similar to the CATF and EIP evaluations, U.S. EPA acknowledged that "[i]f the PM/mortality relationship is not causal, it would lead to a significant overestimation of net benefits" (U.S. EPA, 2011a).

Exposure misclassification also plagues the observational epidemiology. Most epidemiology studies (including the ones providing "effect factors" for the CATF and EIP models) rely on data from central ambient monitoring sites to provide community averages of ambient pollutant concentrations. Interpretation of the statistical results requires assuming that these "community averages" reflect people's actual personal exposures. That is, in the statistical correlations, individuals are assumed to be exposed 24/7, each day of the year, to the $PM_{2.5}$ concentration measured outdoors at the nearest U.S. EPA ambient $PM_{2.5}$ monitor. In reality, people spend most of their time indoors at home or in other environments and the difference between the measured levels and actual personal exposures results in what is called exposure measurement error. That is, because people spend a large majority of their time indoors and are exposed to different air pollutant concentrations than those measured at central outdoor monitors, error is introduced in the exposure estimates (*e.g.*, Lioy *et al*., 1990; Mage and Buckley, 1995; Janssen *et al*., 1997, 1998; Ozkaynak *et al*., 1996; Dominici *et al*., 2003). In some cases, there may be additional error if there are large temporal gaps in the data from ambient air monitors, as in the case of the Pope *et al*. (2002) study, where some of the data had to be estimated. The amount and direction of the exposure measurement error in the epidemiology studies are generally unknown. But, based on analyses of the effects of this type of error, it is likely that the "effect factors" from the epidemiology studies used by CATF and EIP are unreliable and overestimated because of this issue (*e.g.*, Rhomberg *et al*., 2011).

Another common issue in air pollution epidemiology studies is confounding. A confounder is a factor associated with both the exposure and the health outcome, and therefore it is a factor that may explain in part or in full the observed association between the air pollutant and the health endpoint (in this case $PM_{2.5}$ and mortality). Confounding is a major challenge in epidemiology analyses because there are so many potential confounders, including co-pollutants, meteorological factors, societal factors related to PM emissions, and individual exposure factors, which cannot be accounted for because of a lack of data. Also, even when studies consider potential confounders (such as weather, or day of week), data may be incomplete and residual confounding remains an issue. This is a particular problem in the ACS studies, in which several potential confounding factors were considered, including smoking, education, body mass

index (BMI), diet, alcohol consumption, and occupation. However, these factors were evaluated only at the time of enrollment (1982) and not during follow-up (up to 30 years later). Therefore, there was no information on how these factors changed over time, and how these changes influenced the PM-mortality associations. Furthermore, many of these factors were collected using a self-administered questionnaire, an approach that is well known to result in errors and under-reporting of key potential risk factors for mortality (*e.g.*, smoking).

Confounding by other pollutants is of particular importance. There is evidence that these "co-pollutants" can confound associations in PM mortality studies – particularly strongly correlated pollutants. For example, HEI (2009) reported associations between several pollutants and mortality in single-pollutant models, but they did not present results from multi-pollutant models (which would account for the combined effects of multiple pollutants). Mortality risks reported for several pollutants (*e.g.*, SO_2 and summertime O_3) were of similar magnitude and statistical significance as $PM_{2.5}$ (HEI, 2009), suggesting the possibility of confounding. In fact, in an earlier re-analysis of the ACS study, HEI (2000) found that when accounting for other pollutants, $PM_{2.5}$ risk estimates were decreased. Importantly, the issue of confounding relates to both the assumption of causality, where another factor may actually be the causal agent, and the magnitude of the association, where a co-factor may account for some of the observed risk. In both instances, when confounding is not considered, the risk estimates are overestimated. Finally, many other important air pollutants – *e.g.*, the so-called 187 hazardous air pollutants (HAPs) – could play a confounding role; however, because the HAPs are not measured on a routine basis, their confounding role can neither be evaluated nor corrected for.

The interpretation of the observational epidemiology correlations is also markedly affected by which statistical models are used. To address this question, researchers have conducted extensive sensitivity analyses, including tests of the effects of various model assumptions on mortality estimates. The epidemiology studies relied upon in the modeling by CATF and EIP as the source of effect factors (*i.e.*, Pope *et al*., 2002; Schwartz *et al*., 2008; HEI, 2009) have generally used the Cox proportional hazards (PH) model, which has been widely criticized. Moolgavkar (2005) noted that the assumptions of the Cox PH model are not satisfied in studies of pollution health effects, and therefore can result in inaccurate estimates. For example, Abrahamowicz *et al*. (2003) tested the effects of alternative model assumptions in a subset of the ACS CPS-II cohort (the same cohort used by Pope *et al*., 2002 and HEI, 2009), for which 50 cities had some $PM_{2.5}$ data. The authors found that by using alternative, and likely more appropriate model assumptions, the "effect factors" generated for $PM_{2.5}$ were lower. This suggests that epidemiology studies that use the Cox PH model may overstate effect estimates. In addition, other researchers have shown that model uncertainty can be large. For example, Koop and Tole (2004) emphasized that, by neglecting the important issue of model uncertainty, or by focusing on a specific model among many possible options, "most studies overstate confidence in their chosen model and underestimate the evidence from other models," which can result in "uncertain and inaccurate results."

An additional important assumption that is common to air pollution epidemiology studies, and health impact assessments that use these studies, is linearity at low concentrations, meaning that mortality rates are presumed to be directly proportional to increments in ambient $PM_{2.5}$ levels at levels all the way down to zero exposure. Several studies provide evidence that the PM-mortality association is actually non-linear, and a threshold likely exists below which no effects are likely (*e.g.*, Smith *et al*., 2000; Abrahamowicz *et al*., 2003; Gamble and Nicolich, 2006). For example, Smith *et al*. (2000) reported evidence of PM no-effect thresholds at 20-25 $\mu g/m^3$. In addition, Gamble and Nicolich (2006) found that the data from the Harvard Six Cities study show non-linearity and evidence of a threshold below 20 $\mu g/m^3$. Also, Abrahamowicz *et al*. (2003) reported non-linearity in their re-analysis of the ACS CPS-II cohort, with a threshold for $PM_{2.5}$ at around 20 $\mu g/m^3$. This is highly important for effects alleged from CFPPs, as the concentrations resulting from CFPP emissions are, as discussed above, well below these potential thresholds.

Furthermore, a threshold for PM health effects is supported by toxicological, occupational, and controlled human exposure evidence. Toxicity studies demonstrate that the physiological impact and biological mechanism of inhaled PM effects occurs at elevated concentrations only when the lung defense mechanisms are overwhelmed due to the load of particles deposited locally onto tissues (*e.g.*, Oberdörster, 1996, 2002; Valberg and Crouch, 1999; Green *et al*., 2002; Pauluhn, 2011; Valberg *et al*., 2009). For many specific forms of PM, thresholds have been established based on animal, occupational, or controlled human exposure studies. Examples include a no observed adverse effect level (NOAEL) for diesel exhaust particulate exposures of 460 $\mu g/m^3$, yielding a no-effect reference concentration (RfC) of 5 $\mu g/m^3$ (Valberg and Crouch, 1999; U.S. EPA, 2002), and occupational standard threshold limit values (TLVs) for many types of particles (Oller and Oberdörster, 2010; ACGIH, 2014).

Assuming a linear relationship has a significant impact on mortality risk estimates: when a linear, no-threshold function is assumed in health impact modeling when the reality is non-linear, the health effects projections are overestimated; this is especially the case for vast areas of the U.S. that have lower $PM_{2.5}$ levels. For example, as shown in a health impact analysis conducted by U.S. EPA, when a threshold was included, the calculated mortality estimates significantly decreased. Specifically, when U.S. EPA considered a threshold at 20 $\mu g/m^3$ (supported by the scientific evidence discussed above), mortality projections for improvements in $PM_{2.5}$ concentrations from 2000 to 2010 decreased from about 20,000 deaths nationwide to 5,000 deaths or fewer (U.S. EPA, 1999).[16]

Finally, another indication for non-causal bases for the epidemiology correlations is that the quantitative form of the association between $PM_{2.5}$ and mortality depends on U.S. geographical region and season. Researchers have found significant differences in mortality effect estimates across cities and regions that are unexplained despite recent efforts to evaluate factors (*e.g.*, heterogeneity of PM composition) that might play a role (U.S. EPA, 2011b). Therefore, it is problematic – and likely erroneous – to apply a pooled "national effect factor" to all regions of the U.S., as was done in the modeling used by both CATF and EIP. In fact, such an approach erroneously discounts any differential toxicity of $PM_{2.5}$ components, treating all $PM_{2.5}$ components as equally toxic. This assumption is surely incorrect, and significantly impacts the mortality estimates. For example, no evidence exists, either from human exposures or animal studies, showing that inhaling secondary $PM_{2.5}$ formed from emissions of SO_2 and NO_2 (*e.g.*, sulfates, nitrates, included in the CATF and EIP models), at current ambient levels, leads to mortality or morbidity (Green *et al*., 2002; Utell *et al*., 1983; U.S. EPA, 1996).[17] A risk assessment analysis that evaluated the toxicity of ambient PM on the basis of the chemicals composing PM found that none of these chemicals were present at high enough concentrations to cause adverse health effects, let alone hospital admissions or death (Valberg, 2004). Moreover, Rohr and Wyzga (2012) performed a comprehensive review of $PM_{2.5}$ component-based studies in the epidemiological, toxicological, and controlled human exposure arenas, indicating that there was stronger evidence for some particle types (*e.g.*, carbon-containing components) and greater disparity in study findings for other particle types (*e.g.*, sulfates). Therefore, if the $PM_{2.5}$ chemical species linked with power plant emissions and entered into the models of CATF and EIP are unlikely to contribute to mortality, and if mortality numbers are based on reducing this PM below already innocuous levels, then those numbers are exaggerated and misleading.

[16] Note that the theoretical mortality projections in U.S. EPA (1999) were based on an air modeling analysis of 2000 to 2010 improvements in $PM_{2.5}$ air quality in the U.S. resulting from the Clean Air Act. Currently, based on 2013 design value reports available on the U.S. EPA Air Trends website (http://www.epa.gov/airtrends/values.html), there are no U.S. locations with annual average 2011-2013 $PM_{2.5}$ design values in excess of 20 $\mu g/m^3$.

[17] Airborne sulfate is widely used in medicine. It is a common ingredient in bronchodilators used to treat asthma. One "puff" of an albuterol sulfate inhaler delivers a concentration of about 10,000 μg of sulfate per m^3 of inhaled air, which is considered to be safe (Green *et al*., 2002).

5.3.2.2 Morbidity

Many of the same problematic issues as to the interpretation of the mortality results from epidemiology studies are also evident in studies of morbidity outcomes. CATF quantified health effects other than mortality, such as asthma attacks and asthma ER visits, heart attacks, hospital admissions, and chronic bronchitis (Table 5.1 and 5.2). Below, we discuss some of the issues specific to these morbidity outcomes.

The evidence that ambient PM affects asthma and contributes to asthma attacks or ER visits is inconsistent. Not all studies have reported a significant association. CATF based its estimates on pooled estimates from two small studies that followed panels of asthmatic children (Ostro *et al*., 2001; Vedal *et al*., 1998). The first, by Ostro *et al*. (2001), followed a small group of inner-city African-American children from central Los Angeles and Pasadena, California. The authors reported effects of $PM_{2.5}$ that were of a much lesser magnitude than those of PM_{10} and mold. While the authors considered confounding by temperature and humidity, they did not evaluate the important role of exposure to environmental tobacco smoke (ETS) in the home, which affected nearly 40% of the study population. Vedal *et al*. (1998) examined associations between PM_{10} concentrations and lung function and respiratory symptoms in 75 asthmatic children living in a kraft pulp and paper mill community on Vancouver Island. The authors reported small changes in lung function that were not statistically significant in asthmatic children with exposures to PM_{10}, but they found no clear association for many symptoms of asthma (*e.g.*, cough and wheeze). Importantly, the authors did not control for important confounders such as ETS, other air pollutants, and allergens. Overall, these studies do not support a strong association between asthma and $PM_{2.5}$ exposures. Other studies have also reported a lack of association (*e.g.*, O'Connor *et al*., 2008).

Similar issues are associated with estimates of chronic bronchitis. The evidence from studies that evaluated associations between PM exposure and bronchitis is mixed, with some studies reporting significant associations and others reporting no association (U.S. EPA, 2009). The CATF estimates were based on a study by Abbey *et al*. (1995). There are significant uncertainties associated with using this one study to quantify the effects of $PM_{2.5}$. One issue is that the Abbey *et al*. (1995) study focused on PM_{10} that in turn was estimated from total suspended particle (TSP) concentrations, and likely not representative of $PM_{2.5}$. In addition, confounding is also a significant concern in this study.

With regards to the effects of $PM_{2.5}$ on heart attacks (myocardial infarction, or MI), the CATF analysis relied on a single study by Peters *et al*. (2001) that evaluated the effects of $PM_{2.5}$ on the risk of MI among 772 patients in the greater Boston, Massachusetts, area. Problems with this study included exposure measurement error and confounding by other air pollutants. In addition, the Peters *et al*. (2001) study is only one of several major MI studies. Two other studies (Sullivan *et al*., 2005; Peters, 2005) found no association between $PM_{2.5}$ and MI using similar methods, raising uncertainties with the CATF approach of relying on a single study that observed an association between $PM_{2.5}$ and MI and disregarding other studies that reported no such association.

5.3.3 Uncertainties with health effects valuation

In the final step of the benefits evaluation, estimated costs are assigned to the modeled numbers of cases. Specifically, an estimated economic value is assigned for a particular health effect (*e.g.*, a death or hospital admission), as taken from the literature. For example, for hospital admissions, CATF used cost of illness unit values, which estimate the cost of treating or mitigating the effect. There are significant uncertainties with values related to health effects such as asthma exacerbation, for which CATF used willingness to pay (WTP) unit values. These are, for example, survey-derived estimates of what people are willing to pay to avoid an asthma exacerbation.

By far the most controversial value, which is used for premature mortality, is what is known as the value of statistical life (VSL). The VSL is based on what an individual is willing to pay to reduce the risk of death. It is not the value of an actual life or the price someone would pay to avoid certain death; rather, it is the value placed on changes in the likelihood of death, and the values in Tables 5.1 and 5.2 use $7.2 million per hypothetical death. CATF and EIP evaluations were based on using the VSL to estimate costs from "premature mortality." Since mortality is inevitable, a more appropriate approach, however, would have been to estimate gains in life expectancy, or the value of life-years gained, based on WTP. Similar analyses using this approach yield approximately tenfold lower estimated economic benefits (Cox, 2012).

Overall, problems with the valuation methods used, together with the uncertainty in the health effects estimates, indicate that the modeled health costs reported in Tables 5.1 and 5.2 are likely overestimated.

5.4 Recent epidemiologic studies continue to call into question the causal connection between small increments in ambient $PM_{2.5}$ and premature mortality

Several recent epidemiologic analyses of $PM_{2.5}$ health effects have focused on the statistical models alone, with findings casting doubt on the causal connection between increments in ambient $PM_{2.5}$ and premature mortality, as assumed by CATF and EIP. Greven *et al*. (2011) identified potentially serious flaws in assuming that the chronic $PM_{2.5}$ studies (the cohort studies) reflect causality, because confounding appears to be playing a significant role in the statistical findings of positive $PM_{2.5}$-mortality associations. The investigators used a Medicare data set comprised of 18.2 million records over the period 2000-2006 to investigate associations between long-term $PM_{2.5}$ exposure and changes in life expectancy. The authors divided the PM exposure variable into components, separating how $PM_{2.5}$ varies over space (location) and how it varies over time. They estimated two regression coefficients: a "global" coefficient that reflects the association between national time trends in PM and mortality and a "local" coefficient that measures the location-specific time trends in PM and mortality, adjusted by the national trends. If confounding were not an issue, one would expect these two coefficients to be similar. However, Greven *et al*. found differences between the two coefficients, with <u>no</u> associations for the local coefficient reflecting the relationship between PM reduction and change in life expectancy. That is, mortality risk did not respond to changes in $PM_{2.5}$, and thus, risk analyses based on such non-causal risk coefficients will project health effects where there, in fact, are none.

Cox *et al*. (2013) examined correlations between changes in average $PM_{2.5}$ and corresponding changes in average daily mortality rates, from 1999 to 2000, in each of 100 U.S. cities in the National Mortality and Morbidity Air Pollution Study (NMMAPS) data base. The authors found that "reductions in $PM_{2.5}$ do not appear to cause any reductions in mortality rates," and they concluded "it is crucial to use causal relations, rather than statistical associations, to project the changes in human health risks due to interventions such as reductions in particulate air pollution."

Cox and Popken (2015) examined the mortality effect of the nationwide "natural experiment" whereby $PM_{2.5}$ levels for 483 counties in the 15 most populated U.S. states declined as much as 30% between 2000 and 2010. They compared county-level changes in average annual ambient $PM_{2.5}$ levels to corresponding changes in all-cause and cardiovascular disease (CVD) mortality rates over the course of the decade. Even though some studies have demonstrated statistical associations (which have been interpreted causally or relied upon in the type of calculations made by CATF and EIP), they found that the historical data did <u>not</u> predict a causal basis for the epidemiological associations. The authors concluded: "[Our]

findings suggest that predicted substantial human longevity benefits resulting from reducing $PM_{2.5}$ and ozone may not occur, or may be smaller than previously estimated."

5.5 Experimental data do not support ambient $PM_{2.5}$ causing mortality

The correlations that CATF and EIP use to model reductions in health statistics are from observational studies that examine two factors, which, in small part, seem to go up and down together, namely, changes in mortality (either temporally, say, on a day-by-day basis, or geographically, say, on a city-by-city basis) and changes in levels of ambient $PM_{2.5}$ measured at central monitors from day-to-day, or from city-to-city. Small correlations between $PM_{2.5}$ levels and mortality are reported by the epidemiology studies, but it is not correct to assume the statistical deaths reflected in the PM-mortality correlations are caused by changes in the levels of outdoor $PM_{2.5}$.

The claim of mortality risk being due to present-day ambient outdoor levels of $PM_{2.5}$ is based on assuming a causal link behind the observational epidemiology. This logical leap is taken despite the widespread recognition that statistical correlations are not equivalent to causation (Hill, 1965; U.S. EPA, 2009, p. 1-14: "Causality determinations are based on the evaluation and synthesis of evidence from across scientific disciplines" and "An association…is insufficient proof of a causal relationship between exposure and disease or health effect").

Interpretation of correlations between air pollution levels and health effects needs to be supported by experimental science and clinical evidence. Although we can clearly identify who dies of car accidents, food poisoning, firearms, viral and bacterial infections, and so forth, for the CATF and EIP model predictions of deaths from breathing outdoor air, not a single individual has been identified, or reported in the medical literature, whose death would have been prevented, but for him/her inhaling low levels of ambient $PM_{2.5}$. Laboratory experiments have carefully examined animals exposed to high levels of airborne PM, and human volunteers have breathed PM in clinical settings, including at $PM_{2.5}$ levels hundreds of times higher than found in outdoor air, with no evidence of sudden death or any life-threatening effects (Schlesinger and Cassee, 2003).

The major amount of ambient $PM_{2.5}$ generated from power plant emissions is secondary sulfate (SO_4^{2-}), and sulfate is suggested as one of the primary chemical components in PM that is responsible for the mortality effects of $PM_{2.5}$. However, biological evidence for mortality or life-threatening health effects being caused by sulfate at ambient concentrations is entirely lacking. Clinical experiments have exposed human volunteers (including children and asthmatics) to sulfate particulates at high concentrations (35 to 2,000 $\mu g/m^3$) in combination with heavy exercise (Linn *et al*., 1981, 1989, 1994, 1995, 1997; Hackney *et al*., 1989). These laboratory concentrations were about 6 to 330 times <u>greater</u> than St. Louis ambient levels of sulfate (~6 $\mu g/m^3$). Even exposures at such elevated SO_4 levels resulted only in modest and reversible changes in pulmonary function measurements, and nothing has ever been observed even approximating life-threatening effects in these laboratory experiments on humans breathing high levels of SO_4 (compared to ambient).

Furthermore, sulfate is a common constituent of airborne medications that are repeatedly inhaled by asthmatics to alleviate airway narrowing. Personal inhalers for asthmatics (inhalers that produce an aerosol of a bronchodilator drug) use a sulfate salt of the active drug (*e.g.*, albuterol sulfate, metaproterenol sulfate, terbutaline sulfate). For example, a typical dosage of albuterol sulfate inhalation solution administered by nebulization three to four times a day corresponds to daily inhalation of approximately 1.3 to 1.7 mg of sulfate, or over 10 times greater than the average daily amount inhaled from ambient air (at 6 $\mu g/m^3$). Inhalation of the "sulfate" in asthma medications is not known to cause harm to asthmatics, let alone precipitate an asthma attack or hasten death.

In summary, the CATF and EIP calculated increases in deaths and other health effects (Tables 5.1 and 5.2) lack plausibility and experimental support, and their hypothetical nature must be recognized.

5.6 Comprehensive risk evaluations of hazardous air pollutant (HAP) emissions from U.S. coal-fired power plants do not provide support for significant health risks from primary PM emissions from CFPPs

If dramatic health effects, such as those listed in Table 5.1, are to be attributed to airborne particles deriving from coal-fired power plants, there must be some chemical constituent(s) contained within the particulate matter that is(are) highly toxic. While the studies discussed above bear on the potential health risks related to secondary $PM_{2.5}$ (sulfates and nitrates) formed from CFPP emissions, this question of "mode of action" has been exhaustively addressed for primary PM emissions by several health risk assessments of HAPs present in "utility boiler" air emissions. The possibility of health effects from coal-fired power plant air emissions has been examined by U.S. EPA and others using quantitative health risk assessment (French *et al*., 1997; U.S. EPA, 1998, 2011c; EPRI, 2009). Overall, these studies have demonstrated that ambient air levels of hazardous air pollutant (HAP) chemicals, including trace metals in particulate form, emitted by power plants are below thresholds of health concern.

The results have been remarkably consistent for all these evaluations. In its 1998 assessment, U.S. EPA considered the 67 most potentially toxic chemicals that could be present in gas and particle air emissions from power plants. The agency concluded that, on either a plant-by-plant basis or on a nationwide basis, the "potentially hazardous" coal-fired power-plant air emissions were not expected to lead to significant health impacts. In its assessment, EPRI (2009) concluded that "Under realistic exposure scenarios, inhalation risks of cancer are below one in one million for all power plants, and inhalation risks of non-cancer toxic effects are well below federal threshold levels for all power plants." EPRI also concluded that population-weighted inhalation risks were "insignificant."

U.S. EPA's recent (2011c) "Mercury and Air Toxics Rule" for hazardous air pollutant emissions from fossil-fuel power plants found minimal expectation of potential non-cancer health effects from power plant HAPs emissions: U.S. EPA found that "All of the facilities had non-cancer target-organ-specific hazard index values less than one…" and that the coal units never exceeded a non-cancer hazard index of 0.05[18] (whereas the level of potential concern would be HI >1.0). In addition, the highest cancer risk that was estimated, 5 in one million lifetime risk, was well within U.S. EPA's acceptable cancer risk range (1 in 10,000 lifetime risk to 1 in 1,000,000 lifetime risk).

[18] A hazard index (HI) is the ratio of the received dose divided by a dose that is low enough to be health protective, *e.g.*, a "reference dose." Hence, HI values that are less than 1.0 indicate that no adverse health effects are anticipated.

6 Asthma is a complex, multi-factorial disease, with a multitude of known triggers and risk factors. Scientific studies provide evidence that asthma prevalence and morbidity are more closely linked to allergic status, lifestyle factors, and indoor air pollution than to indicators of outdoor air pollution.

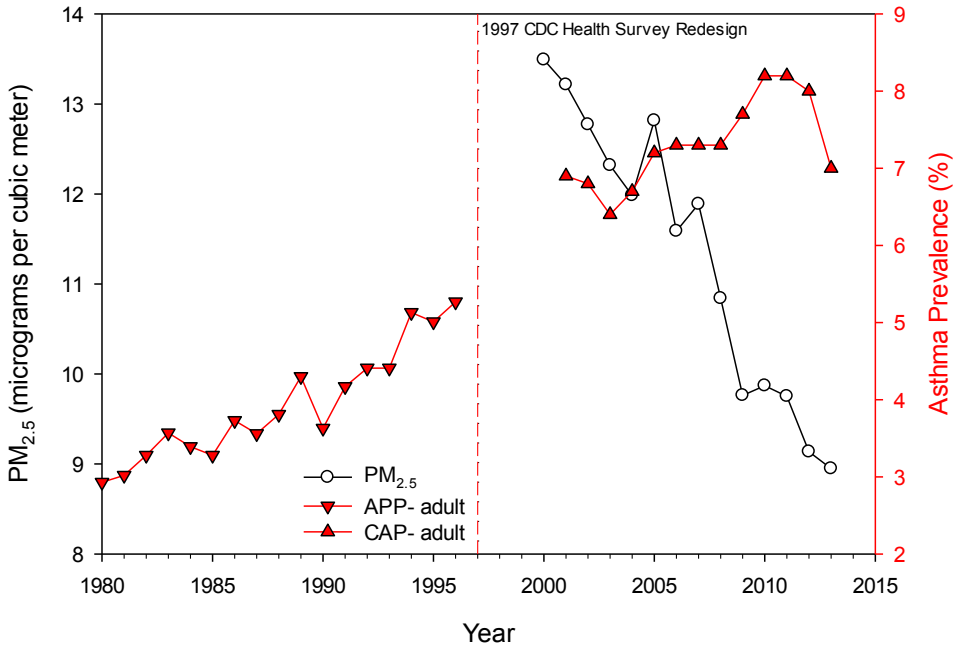
Over the past several decades, asthma prevalence[19] in the U.S. and other countries has been rising, but the cause is unclear. Although there has been an increase in asthma prevalence over the past 20 to 30 years, this increase has occurred during a period of time when concentrations of anthropogenic air pollutants in outdoor air have been decreasing (Anderson, 1997; Anderson *et al*., 2012). This is illustrated by Figure 6.1 that compares national-scale trends in several criteria air pollutants ($PM_{2.5}$, PM_{10}, O_3, SO_2) over the past two to three decades with national-scale trends in asthma prevalence for both adults and children. As reflected by this graph, ambient air pollutant emissions and concentrations in the United States have decreased significantly over the past several decades while the prevalence of asthma has increased, providing support for the conclusion that factors other than exposure to outdoor air pollutants are more important risk factors underlying the trends in increased asthma prevalence.

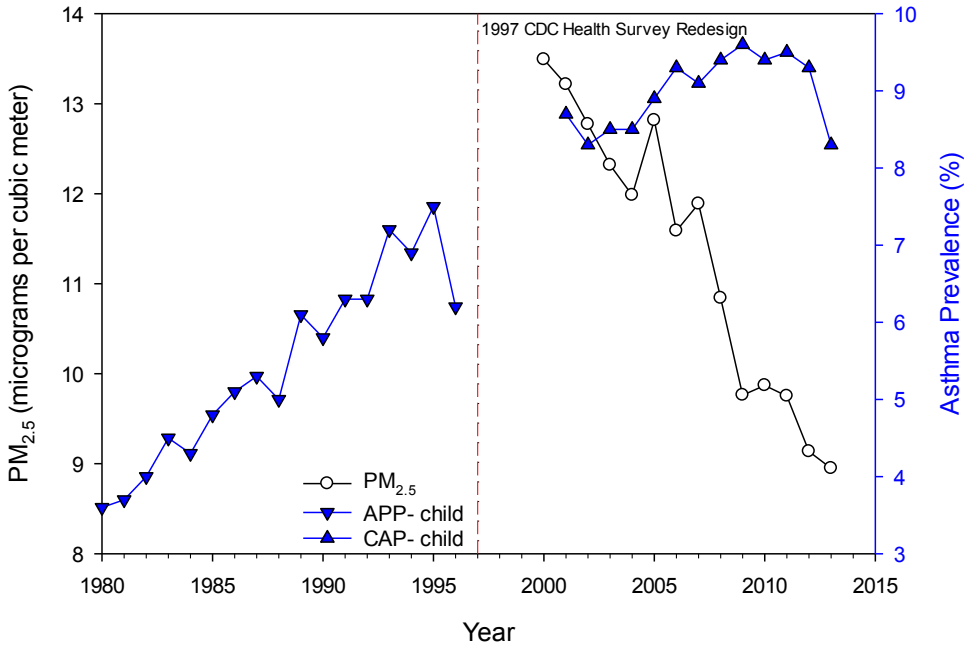
Studies of within-city trends in asthma statistics illustrate the conflicting evidence regarding the nature of the linkage between ambient air pollution and asthma morbidity and mortality. For example, in a study of asthma hospitalizations across communities in the City of Boston conducted by researchers at Boston University, School of Public Health, Gottlieb *et al.* (1995) observed dramatic differences in asthma hospitalizations among different communities. Some areas had asthma hospitalization rates as high as 10 per 1,000, but despite similar ambient air quality in nearby neighborhoods, others had much lower rates of about 1.3 per 1,000.

In New York City, investigators have analyzed the distribution and factors affecting asthma mortality and hospitalization (Carr *et al.*, 1992; De Palo *et al.*, 1994). These studies have shown asthma prevalence in New York City to be related strongly to socioeconomic status, with several factors linking asthma with poor housing conditions. Factors that related to asthma risk in low-income areas were the number of occupants (related to bacterial and viral exposures), water leaks (related to fungi exposures), moist basements (related to fungi exposures), deteriorating building materials (related to fungi and mite exposures), and house dust (related to insects, animal dander, and exposures to animal excreta).

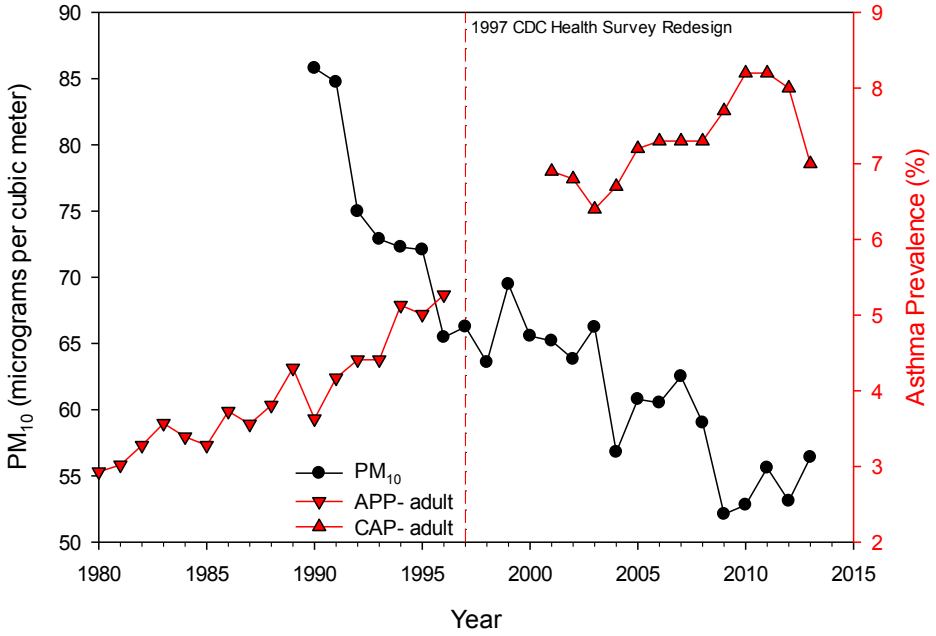
[19] Asthma prevalence is defined as the percentage of people who have ever been diagnosed with asthma and still have asthma at a particular point in time.

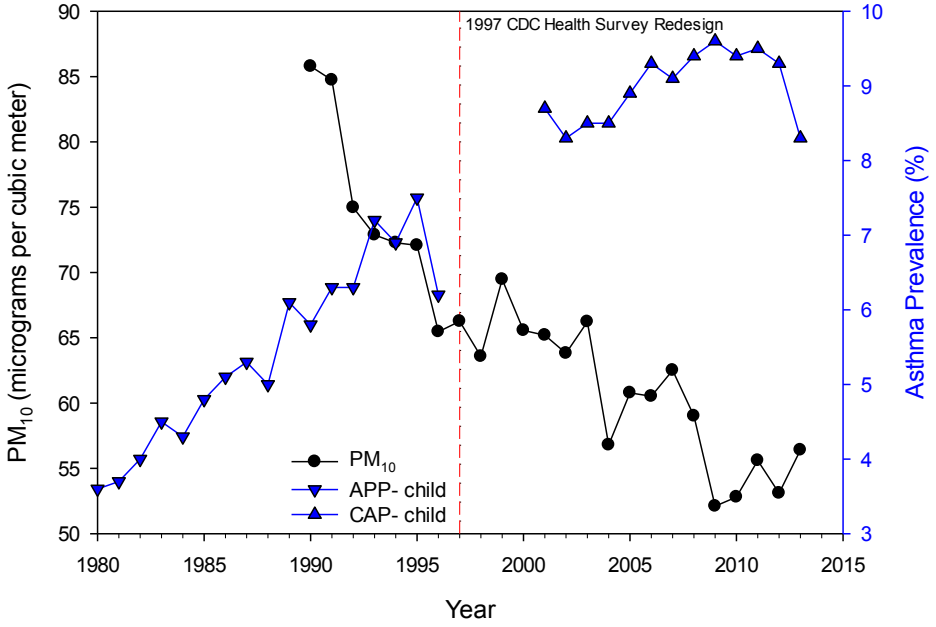
(a) As nationwide $PM_{2.5}$ levels have declined, nationwide adult and pediatric asthma prevalence has increased.



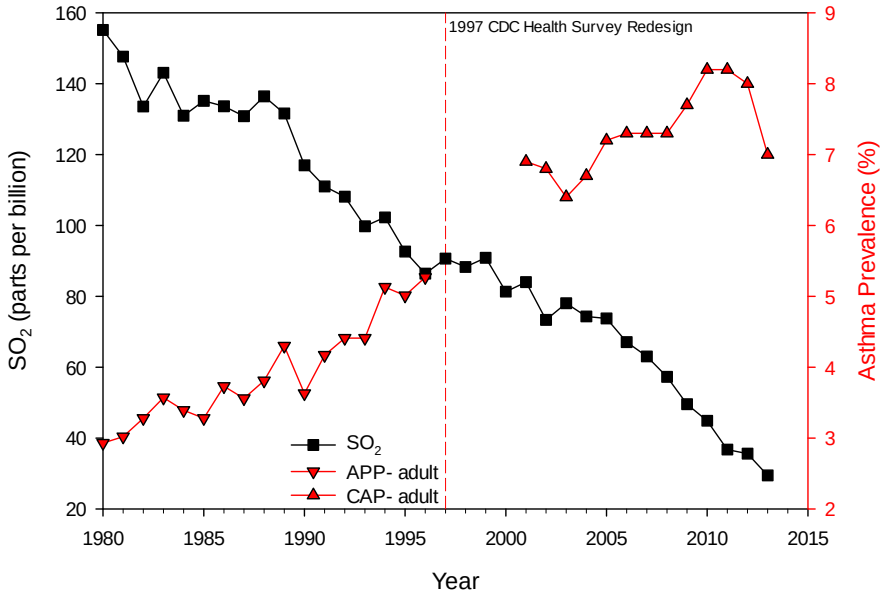


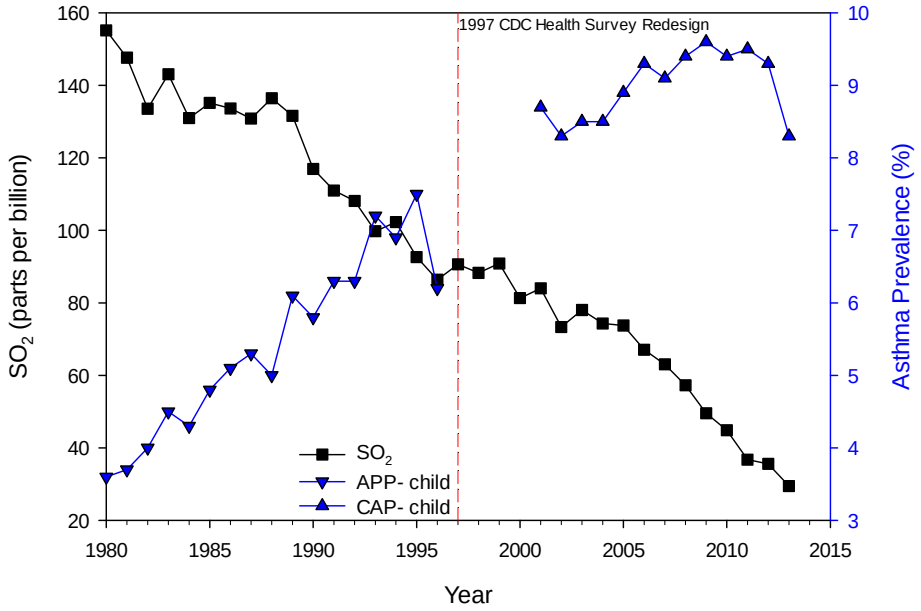
(b) As nationwide PM_{10} levels have declined, nationwide adult and pediatric asthma prevalence has increased.



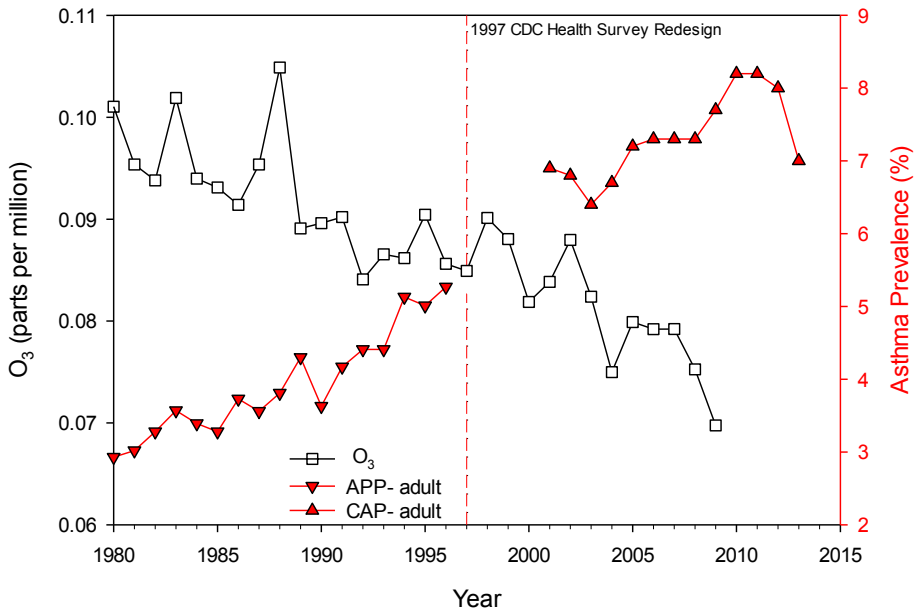


(c) As nationwide SO_2 levels have declined, nationwide adult and pediatric asthma prevalence has increased.





(d) As nationwide O_3 levels have declined, nationwide adult and pediatric asthma prevalence has increased.



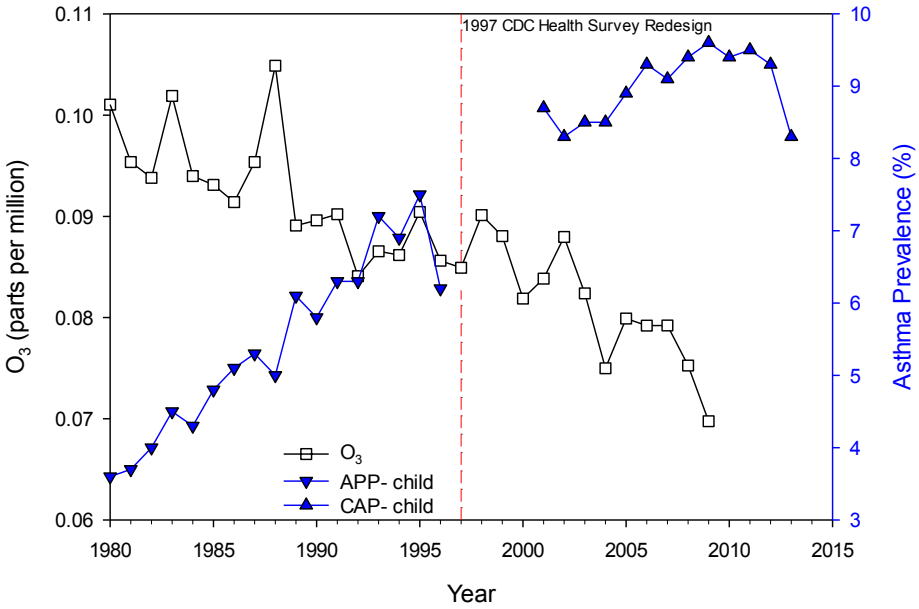


Figure 6.1 National-scale Trends in Several Criteria Air Pollutants with National-scale Trends in Asthma Prevalence for both Adults and Children. Criteria air pollutant data obtained from the U.S. EPA AirTrends website (http://www.epa.gov/airtrends/) and asthma prevalence data obtained from the U.S. Centers for Disease Control and Prevention (CDC) Asthma Surveillance Data website (http://www.cdc.gov/asthma/asthmadata.htm). Prior to 1997, CDC collected data on asthma period prevalence (APP), which

reflects the percentage of the U.S. population having asthma in the previous 12 months. CDC redesigned its health survey in 1997, and in 2001, began to collect data on current asthma prevalence (CAP), which represents the percentage of the U.S. population diagnosed with asthma and having asthma at the time of the survey.

Gupta *et al*. (2008) have demonstrated large geographic variability in childhood asthma prevalence across different Chicago neighborhoods. As illustrated in Figure 6.2 below, the Gupta *et al*. (2008) data for childhood asthma prevalence (green to orange shading) show no apparent relationship between either ambient $PM_{2.5}$ levels (numbers next to green diamonds) or proximity to two coal-fired power plants (purple squares) that were in operation at the time of the study.

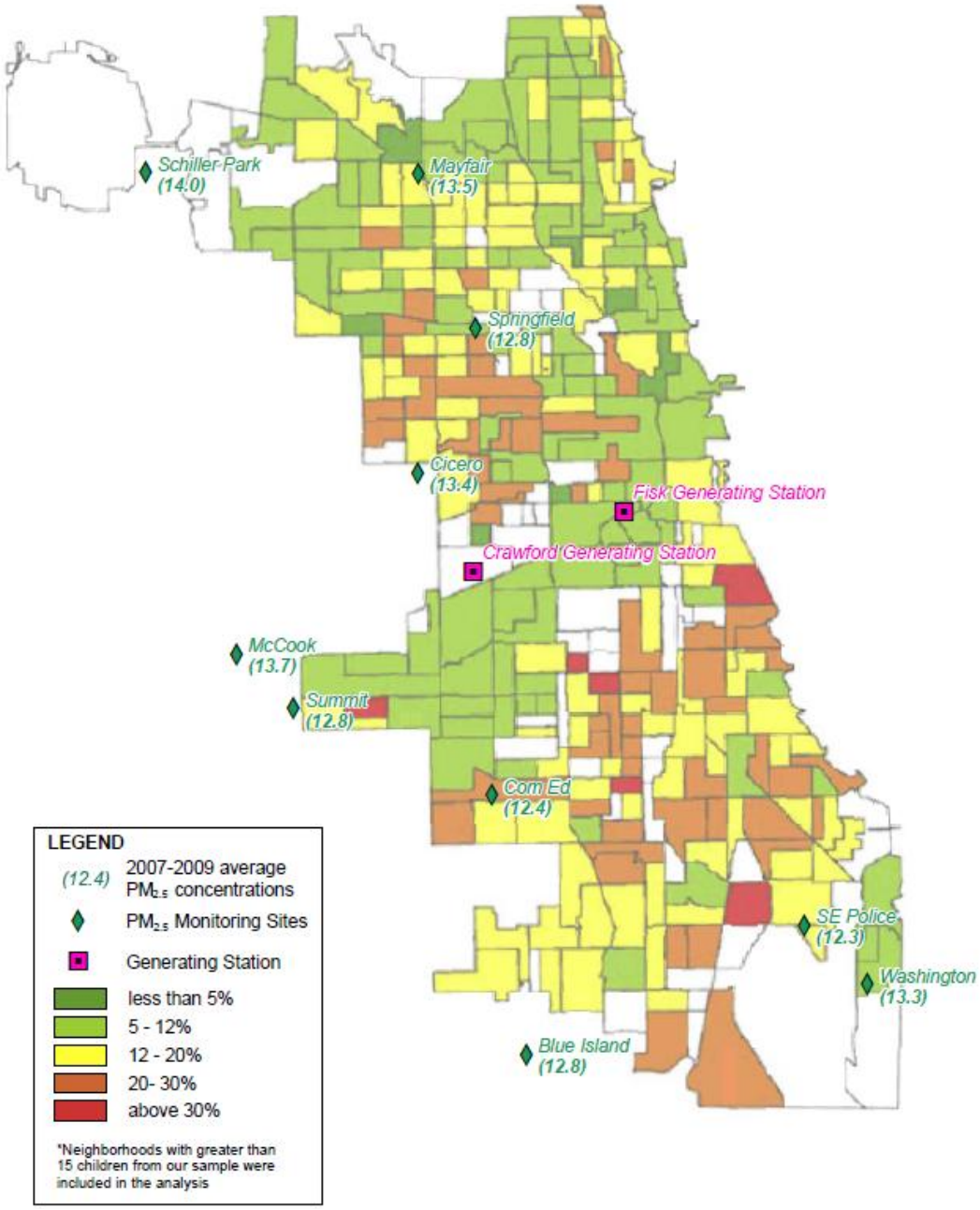


Figure 6.2 Childhood Asthma Prevalence in Chicago Neighborhoods (adapted from Gupta *et al*., 2008)

Importantly, studies worldwide report low prevalence of asthma in countries with high ambient air pollution, such as Mexico, Eastern Europe, China, and Greece, whereas asthma rates are nearly 10 times higher in countries that have very good air quality and much less industry, for example, New Zealand, Australia, and Canada (Peat and Li, 1999; ISAAC, 1998). In the United Kingdom, regional differences in ambient air pollution do not correlate with asthma prevalence (Anderson, 1997; Anderson *et al*., 2012). In Europe, asthma rates are lower in more polluted regions than in regions with cleaner air (Björkstén, 1997; Nicolai, 1997). Also, during the time period following unification, East Germany (a more polluted region) had less asthma than West Germany (Krämer *et al*., 2010).

It is now widely recognized that asthma is a complex, multi-factorial disease, with a multitude of known triggers and risk factors. As reflected in Eggleston (2007), clinicians feel that indoor air is likely much more important than outdoor air for triggering asthmatic symptoms, in part because people spend so much of their time indoors (Eggleston, 2007):

> Our understanding of the environmental influences [of asthma] is still in its infancy, but we can say that indoor exposures are more important than ambient pollutants and that bioaerosols containing allergenic proteins are especially important.

For example, some of the most potent asthma-inducing allergens (such as spores, mold, pollen, and allergens from rodents, pets, fungi, cockroaches, and dust mites) can be found in indoor environments (Carr *et al.*, 1992; De Palo *et al.*, 1994; Leaderer *et al*., 2002; Belanger *et al*., 2003; Teach *et al.*, 2006). A recent review of scientific studies published between 2000 and 2013 regarding indoor environments and asthma found a causal relationship with asthma exacerbation by indoor dampness-related agents, endotoxin, and environmental tobacco smoke (Kanchongkittiphon *et al*., 2015). The authors also reported suggestive evidence for asthma exacerbation by indoor fungi, NO_2 (which is emitted from natural gas appliances such as natural gas cooking burners), presence of rodents, feather/down pillows; and dust mite, cockroach, dog, and dampness-related agents. Also, other studies have linked fragranced consumer products, such as air fresheners, deodorizers, and household cleaning products, with asthma exacerbation (Steinemann *et al*., 2011).

Well-respected authorities on asthma, when describing factors that contribute to asthma prevalence and exacerbation, list many more indoor-air / lifestyle factors as opposed to man-made substances in the outdoor air. For example, collecting asthma risk factors and asthma triggers from the American Lung Association (ALA, 2014), National Heart, Lung, and Blood Institute (NHLBI, 2014), and National Institute of Environmental Health Sciences (NIEHS, 2014) websites yields the list given below. Each person reacts differently to the various risk factors and asthma triggers, but the primary established factors include:

- **colds,** *i.e.*, viral respiratory infections;
- pets and **animals**;
- **cigarette** smoke, environmental tobacco smoke (ETS);
- allergens in **fragrances** (*e.g.*, lilacs), hairspray, and cleaning products;
- **plant materials,** pollens, mold, fungus, mildew, grasses, flowers, house dust;
- **foods,** *e.g.*, sulfites;
- being overweight;
- **animal materials,** animal fur / dander, **dust mites,** cockroaches, feathers;
- indoor and outdoor air pollutants such as **ozone, nitrogen dioxide, sulfur dioxide**;

- exposure to **cold air** or sudden temperature change;
- **maternal stress** during pregnancy period when child was *in utero*;
- excitement/**stress**;
- **exercise,** physical activity; and
- over the counter **medications**, *e.g.*, aspirin or other non-steroidal anti-inflammatory drugs.

It remains unclear as to why the prevalence of childhood asthma has increased over the decades. There is the usual issue of increased diagnostic awareness, and lowered thresholds for what is classified as asthma. Also, the fraction of children who are overweight has increased over time, and high body mass index is a risk factor for asthma (Kwon *et al*., 2006; LeMasters *et al*., 2015). Episodes of high maternal stress during the prenatal period when the child is *in utero* have also been shown to increase the risk of developing asthma (Cookson *et al*., 2009; Turcotte-Tremblay *et al*., 2014). Interestingly, reduced exposure to bacteria and allergens in the first year of life has been linked to an increased risk of developing asthma later in life, suggesting that immune system hypersensitivity (atopy) is exacerbated by infants not experiencing exposure to common antigen challenges (Lynch *et al*., 2014). Exposure to allergens subsequent to the first year of life, however, increased risk of sensitization, wheeze, and asthma.

A number of investigators have examined indoor-environment and lifestyle factors and have found them to play an important part in asthma prevalence and occurrence of asthma attacks. That is, exposures to airborne allergens, dusts, and cooking-related emissions (*e.g.*, NO_2 from natural gas cooking burners) are linked to socioeconomic status and population density in homes, and these exposures increase allergic sensitization and asthma development and exacerbation (Leaderer *et al*., 2002). Teach *et al*. (2006) studied a cohort of children with moderate to severe asthma who were treated in an urban pediatric emergency department, and they correlated these exposures with household income, prior asthma morbidity, health care utilization, and quality of life. They found that increased home exposure to ETS, allergens, and cockroach allergen was significantly associated with low household income. In the presence of ETS, cockroach antigen exposure was associated with adverse effects on asthma morbidity.

Belanger *et al*. (2003) reported that home indoor-air exposures (mold, cockroach allergen, NO_2, fungi) increased the frequency of infant wheeze and persistent cough. A study that collected dust samples, taken from living-area floors and from the child's bed, showed house dust mite allergen concentrations that increased asthma severity (Gent *et al*., 2009). Indoor NO_2 levels, which are known to have gas cooking stoves as primary indoor emission sources, have been linked to asthma morbidity and an asthma severity score (frequency of wheeze, night symptoms, and use of rescue medication) (Belanger *et al*., 2013). The authors reported that asthmatic children exposed to NO_2 concentrations common in urban and suburban homes are at risk for increased asthma morbidity. Some investigators have tested indoor asthma triggers using an intervention approach. For example, in a Michigan study, staff assessed homes for asthma triggers and subsequently provided products and services to reduce exposures to cockroaches, dust mites, mold, tobacco smoke, and other triggers (Largo *et al*., 2011). The investigators found that these interventions substantially reduced the impact of asthma on the children studied, and the proportion of asthmatic children who sought acute unscheduled health care for their asthma decreased by more than 47%.

In a U.S. National Institutes of Health (NIH) study, Arbes *et al*. (2007) reported findings suggesting that more than 50 percent of current asthma cases in the United States can be attributed to specific allergies. Another recent study (Mitchell *et al*., 2009) identified "obesity, antibiotics use, and television watching [sedentary lifestyle]" as risk factors for asthma in children.

In summary, asthma is a multi-factorial disease that has shown significant increases in prevalence over the past few decades, yet, outdoor air pollution, such as ambient $PM_{2.5}$, has been trending downwards over the same time period. The time trends are in opposite directions, and therefore, completely contrary to the hypothesis of a causal link. Data such as these raise questions regarding the impacts of further reductions in outdoor air pollutant levels on asthma prevalence.

As shown in the graphs below (Figures 6.3 through 6.7), there are in fact data specific to the St. Louis area showing that over the many years that $PM_{2.5}$ air quality has been steadily improving, various asthma statistics have remained relatively unchanged. These asthma statistics include:

- In Figure 6.3, weighted prevalence of adult lifetime doctor-diagnosed asthma and crude prevalence of pediatric doctor-diagnosed asthma for the St. Louis Region from the Missouri Behavioral Risk Factor Surveillance System (BRFSS).
- In Figure 6.4, rates (per 10,000) of total all-age asthma inpatient hospitalizations for St. Louis City from the Missouri Information for Community Assessment (MICA) system.
- In Figure 6.5, rates (per 1,000) of total all-age asthma emergency room (ER) visits for St. Louis City from the Missouri Information for Community Assessment (MICA) system.
- In Figure 6.6, rates (per 10,000) of pediatric (<15 years of age) asthma inpatient hospitalizations for St. Louis City from the Missouri Information for Community Assessment (MICA) system.
- In Figure 6.7, rates (per 1,000) of pediatric (<15 years of age) asthma emergency room (ER) visits for St. Louis City from the Missouri Information for Community Assessment (MICA) system.

Moreover, similar to what has been shown for other U.S. cities, there is also evidence that asthma statistics are highly variable between different St. Louis City zip codes despite similarities in outdoor air quality. This is illustrated by Figures 6.8 through 6.10 that examine the following asthma statistics by zip code:

- In Figure 6.8, 2010 rates (per 10,000) of total all-age asthma inpatient hospitalizations for St. Louis City zip codes from the Missouri Information for Community Assessment (MICA) system.
- In Figure 6.9, 2010 rates (per 1,000) of total all-age asthma emergency room (ER) visits for St. Louis City zip codes from the Missouri Information for Community Assessment (MICA) system.
- In Figure 6.10, 2006-2008 rates (per 1,000) of pediatric (<15 years of age) asthma emergency room (ER) visits for St. Louis City zip codes from an undated Missouri DHSS Report (only includes zip codes with more than 300 asthma ER visits during 2006-2008 three year-period).

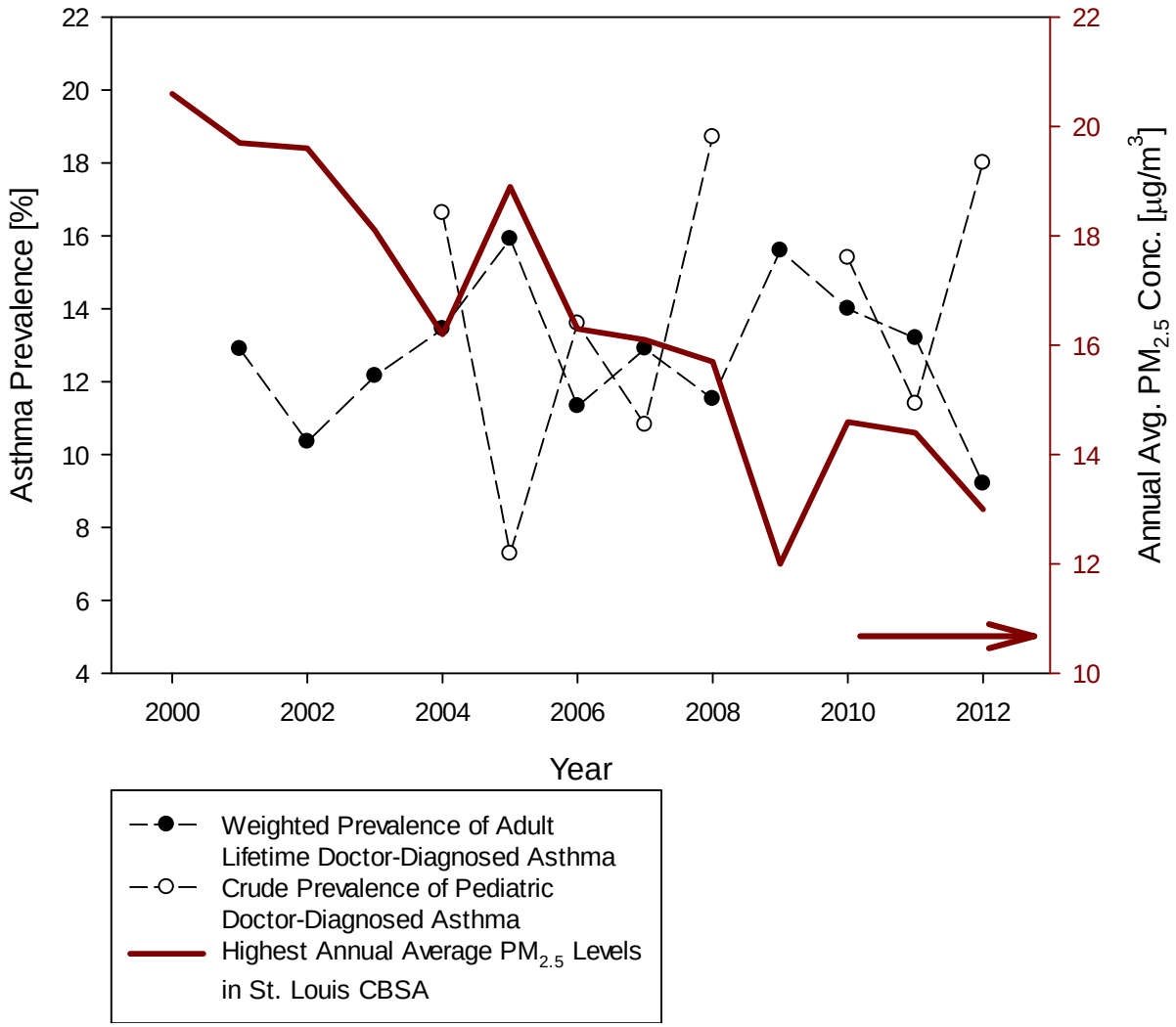


Figure 6.3 St. Louis-area $PM_{2.5}$ Levels Have Dropped by More than 25% While Adult and Pediatric Asthma Prevalence in the St. Louis Region Has Remained Relatively Unchanged. Highest annual average $PM_{2.5}$ concentrations in the St. Louis CBSA obtained from the U.S. EPA AirData website, and doctor-diagnosed adult and pediatric asthma prevalence data in the St. Louis Region obtained from the Missouri Behavioral Risk Factor Surveillance System (BRFSS).

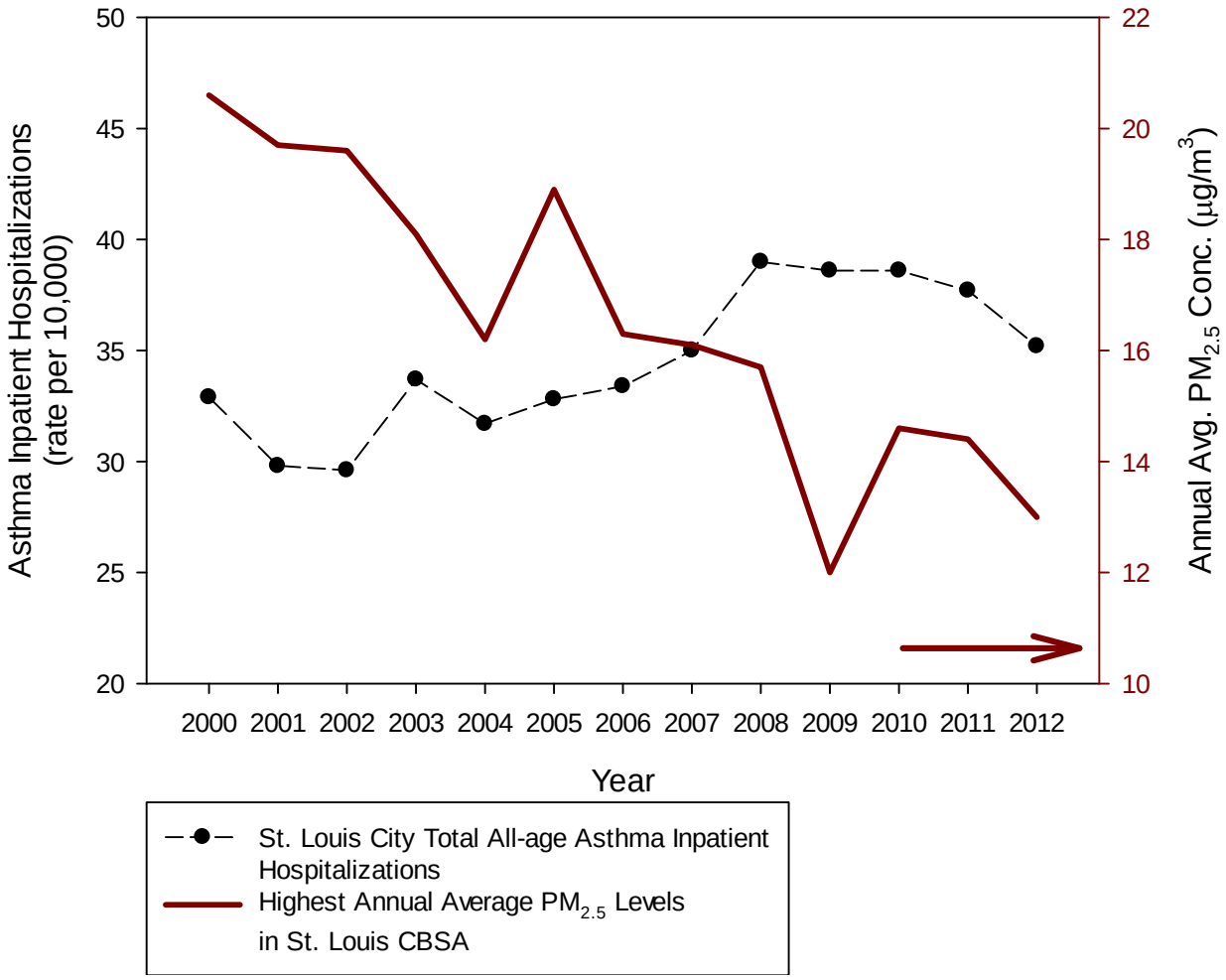


Figure 6.4 St. Louis-area $PM_{2.5}$ Levels Have Dropped by More than 25% While All-age Asthma Inpatient Hospitalization Rates in St. Louis City Have Slightly Increased. Highest annual average $PM_{2.5}$ concentrations in the St. Louis CBSA obtained from the U.S. EPA AirData website, and rates (per 10,000) of total all-age asthma inpatient hospitalizations in St. Louis City obtained from the Missouri Information for Community Assessment (MICA) system.

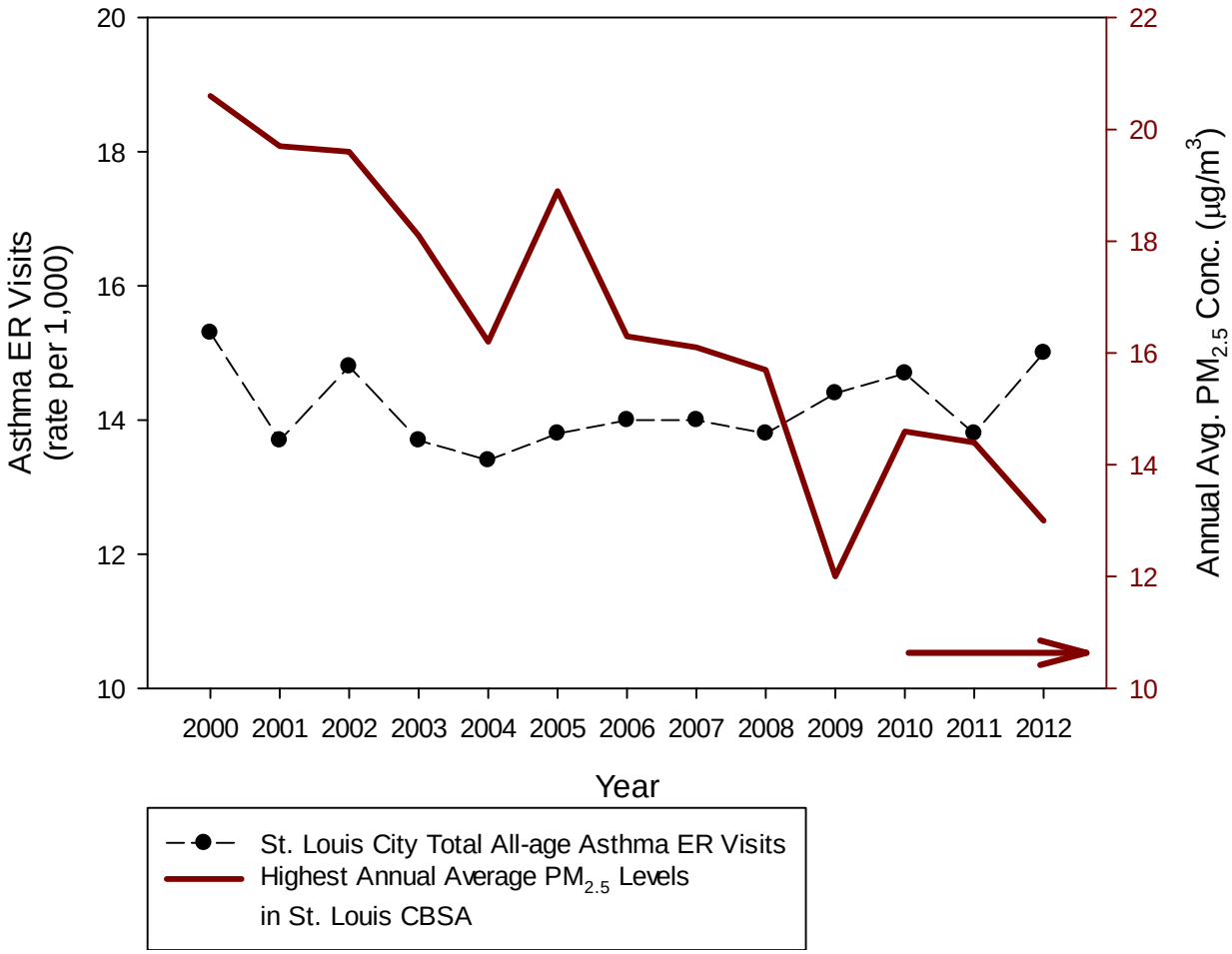


Figure 6.5 St. Louis-area $PM_{2.5}$ Levels Have Dropped by More than 25% While Rates of All-age Asthma ER Visits Have Remained Steady. Highest annual average $PM_{2.5}$ concentrations in the St. Louis CBSA obtained from the U.S. EPA AirData website, and rates (per 1,000) of total all-age asthma emergency room (ER) visits in St. Louis City obtained from the Missouri Information for Community Assessment (MICA) system.

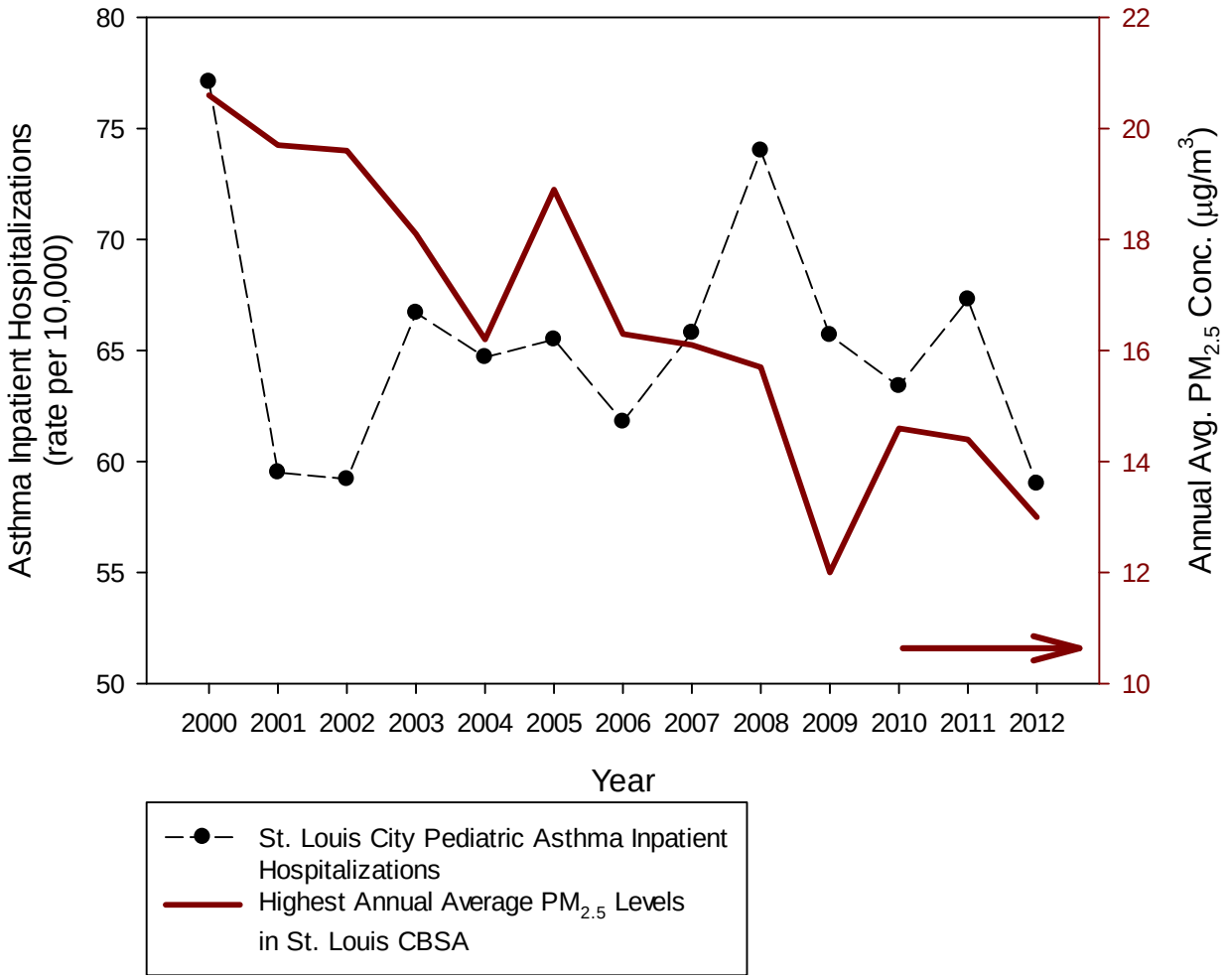


Figure 6.6 St. Louis-area $PM_{2.5}$ Levels Have Dropped by More than 25% While Pediatric Asthma Inpatient Hospitalization Rates in St. Louis City Have Remained Relatively Unchanged. Highest annual average $PM_{2.5}$ concentrations in the St. Louis CBSA obtained from the U.S. EPA AirData website, and rates (per 10,000) of pediatric (<15 years of age) asthma inpatient hospitalizations in St. Louis City obtained from the Missouri Information for Community Assessment (MICA) system.

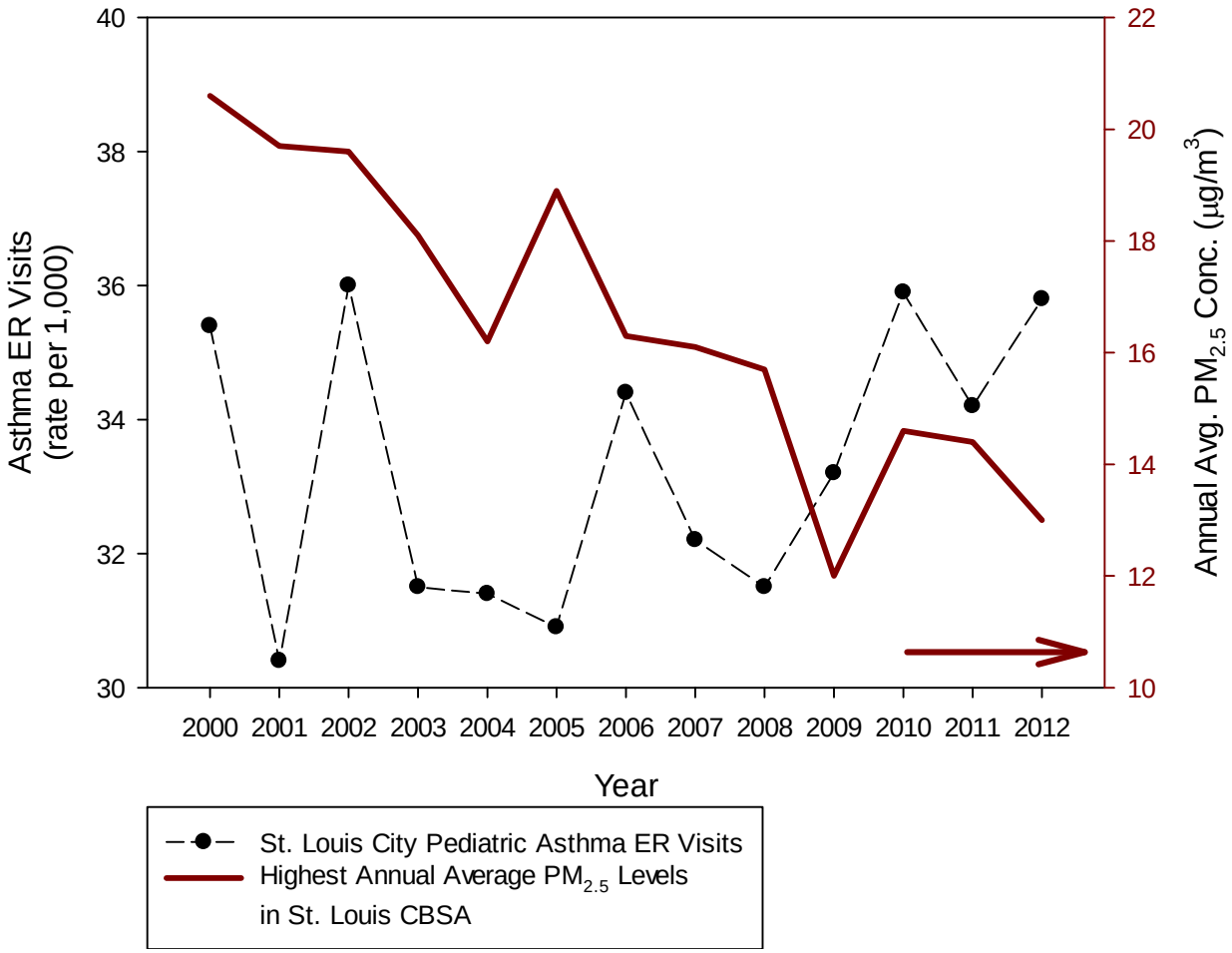


Figure 6.7 St. Louis-area $PM_{2.5}$ Levels Have Dropped by More than 25% While Rates of Pediatric Asthma ER Visits Have Remained Relatively Unchanged. Highest annual average $PM_{2.5}$ concentrations in the St. Louis CBSA obtained from the U.S. EPA AirData website, and rates (per 1,000) of pediatric (<15 years of age) asthma emergency room (ER) visits in St. Louis City obtained from the Missouri Information for Community Assessment (MICA) system.

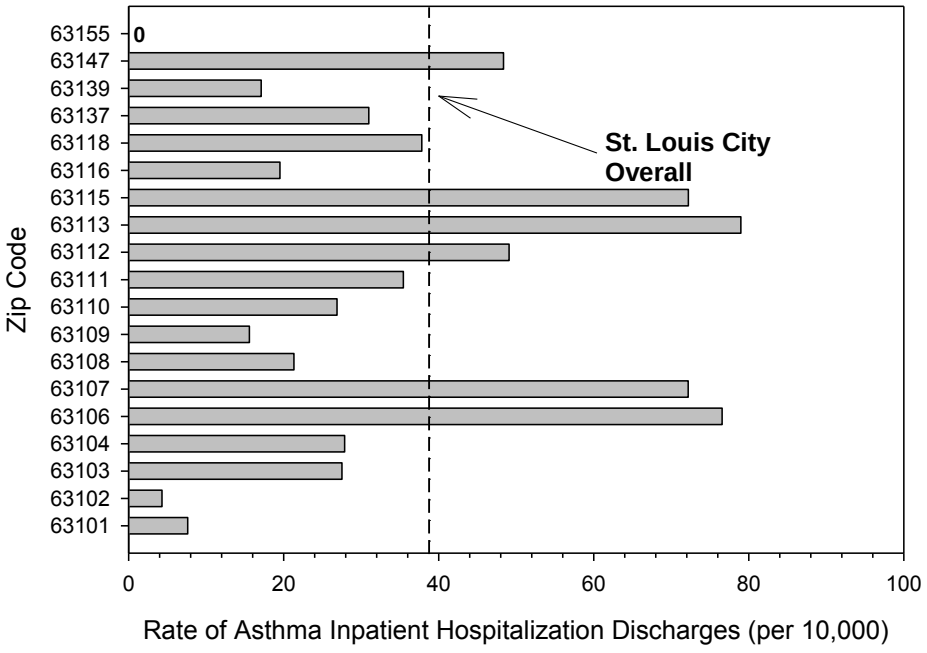


Figure 6.8 Despite Being Located Within the Same Airshed, Rates of Total All-age Asthma Inpatients Hospitalizations Vary Significantly by Zip Code in the St. Louis City Area. 2010 rates (per 10,000) of total all-age asthma inpatient hospitalization discharges for St. Louis City zip codes obtained from the Missouri Information for Community Assessment (MICA) system; numbers of cases converted to rates using 2010 census data.

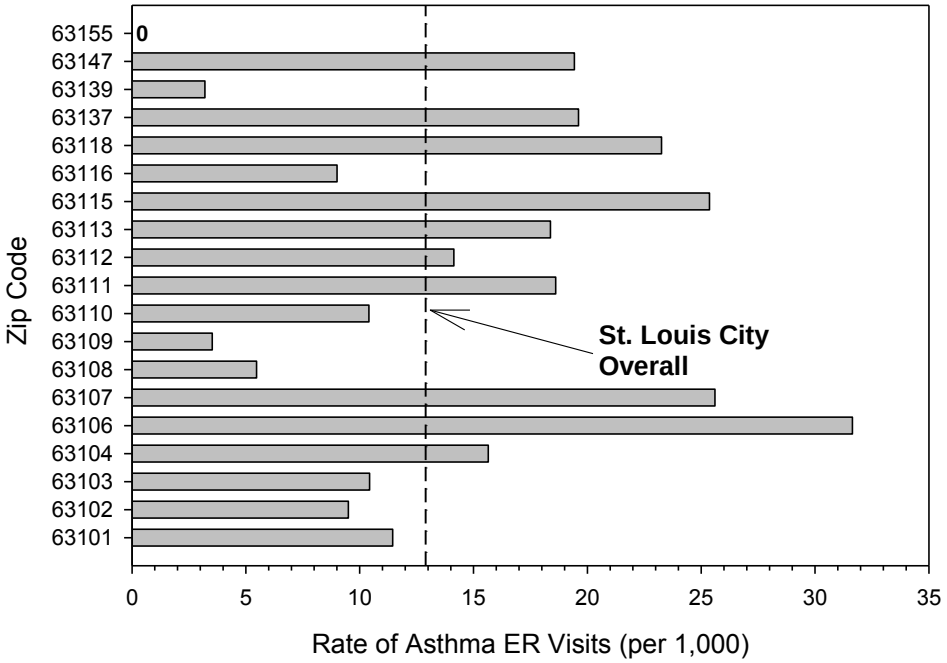


Figure 6.9 Despite Being Located Within the Same Airshed, Rates of Total All-age Asthma Emergency Room (ER) Visits Vary Significantly by Zip Code in the St. Louis City Area. 2010 Rates (per 1,000) of total all-age asthma emergency room (ER) visits for St. Louis City zip codes obtained from the Missouri Information for Community Assessment (MICA) system; numbers of cases converted to rates using 2010 census data.

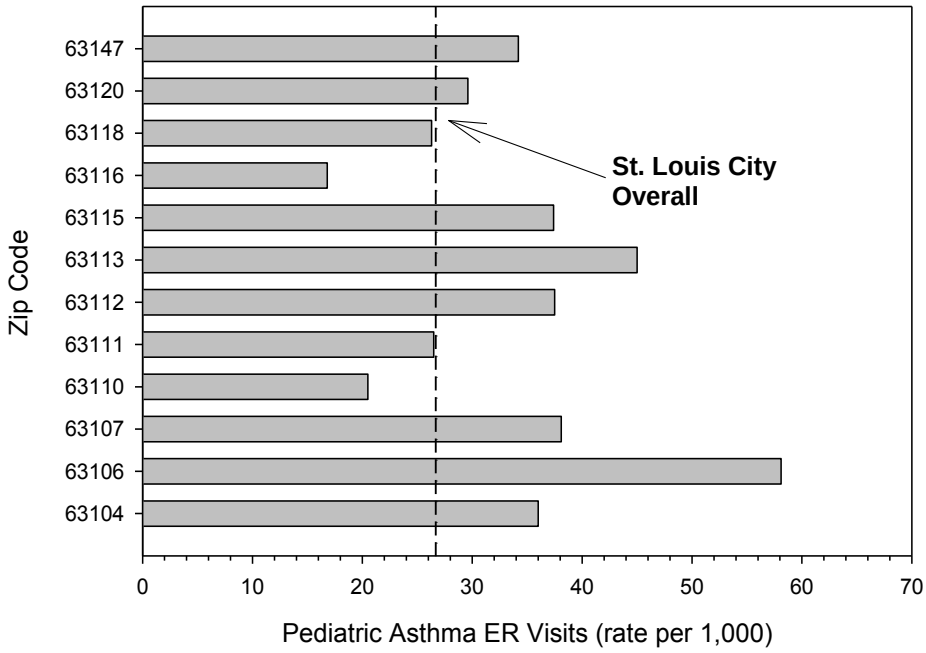


Figure 6.10 Despite Being Located Within the Same Airshed, Rates of Pediatric Asthma Emergency Room (ER) Visits Vary Significantly by Zip Code in the St. Louis City Area. 2006-2008 rates (per 1,000) of pediatric (<15 years of age) asthma emergency room (ER) visits for St. Louis City zip codes obtained from an undated Missouri DHSS Report (only includes zip codes with more than 300 asthma ER visits during 2006-2008 three year-period).

7 References

Abbey, DE; Ostro, BE; Petersen, F; Burchette, RJ. 1995. "Chronic respiratory symptoms associated with estimated long-term ambient concentrations of fine particulates less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$) and other air pollutants." *J. Expo. Anal. Environ. Epidemiol.* 5(2):137-159.

Abrahamowicz, M; Schopflocher, T; Leffondre, K; du Berger, R; Krewski, D. 2003. "Flexible modeling of exposure-response relationship between long-term average levels of particulate air pollution and mortality in the American Cancer Society study." *J. Toxicol. Environ. Health* 66(16-19):1625-1654.

Abt Associates Inc. 2010. "Technical Support Document for the Powerplant Impact Estimator Software Tool." Report to Clean Air Task Force. 113p., July.

Air Resources Board (ARB). 2005. "Indoor Air Pollution in California: Report to the California Legislature." February. Accessed at http://www.arb.ca.gov/research/indoor/ab1173/report0205/report0205.htm.

Allen, R; Larson, T; Sheppard, L; Wallace, L; Sally Liu, LJ. 2003. "Use of real-time light scattering data to estimate the contribution of infiltrated and indoor generated particles to indoor air." *Environ. Sci. Technol.* 37:3484-3492.

Amato, F; Hopke, P. 2012. "Source apportionment of the ambient PM 2.5 across St. Louis using constrained positive matrix factorization." *Atmos. Environ.* 46:329-337. doi: 10.1016/j.atmosenv.2011.09.062.

American Conference of Governmental Industrial Hygienists (ACGIH). 2014 "2014 TLVs and BEIs: Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices." ACGIH Publication #0114. 254 p. Published by ACGIH, 1330 Kemper Meadow Drive, Cincinnati, OH.

American Lung Association (ALA). 2014. "Reduce asthma triggers." Accessed at http://www.lung.org/lung-disease/asthma/taking-control-of-asthma/reduce-asthma-triggers.html.

Anderson, HR; Butland, BK; van Donkelaar, A; Brauer, M; Strachan, DP; *et al*. 2012. "Satellite-based estimates of ambient air pollution and global variations in childhood asthma prevalence." *Environ Health Perspect*. 120(9):1333-9.

Anderson, HR. 1997. "Air pollution and trends in asthma." In *The Rising Trends in Asthma*. (Eds.: Chadwick, D; Cardew, G), John Wiley and Sons, New York, pp. 190-207.

Arbes, SJ Jr.; Gergen, PJ; Vaughn, B; Zeldin, DC. 2007. "Asthma cases attributable to atopy: results from the Third National Health and Nutrition Examination Survey." *J. Allergy Clin. Immunol*. 120(5):1139-45.

ARCADIS. 2001. "Indoor Air Quality: Residential Cooking Exposures (Final)." Report to California Air Resources Board (CARB). 231p., November 30.

Baldauf, R; Fortune, C; Weinstein, J; Wheeler, M; Blanchard, F. 2006. "Air contaminant exposures during the operation of lawn and garden equipment." *J. Expo. Sci. Environ. Epidemiol.* 16(4):362-370.

Beelen, R; Hoek, G; van den Brandt, PA; Goldbohm, RA; Fischer, P; Schouten, LJ; Jerrett, M; Hughes, E; Armstrong, B; Brunekreef, B. 2008. "Long-term effects of traffic-related air pollution on mortality in a Dutch cohort (NLCS-AIR Study)." *Environ. Health Perspect.* 116:196-202.

Belanger, K; Beckett, W; Triche, E; Bracken, MB; Holford, T; Ren, P; McSharry, JE; Gold, DR; Platts-Mills, TAE; Leaderer, BP. 2003. "Symptoms of wheeze and persistent cough in the first year of life: associations with indoor allergens, air contaminants, and maternal history of asthma." *Am J Epidemiol.* 158(3):195-202.

Belanger, K; Holford, TR; Gent, JF; Hill, ME; Kezik, JM; Leaderer, BP. 2013. "Household levels of nitrogen dioxide and pediatric asthma severity." *Epidemiology.* 24(2):320-30.

Björkstén, B. 1997. "Epidemiology of pollution-induced airway disease in Scandinavia and Eastern Europe." *Allergy* 52(suppl 38):23-25.

Britigan, N; Alshawa, A; Nizkorodov, SA. 2006. "Quantification of ozone levels in indoor environments generated by ionization and ozonolysis air purifiers." *J. Air Waste Manage. Assoc*. 56:601-610.

Brunekreef, B; Beelen, R; Hoek, G; Schouten, L; *et al*. 2009. "Effects of Long-Term Exposure to Traffic-Related Air Pollution on Respiratory and Cardiovascular Mortality in the Netherlands: The NLCS-AIR Study." HEI Research Report 139. 106p., March.

Burke, JM; Zufall, MJ; Ozkaynak, H. 2001. "A population exposure model for particulate matter: Case study results for PM(2.5) in Philadelphia, PA." *J. Expo. Anal. Environ. Epidemiol.* 11 (6) :470-489.

Carr, W; Zeitel, L; Weiss, K. 1992. "Variations in asthma hospitalization and deaths in New York City." *Am J Public Health* 82:59-65.

Chay, K; Dobkin, C; Greenstone, M. 2003. "The Clean Air Act of 1970 and adult mortality." *Journal of Risk and Uncertainty*. 27:279-300.

Chessor, E. 1998. "Case studies: Testing of ozone-generating air-purifying devices." *Appl. Occup. Environ. Hyg*. 13:141-143.

Clark, NA; Allen, RW; Hystad, P; Wallace, L; Dell, SD; Foty, R; Dabek-Zlotorzynska, E; Evans, G; Wheeler, AJ. 2010. "Exploring variation and predictors of residential fine particulate matter infiltration." *Int. J. Environ. Res. Public Health* 7(8):3211-3224.

Clean Air Task Force (CATF). 2010. "The Toll from Coal: An Updated Assessment of Death and Disease from America's Dirtiest Energy Source." 16p., September.

Clean Air Task Force (CATF). 2014. "Death and disease from power plants." Accessed at http://www.catf.us/fossil/problems/power_plants/.

Cookson, H; Granell, R; Joinson, C; Ben-Shlomo, Y; Henderson, AJ. 2009. "Mothers' anxiety during pregnancy is associated with asthma in their children." *J Allergy Clin Immunol.* 123(4):847-53.e11.

Cox, LA Jr. 2012. "Reassessing the human health benefits from cleaner air." *Risk Anal.* 32(5):816-829.

Cox, LA Jr.; Popken, DA; Ricci, PF. 2013. "Warmer is healthier: Effects on mortality rates of changes in average fine particulate matter ($PM_{2.5}$) concentrations and temperatures in 100 US cities." *Regul. Toxicol. Pharmacol.* 66:336-346.

Cox, LA; Popken, DA. 2015. "Has reducing $PM_{2.5}$ and O_3 caused reduced mortality rates in the US?" *Ann. Epidemiol.* 25(3):162-73. doi: 10.1016/j.annepidem.2014.11.006.

De Palo, VA; Mayo, PH; Friedman, P; Rosen, MJ. 1994. "Demographic influences on asthma hospital admission rates in New York City." *Chest* 106:447-451.

Diapouli, E; Chaloulakou, A; Koutrakis, P. 2013. "Estimating the concentration of indoor particles of outdoor origin: A review." *J. Air Waste Manage. Assoc.* 63(10):1113-1129.

Dominici, F; McDermott, A; Zeger, SL; Samet, JM. 2003. "National maps of the effects of particulate matter on mortality: Exploring geographical variation." *Environ. Health Perspect.* 111(1):39-44.

Eggleston, PA. 2007. "The environment and asthma in US inner cities." *Chest* 132:782S-788S.

Emery, C; Jung, J; Downey, N; Johnson, J; Jimenez, M; Yarwood, G; Morris, R. 2012. "Regional and global modeling estimates of policy relevant background ozone over the United States." *Atmos. Environ.* 47:206-217.

Enstrom, JE. 2005. "Fine particulate air pollution and total mortality among elderly Californians, 1973-2002." *Inhal. Toxicol.* 17:803-816.

Environmental Integrity Project (EIP). 2012. "Net Loss: Comparing the Cost of Pollution *vs*. the Value of Electricity from 51 Coal-Fired Plants." 32p., June.

EPRI. 2009. "Updated hazardous air pollutant (HAP) emissions estimates and inhalation human health risk assessment for US coal-fired electric generating units." Electric Power Research Institute 1017980, Palo Alto, CA. Accessed at http://my.epri.com/portal/server.pt?Abstract_id=000000000001017980.

Fann, N; Lamson, AD; Anenberg, SC; Wesson, K; Risley, D; Hubbell, BJ. 2012. "Estimating the national public health burden associated with exposure to ambient PM(2.5) and ozone." *Risk Anal.* 32 (1) :81-95.

Fewell, Z; Smith, GD; Sterne, JAC. 2007. "The impact of residual and unmeasured confounding in epidemiologic studies: A simulation study." *Am. J. Epidemiol.* 166(6):646-655.

French, C; Peters, W; Maxwell, B; Rice, G; Colli, A; *et al*. 1997. "Assessment of health risks due to hazardous air pollutant emissions from electric utilities." *Drug. Chem. Toxicol.* 20(4):375-386.

Gamble, JF. 1998. "$PM_{2.5}$ and mortality in long-term prospective cohort studies: Cause-effect or statistical association?" *Environ. Health Perspect.* 106(9):535-549.

Gamble, JF; Nicolich, MJ. 2000. "Comparison of ambient PM risk with risks estimated from PM components of smoking and occupational exposures." *J. Air Waste Management Assoc.* 50(8):1514-1531.

Gamble, JF; Nicolich, MJ. 2006. "Comments on the updated Harvard Six Cities Study (Letter)." *Am. J. Respir. Crit. Care Med.* 174(6):722.

Gent, JF; Koutrakis, P; Belanger, K; Triche, E; Holford, TR; Bracken, MB; Leaderer, BP. 2009. "Symptoms and medication use in children with asthma and traffic-related sources of fine particle pollution." *Environ. Health Perspect.* 117(7):1168-1174.

Gottlieb, DJ; Beiser, AS; O'Connor, GT. 1995. "Poverty, race, and medication use are correlates of asthma hospitalization rates. A small area analysis in Boston." *Chest.* 108(1):28-35.

Green, LC; Crouch, EAC; Ames, MR; Lash, TL. 2002. "What's wrong with the national ambient air quality standard (NAAQS) for fine particulate matter (PM2.5)?" *Regul. Toxicol. Pharmacol.* 35:327-337.

Greven, S; Dominici, F; Zeger, S. 2011. "An approach to the estimation of chronic air pollution effects using spatio-temporal information." *J. Amer. Stat. Assoc.* 106: 396-406.

Gupta, RS; Zhang, X; Sharp, LK; Shannon, JJ; Weiss, KB. 2008. "Geographic variability in childhood asthma prevalence in Chicago." *J Allergy Clin Immunol.* 121(3):639-645.

Hackney, JD; Linn, WS; Avol, EL. 1989. "Acid fog: Effects on respiratory function and symptoms in healthy and asthmatic volunteers." *Environ. Health Perspectives* 79:159-162.

Health Effects Institute (HEI). 2000. "Reanalysis of the Harvard Six Cities Study and the American Cancer Society Study of Particulate Air Pollution and Mortality." HEI Special Report. 303p.

Health Effects Institute (HEI). 2009. "Extended Follow-Up and Spatial Analysis of the American Cancer Society Study Linking Particulate Air Pollution and Mortality." HEI Research Report 140. 154p.

Health Effects Institute (HEI). 2010. "Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects." Special Report 17. 386p., January.

Hill, AB. 1965. "Environment and disease: Association or causation?" *Proc. R. Soc. Med*. 58:295-300.

International Study of Asthma and Allergies in Childhood (ISAAC). 1998. "Worldwide variation in prevalence of symptoms of asthma, allergic rhinoconjuncitivitis, and atopic eczema: ISAAC." *Lancet* 351: 1225-32.

Jacobs, EJ; Connell, CJ; Patel, AV; Chao, A; Rodriguez, C; Seymour, J; McCullough, ML; Calle, EE; Thun, MJ. 2001. "Vitamin C and vitamin E supplement use and colorectal cancer mortality in a large American Cancer Society cohort." *Cancer Epidemiol Biomarkers Prev*. 10:17-23.

Janssen, NA; Hoek, G; Brunekreef, B; Harssema, H; *et al*. 1998. "Personal sampling of particles in adults: Relation among personal, indoor, and outdoor air concentrations." *Am J Epidemiol.* 147:537-547.

Janssen, NA; Hoek, G; Harssema, H; Brunekreef, B. 1997. "Childhood exposure to PM_{10}: Relation between personal, classroom, and outdoor concentrations." *Occup Environ Med.* 54(12):888-894.

Kanchongkittiphon, W; Mendell, MJ; Gaffin, JM; Wang, G; Phipatanakul, W. 2015. "Indoor environmental exposures and exacerbation of asthma: An update to the 2000 review by the Institute of Medicine." *Environ Health Perspect*. 123(1):6-20. doi: 10.1289/ehp.1307922.

Keatinge, WR. 2002. "Winter mortality and its causes." *Inter. J. Circumpolar Health* 61:292-299.

Keatinge, WR; Donaldson, GC. 2001. "Mortality related to cold and air pollution in London after allowance for effects of associated weather patterns." *Environ. Res.* 86:209-216.

Keatinge, WR; Donaldson, GC. 2006. "Heat acclimatization and sunshine cause false indications of mortality due to ozone." *Environ. Res.* 100(3):387-393.

Kloner, RA; McDonald, S; Leeka, J; Poole, WK. 2009. "Comparison of total and cardiovascular death rates in the same city during a losing versus winning super bowl championship." *Am J Cardiol*. 103:1647-50.

Koop, G; Tole, L. 2004. "Measuring the health effects of air pollution: To what extent can we really say that people are dying from bad air?" *J. Environ. Econ. Manage.* 47:30-54.

Krämer, U; Oppermann, H; Ranft, U; Schäfer, T; Ring, J; Behrendt, H. 2010. "Differences in allergy trends between East and West Germany and possible explanations." *Clin Exp Allergy.* 40(2):289-98. doi: 10.1111/j.1365-2222.2009.03435.x.

Kwon, HL; Ortiz, B; Swaner, R; Shoemaker, K; Jean-Louis, B; Northridge, ME; Vaughan, RD; Marx, T; Goodman, A; Borrell, LN; Nicholas, SW; Harlem Children's Zone Asthma Initiative. 2006. "Childhood asthma and extreme values of body mass index: the Harlem Children's Zone Asthma Initiative." *J. Urban Health.* 83(3):421-33.

Largo, TW; Borgialli, M; Wisinski, CL; Wahl, RL; Priem, WF. 2011. "Healthy Homes University: a home-based environmental intervention and education program for families with pediatric asthma in Michigan." *Public Health Rep.* 126(Suppl 1):14-26.

Leaderer, BP; Belanger, K; Triche, E; Holford, T; Gold, DR; Kim, Y; Jankun, T; Ren, P; McSharry Je, JE; Platts-Mills, TA; Chapman, MD; Bracken, MB. 2002. "Dust mite, cockroach, cat, and dog allergen concentrations in homes of asthmatic children in the northeastern United States: Impact of socioeconomic factors and population density." *Environ Health Perspect.* 110(4):419-25.

Lee, JH; Hopke, PK. 2006. "Apportioning sources of $PM_{2.5}$ in St. Louis, MO using speciation trends network data." *Atmos. Environ.* 40:S360-S377.

Lee, K; Vallarino. J; Dumyahn, T; Ozkaynak, H; Spengler, JD. 1999. "Ozone decay in residences." *J. Air Waste Manag. Assoc.* 49:1238-1244.

LeMasters, G; Levin, L; Bernstein, DI; Lockey, SD 4th; Lockey, JE; Burkle, J; Khurana Hershey, GK; Brunst, K; Ryan, PH. 2015. "Secondhand smoke and traffic exhaust confer opposing risks for asthma in normal and overweight children." *Obesity (Silver Spring).* 23(1):32-6. doi: 10.1002/oby.20941.

Leovic, K; Whitaker, D; Northeim, C; Sheldon, L. 1998. "Evaluation of a test method for measuring indoor air emissions from dry-process photocopiers." *J. Air Waste Manage. Assoc*. 48:915-923.

Leovic, KW; Sheldon, LS; Whitaker, DA; Hetes, RG; Calcagni, JA; Baskir, JN. 1996. "Measurement of indoor air emissions from dry-process photocopy machines." *J. Air Waste Manage. Assoc*. 46:821-829.

Levy, JI; Dumyahn, T; Spengler, JD. 2002b. "Particulate matter and polycyclic aromatic hydrocarbon concentrations in indoor and outdoor microenvironments in Boston, Massachusetts." *J. Exp. Anal. Environ. Epidem*. 12:104-114.

Levy, JI; Spengler, JD; Hlinka, D; Sullivan, D; Moon, D. 2002a. "Using CALPUFF to evaluate the impacts of power plant emissions in Illinois: Model sensitivity and implications." *Atmos. Environ.* 36:1063-1075.

Levy, JI; Wilson, AM; Evans, JS; Spengler, JD. 2003. "Estimation of primary and secondary particulate matter intake fractions for power plants in Georgia." *Environ. Sci. Technol.* 37:5528-5536.

Levy, JI; Wilson, AM; Evans, JS; Spengler, JD. 2003. "Estimation of primary and secondary particulate matter intake fractions for power plants in Georgia." *Environ. Sci. Technol.* 37:5528-5536.

Linn, WS; Anderson, KR; Shamoo, DA; Edwards, SA; *et al*. 1995. "Controlled exposures of young asthmatics to mixed oxidant gases and acid aerosol." *Am. J. Respir. Crit. Care Med.* 152:885-891.

Linn, WS; Avol, EL; Anderson, KR; Shamoo, *et al*. 1989. "Effect of droplet size on respiratory responses to inhaled sulfuric acid in normal and asthmatic volunteers." *Am. Rev. Respir. Dis.* 140:161-166.

Linn, WS; Gong, H Jr.; Shamoo, DA; Anderson, KR; Avol, EL. 1997. "Chamber exposures of children to mixed ozone, sulfur dioxide, and sulfuric acid." *Arch. Environ. Health* 52 :179-187.

Linn, WS; Kleinman, MT; Bailey, RM; Medway, DA; *et al*.. 1981. "Human respiratory responses to an aerosol containing zinc ammonium sulfate." *Environ. Res.* 25:404-414.

Linn, WS; Shamoo, DA; Anderson, KR; Peng, RC; Avol, EL; Hackney, JD. 1994. "Effects of prolonged, repeated exposure to ozone, sulfuric acid, and their combination in healthy and asthmatic volunteers." *Am. J. Respir. Crit. Care Med.* 150:431-440.

Lioy, PJ; Waldman, JM; Buckley, T; Butler, J; *et al*. 1990. "Personal, indoor, and outdoor concentrations of PM_{10} measured in an industrial community during the winter." *Atmos. Environ.* 24B:57-66.

Lipfert, FW; Wyzga, RE; Baty, JD; Miller, JP. 2006. "Traffic density as a surrogate measure of environmental exposures in studies of air pollution health effects: Long-term mortality in a cohort of US veterans." *Atmos. Environ.* 40(1):154-169.

Logue, JM; Klepeis, NE; Lobscheid, AB; Singer, BC. 2014. "Pollutant exposures from natural gas cooking burners: A simulation-based assessment for Southern California." *Environ. Health Perspect.* 122(1):43-50. doi: 10.1289/ehp.1306673.

Long, CM; Suh, HH; Catalano, PJ; Koutrakis, P. 2001. "Using time- and size-resolved particulate data to quantify indoor penetration and deposition behavior." *Environ. Sci. Technol.* 35:2089-2099.

Long, CM; Suh, HH; Koutrakis, P. 2000. "Characterization of indoor particle sources using continuous mass and size monitors." *J. Air Waste Manage. Assoc*. 50:1236-1250.

Lynch, SV; Wood, RA; Boushey, H; Bacharier, LB; Bloomberg, GR; Kattan, M; *et al*. 2014. "Effects of early-life exposure to allergens and bacteria on recurrent wheeze and atopy in urban children." *J. Allergy Clin. Immunol.* pii:S0091-6749(14)00593-4. doi: http://dx.doi.org/10.1016/j.jaci.2014.04.018.

Mage, DT; Buckley, TJ. 1995. "The Relationship between Personal Exposures and Ambient Concentrations of Particulate Matter." In *Proceedings of the Air & Waste Management Association 88th Annual Meeting, San Antonio, TX,* Paper No. 95-MP18.01, June.

Mason, MA; Sparks, LW; Moore, SA; Dolgov, I; Perry, RB. 2000. "Characterization of Ozone Emissions from Air Cleaners Equipped with Ozone Generators and Sensor and Feedback Control Circuitry." Presented to Engineering Solutions to Indoor Air Quality Programs Symposium, Research Triangle Park, NC, July 17-19.

McDonnell, WF; Nishino-Ishikawa, N; Petersen, FF; Chen, LH; Abbey, DE. 2000. "Relationships of mortality with the fine and coarse fractions of long-term ambient PM_{10} concentrations in nonsmokers." *J. Expo. Anal. Environ. Epidemiol.* 10(5):427-436.

McKone, TE; Ryan, PB; Ozkaynak, H. 2009. "Exposure information in environmental health research: Current opportunities and future directions for particulate matter, ozone, and toxic air pollutants." *J. Expo. Sci. Environ. Epidemiol.* 19:30-44.

Missouri Department of Natural Resources (MoDNR). Undated. "Technical Support Document: MISSOURI Area Designations For the 2010 SO2 Primary National Ambient Air Quality Standard." 30p. Accessed at http://www.epa.gov/so2designations/tsd/07_MO_tsd.pdf.

Mitchell, EA; Stewart, AW; Clayton, T; Asher, MI; Ellwood, P; Mackay, R; Moyes, C; Pattemore, PK; Pearce, N. 2009. "Cross-sectional survey of risk factors for asthma in 6-7-year-old children in New Zealand: International Study of Asthma and Allergy in Childhood Phase Three." *J. Paediatr. Child Health* 45(6):375-83.

Moolgavkar, SH. 2005. "A review and critique of the EPA's rationale for a fine particle standard." *Regul. Toxicol. Pharmacol.* 42:123-144.

Moolgavkar, SH. 2006. "Fine particles and mortality." *Inhal. Toxicol.* 18(1):93-94.

Moore, K. [Missouri Department of Natural Resources (MoDNR)]. 2014. Letter to K. Brooks [U.S. EPA Region VII] re: response to August 19, 2014 letter regarding designations for the 2012 annual fine particulate matter ($PM_{2.5}$) National Ambient Air Quality Standard (NAAQS). 2p., October 28.

National Heart, Lung, and Blood Institute (NHLBI). 2014. "What is asthma?" August. Accessed at http://www.nhlbi.nih.gov/health/health-topics/topics/asthma/.

National Institute of Environmental Health Sciences (NIEHS). 2014. "Allergens & irritants." http://www.niehs.nih.gov/health/topics/conditions/asthma/allergens/index.cfm.

Nicolai, NT. 1997. "Epidemiology of pollution-induced airway disease: Urban/rural differences in East and West Germany." *Allergy* 52(suppl 38):26-29.

Oberdorster, G. 1996. "Significance of particle parameters in the evaluation of exposure-dose-response relationships of inhaled particles." *Part. Sci. Technol.* 14:135-151.

Oberdorster, G. 2002. "Toxicokinetics and effects of fibrous and nonfibrous particles." *Inhal. Toxicol.* 14(1):29-56.

O'Connor, GT; Neas, L; Vaughn, B; Kattan, M; Mitchell, H; Crain, EF; Evans, R; Gruchalla, R; Morgan, W; Stout, J; Adams, GK; Lippman, M. 2008. "Acute respiratory health effects of air pollution on children with asthma in US inner cities." *J. Allergy Clin. Immunol.* 121(5):1133-1139.

Office of Management and Budget (OMB). 2010. "2010 Standards for delineating metropolitan and micropolitan statistical areas." *Fed. Reg.* 75 (123):37246-37252

Oller, AR, Oberdörster, G. 2010. "Incorporation of particle size differences between animal studies and human workplace aerosols for deriving exposure limit values." *Regul. Toxicol. Pharmacol.* 57:181-94.

Ostro, B; Lipsett, M; Mann, J; Braxton-Owens, H; White, M. 2001. "Air pollution and exacerbation of asthma in African-American children in Los Angeles." *Epidemiology* 12:200-208.

Ozkaynak, H; Xue, X; Spengler, J; *et al*. 1996. "Personal exposure to airborne particles and metals: Results from the particle team study in Riverside, CA." *J. Expo. Anal. Environ. Epidemiol*. 6:57-78.

Pauluhn, J. 2011. "Subchronic inhalation toxicity of iron oxide (magnetite, Fe(3) O(4)) in rats: Pulmonary toxicity is determined by the particle kinetics typical of poorly soluble particles." *J. Appl. Toxicol.* 32(7):488-504.

Peat, JK; Li, J. 1999. "Reversing the trend: Reducing the prevalence of asthma." *J. Allergy Clin. Immunol.* 103(1):1-10.

Perkins, J; Heilbrun, L; Symanski, E; Coker, A; Eggleston, K. 2009. "A Study to Evaluate the Health Effects of Air Pollution in Bexar County with a Focus on Local Coal and Gas Fired Power Plants." 142p., September.

Peters, A. 2005. "Particulate matter and heart disease: Evidence from epidemiological studies. *Toxicol. Appl. Pharmacol.* 207:S477-S482.

Peters, A; Dockery, DW; Muller, JE; Mittleman, MA. 2001. "Increased particulate air pollution and the triggering of myocardial infarction." *Circulation* 103:2810-2815.

Phalen, RF. 2002. "Chapter 3: Limitations of the epidemiology." In *The Particulate Air Pollution Controversy: A Case Study and Lessons Learned.* (Phalen, RF), Kluwer Academic Publishers, Boston.

Pope, CA; Burnett, RT; Thun, MJ; Calle, EE; Krewski, D; *et al*. 2002. "Lung cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution." *JAMA* 287(9):1132-1141.

Quintana, PJE; Valenzia, JR; Delfino, RJ; Liu, LJS. 2001. "Monitoring of 1-min personal particulate matter exposures in relation to voice-recorded time-activity data." *Environ. Res.* 87:199-213.

Rhomberg, LR; Chandalia, JK; Long, CM; Goodman, JE. 2011. "Measurement error in environmental epidemiology and the shape of exposure-response curves." *Crit. Rev. Toxicol.* 41(8):651-71.

Rohr, AC; Wyzga, RE. 2012. "Attributing health effects to individual particulate matter constituents." *Atmos. Environ.* 62: 130-152.

Sarnat, SE; Coull, BA; Ruiz, PA; Koutrakis, P; Suh, HH. 2006. "The influences of ambient particles composition and size on particle infiltration in Los Angeles, CA, residences." *J. Air Waste Manage. Assoc.* 56:186-196.

Schlesinger, RB; Cassee, F. 2003. "Atmospheric secondary inorganic particulate matter: The toxicological perspective as a basis for health effects risk assessment." *Inhal. Toxicol.* 15(3):197-235.

Schwartz, J; Coull, B; Laden, F; Ryan, L. 2008. "The effect of dose and timing of dose on the association between airborne particles and survival." *Environ. Health Perspect.* 116(1):64-69.

Shaughnessy, RJ; Oatman, L. 1992. "The use of ozone-generators for the control of indoor air contaminants in an occupied environment." Presented to IAQ '91: Healthy Buildings, October 19-21.

Smith, CJ; Fischer, TH; Sears, SB. 2000. "Environmental tobacco smoke, cardiovascular disease, and the nonlinear dose-response hypothesis." *Toxicol. Sci.* 54:462-472.

Spengler, JD; Samet, JM; McCarthy, JF. 2001. *Indoor Air Quality Handbook*. McGraw Hill, New York, NY, 1488p.

Steinemann, AC; MacGregor, IC; Gordon, SM; Gallagher, LG; Davis, AL; Ribeiro, DS; Wallace, LA. 2011. "Fragranced consumer products: Chemicals emitted, ingredients unlisted." *Environ. Impact Assess. Rev.* 31:328-333. doi: 10.1016/j.eiar.2010.08.002.

Stieb, DM; Judek, S; Burnett, RT. 2002. "Meta-analysis of time-series studies of air pollution and mortality: Effects of gases and particles and the influence of cause of death, age, and season." *J. Air Waste Manage. Assoc.* 52:470-484.

Sullivan, J; Sheppard, L; Schreuder, A; Ishikawa, N; Siscovick, D; Kaufman, J. 2005. "Relation between short-term fine particulate matter exposure and onset of myocardial infarction." *Epidemiology* 16:41-48.

Taubes, G. 1995. "Epidemiology faces its limits." *Science* 269:164-169.

Teach, SJ; Crain, EF; Quint, DM; Hylan, ML; Joseph, JG. 2006. "Indoor environmental exposures among children with asthma seen in an urban emergency department." *Pediatrics.* 117(4 Pt 2):S 152-8.

Tuomi, T; Engstrom, B; Niemela, R; Svinhufvud, J; Reijula, K. 2000. "Emission of ozone and organic volatiles from a selection of laser printers and photocopiers." *Appl. Occup. Environ. Hyg*. 15(8):629-634.

Turcotte-Tremblay, AM; Lim, R; Laplante, DP; Kobzik, L; Brunet, A; King, S. 2014. "Prenatal maternal stress predicts childhood asthma in girls: project ice storm." *Biomed Res Int.* 2014:201717. doi: 10.1155/2014/201717.

U.S. EPA, 2003. "Eight-site Source Apportionment of $PM_{2.5}$ Speciation Trends Data." 87p., September. Accessed at http://www.epa.gov/airtrends/specialstudies/8sitesaspectrendsfinal.pdf.

U.S. EPA. 1995. "Ozone Generators in Indoor Air Settings." National Risk Management Research Laboratory, EPA-600/R-95-154. 34p., October.

U.S. EPA. 1996. "Air Quality Criteria for Particulate Matter, Volume I-III (Final)." Environmental Criteria and Assessment Office, Center for Environmental Research Information, EPA/600/P-95/001aF, EPA/600/P-95/001bF, EPA/600/P-95/001cF. April.

U.S. EPA. 1998. "Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units—Final Report to Congress." Office of Air Quality Planning and Standards, EPA-453/R-98-004a. 502p., February.

U.S. EPA. 1999. "The Benefits and Costs of the Clean Air Act 1990 to 2010 - EPA Report to Congress." EPA-410-R-99-001. 146p., November.

U.S. EPA. 2002. "Health Assessment Document for Diesel Engine Exhaust." National Center for Environmental Assessment, Office of Research and Development, EPA/600/8-90/057F.

U.S. EPA. 2005. "Clean Air Interstate Rule Emissions Inventory Technical Support Document." 164p., March 4. Accessed at http://www.epa.gov/cair/pdfs/finaltech01.pdf.

U.S. EPA. 2008. "Integrated Science Assessment for Oxides of Nitrogen." National Center for Environmental Assessment (NCEA) - RTP Division, EPA/600/R-08/071. 260p.

U.S. EPA. 2009. "Integrated Science Assessment for Particulate Matter (Final)." Office of Research and Development, National Center for Environmental Assessment (NCEA) - RTP Division, EPA/600/R-08/139F. 2228p., December.

U.S. EPA. 2011a. "The Benefits and Costs of the Clean Air Act from 1990 to 2020 (Final Report - Rev. A)." Office of Air and Radiation. 238p., April.

U.S. EPA. 2011b. "Policy Assessment for the Review of the Particulate Matter National Ambient Air Quality Standards." Office of Air Quality Planning and Standards, EPA-452/R-11-003. 458p., April.

U.S. EPA. 2011c. "Supplement to the Non-Hg Case Study Chronic Inhalation Risk Assessment In Support of the Appropriate and Necessary Finding for Coal- and Oil-Fired Electric Generating Units." EPA-452/R-11-013. November.

U.S. EPA. 2013a. "Integrated Science Assessment for Oxides of Nitrogen–Health Criteria (First External Review Draft)." National Center for Environmental Assessment (NCEA), EPA/600/R-13/202. 878p. Accessed at http://www.epa.gov/ncea/isa

U.S. EPA. 2013b. "Integrated Science Assessment for Ozone and Related Photochemical Oxidants (Final)." National Center for Environmental Assessment (NCEA), EPA/600/R–10/076F. 1251p.

U.S. EPA. 2015. "The Green Book Nonattainment Areas of Criteria Pollutants [website]." Accessed at http://www.epa.gov/oaqps001/greenbk/map8hr_2008.html.

Utell, MJ; Morrow, PE; Speers, DM; Darling, J; Hyde, RW. 1983. "Airway responses to sulfate and sulfuric acid aerosols in asthmatics." *Am. Rev. Respir. Dis.* 128:444-450.

Valberg, PA. 2004. "Is PM more toxic than the sum of its parts? Risk-assessment toxicity factors versus PM-mortality 'effect functions'." *Inhal. Toxicol.* 16(Suppl. 1):19-29.

Valberg, PA; Bruch, J; McCunney, RJ. 2009. "Are rat results from intratracheal instillation of 19 granular dusts a reliable basis for predicting cancer risk?" *Regul. Toxicol. Pharmacol.* 54(1):72-83.

Valberg, PA; Crouch, EAC. 1999. "Meta analysis of rat lung tumors from lifetime inhalation of diesel exhaust." *Environ. Health Perspect.* 107:693-699.

Valberg, PA; Watson, AY. 1998. "Alternative hypotheses for PM associations with daily mortality and morbidity." *Inhal. Toxicol.* 10:641-662.

Vedal S, Dutton SJ. 2006. "Wildfire air pollution and daily mortality in a large urban area." *Environ Research* 102:29-35.

Vedal, S; Petkau, J; White, R; Blair, J. 1998. "Acute effects of ambient inhalable particles in asthmatic and non-asthmatic children." *Am. J. Respir. Crit. Care Med.* 157:1034-1043.

Wallace, L; Williams, R. 2005. "Use of personal-indoor-outdoor sulfur concentrations to estimate the infiltration factor and outdoor exposure factor for individual homes and persons." *Environ. Sci. Technol.* 39:1707-1714.

Wallace, LA; Emmerich, SJ; Howard-Reed, C. 2004. "Source strengths of ultrafine and fine particles due to cooking with a gas stove." *Environ. Sci. Technol.* 38:2304-2311.

Wang, G; Hopke, P; Fu, G. 2009. "Identification of major sources of PM2.5 in St. Louis Missouri USA." *J. Ocean Univ. China* 8(2):101-110. doi: 10.1007/s11802-009-0101-1.

Waring, MS; Siegel, JA. 2011. "The effect of an ion generator on indoor air quality in a residential room." *Indoor Air* 21(4):267-76.

Weschler, CJ. 2000. "Ozone in indoor environments: Concentration and chemistry." *Indoor Air* 10:269-288.

Williams, R. 2005. "What Is The Relationship Between Personal Exposure And Ambient Fixed Site Measurements?" Poster available at:
http://www.epa.gov/nheerl/download_files/posters/S1_001_Williams_PM_BOSC05.pdf

Zeger, SL; Dominici, F; McDermott, A; Samet, JM. 2008. "Mortality in the Medicare population and chronic exposure to fine particulate air pollution in urban centers (2000-2005)." *Environ. Health Perspect.* 116:1614-1619.

DELCARATION OF MICHAEL G. MUELLER

1. I, Michael G. Mueller, make this declaration based on my personal knowledge, and if sworn in as a witness, I could testify competently to the following facts.

2. I am the Vice President of Energy Management and Trading of Ameren Missouri. As part of my responsibilities, my department is responsible for procuring coal and rail transportation on behalf of Ameen Missouri's generation fleet. I describe aspects of a coal supply contract ("the Peabody Agreement") below.

3. On August 4, 2011, Union Electric Company d/b/a Ameren Missouri announced that it had entered into a long-term coal supply contract with Peabody Energy to purchase low sulfur coal through 2017.

4. The low sulfur coal contract is part of Ameren Missouri's compliance strategy to meet emission targets required by the Cross State Air Pollution Rule.

5. Under the terms of the coal supply agreement, Peabody must provide coal to Ameren Missouri's energy centers, including Rush Island, Labadie and Meramec with sulfur content below a designated level. While the commercial terms of the agreement are confidential, SO2 emissions from Rush Island, Meramec and Labadie have consistently been below .50 lb/mm BTU as a result of coal procured under the Peabody Agreement.

6. The initial term of the contract concludes on December 31, 2017, the agreement allows for an additional extension of three (3) years through December 31, 2020.

7. Copies of media releases from Ameren Corporation and Peabody Energy regarding the coal supply contract are appended to this declaration.

Executed on June 29, 2015.

Michael G. Mueller

Subscribed and sworn to before me
on this 29th day of June, 2015.

Notary Public
My Commission Expires: 11-2-17

CARLETTA GIESLER
Notary Public - Notary Seal
State of Missouri
Commissioned for Ste. Genevieve County
My Commission Expires: November 02, 2017
Commission Number: 13401289

Ameren MISSOURI

1901 Chouteau Avenue : St. Louis, MO 63103 : AmerenMissouri.com

Contact Rita Holmes-Bobo
Media Hotline 314.554.2182

For Immediate Release

Ameren Missouri Announces Proactive, Cost-Effective Environmental Compliance Strategy

Customer benefits are estimated to result in avoided electric rate increases of 15-20 percent by 2017

St. Louis, MO, Aug. 4, 2011 — Today Ameren Missouri announced its environmental compliance strategy to meet a new stringent federal rule that requires significant reductions in sulfur dioxide (SO_2) emissions. The backbone of the strategy is a long-term contract for the purchase of 91 million tons of ultra-low sulfur coal from Peabody Energy through 2017.

The new federal regulation, the Cross State Air Pollution Rule, will require reductions of SO_2 emissions by 73 percent and nitrogen oxide emissions by 54 percent from 2005 levels.

"This agreement reflects a proactive business strategy to comply with recently issued federal environmental regulations at significantly lower costs for our customers. In particular, this contract will allow us to avoid significant levels of environmental expenditures by 2014 as well as defer the installation of costly clean air filtration equipment well beyond 2017 to meet the federal government's new stringent standards for sulfur dioxide emissions reductions. In total, this strategy will avoid rate increases that would have been necessary just to meet the SO_2 reduction requirements – those would have been in the range of 15 to 20 percent by 2017 for our customers," says Warner Baxter, Ameren Missouri President and CEO.

"The contract represents a major commitment between the largest Powder River Basin producer and the largest Powder River Basin customer," said Peabody Chairman and Chief Executive Officer Gregory H. Boyce. "This contract is a win-win for Ameren and

Peabody, reinforcing the strong relationship between our companies and the growing market for low sulfur Powder River Basin coal."

Baxter added, "For many years, we have anticipated that more stringent rules would be coming and have been taking proactive steps to mitigate the impact on our operations and customers."

A key component of that strategy was the installation of $600 million of clean air filtration equipment, also known as scrubbers, which eliminate nearly 100 percent of all sulfur dioxide emissions from Ameren Missouri's Sioux Plant. Installation of this equipment provided the flexibility to employ the ultra-low sulfur coal compliance strategy that will result in significant customer benefits.

"The bottom line is that this strategy is a win-win for our customers, the environment and the state's economy," said Baxter, "With this approach, we will produce cleaner air, reduce the impact of stringent environmental standards on our customers, strengthen our state's energy and economic future, and enter into a long-term contract with one of Missouri's leading companies---Peabody Energy."

Baxter said that while there will still be significant cost savings from this strategy, environmental compliance costs will continue to rise from current cost levels under the recently issued regulations. In addition, the U.S. Environmental Protection Agency is considering additional regulations for air quality, coal ash and water. These new regulations mean compliance costs are likely to rise even more in the future as final regulations are issued.

This contract is another step in Ameren's long history of aggressively reducing emissions. Since 1990, Ameren Missouri has reduced mass emissions of sulfur dioxide (SO_2) by 62 percent and mass emissions of nitrogen oxide (NOx) by 75 percent.

# # #

Ameren Missouri has been providing electric and gas service for more than a century, and our electric rates are among the lowest in the nation. We serve 1.2 million electric and 126,000 natural gas customers in central and eastern Missouri. Our mission is to meet their energy needs in a safe, reliable, efficient and environmentally responsible manner. Our service area covers 63 counties and more than 500 towns, including the greater St. Louis area. For more information, visit AmerenMissouri.com.

PEABODY ENERGY
News Release

CONTACT:
Meg Gallagher
(314) 342-7963

Confidential: Not for Immediate Release

FOR IMMEDIATE RELEASE
Aug. 4, 2011

PEABODY ENERGY (NYSE: BTU) AND AMEREN SIGN CONTRACT FOR 91 MILLION TONS OF POWDER RIVER BASIN COAL

ST. LOUIS, Aug. 4 – Peabody Energy (NYSE: BTU) and Ameren Corporation (NYSE: AEE) have entered into an agreement to provide 91 million tons of low sulfur coal to serve multiple electricity generating plants in Missouri through 2017.

Peabody will source multiple products from its Powder River Basin operations in Wyoming to serve contract terms that would continue a minimum of six years, with opportunities for extension.

"The contract represents a major commitment between the largest Powder River Basin producer and the largest Powder River Basin customer," said Peabody Chairman and Chief Executive Officer Gregory H. Boyce. "This contract is a win-win for Ameren and Peabody, reinforcing the strong relationship between our companies and the growing market for low sulfur Powder River Basin coal."

"The bottom line is that this strategy is great for our customers, the environment and the state's economy," said Warner L. Baxter, President and Chief Executive Officer of Ameren Missouri. "With this approach, we will produce cleaner air, reduce the impact of stringent environmental standards on our customers, strengthen our state's energy and economic future, and enter into a long-term contract with the leading coal company – Peabody Energy."

Ameren Missouri has been providing electric and gas service for more than a century, and the company's electric rates are among the lowest in the nation. Ameren Missouri serves 1.2 million electric and 126,000 natural gas customers in central and eastern Missouri. Its mission is to meet customers' energy needs in a safe, reliable, efficient and environmentally responsible manner. Ameren Missouri's service area covers 63 counties and more than 500 towns, including the greater St. Louis area.

Peabody Energy (NYSE: BTU) is the world's largest private-sector coal company and a global leader in clean coal solutions. With 2010 sales of 246 million tons and nearly $7 billion in revenues, Peabody fuels 10 percent of U.S. power and 2 percent of worldwide electricity.

-End-

Certain statements in this press release are forward-looking as defined in the Private Securities Litigation Reform Act of 1995. These statements involve certain risks and uncertainties that may cause actual results to differ materially from expectations as of the date of this release. For detailed risk factors, please refer to the company's filings with the U.S. Securities and Exchange Commission. These factors are difficult to accurately predict and may be beyond the control of the company.

Environment

Submitted to:
Schiff Hardin, LLP
Chicago, Illinois

Submitted by:
AECOM
Chelmsford, MA
60344380.100
September 2015

Characterization of 1-Hour SO_2 Concentrations in the Vicinity of the Labadie Energy Center

AECOM Environment
September 2015
Document No.: 60344380.100

AECOM Environment

Submitted to:
Schiff Hardin, LLP
Chicago, Illinois

Submitted by:
AECOM
Chelmsford, MA
60344380.100
September 2015

Characterization of 1-Hour SO_2 Concentrations in the Vicinity of the Labadie Energy Center

Prepared By: Mary Kaplan

Reviewed By: Robert Paine

Contents

1.0 Introduction 1-3

1.1 Report Organization 1-3

2.0 Description of Modeled Emission Sources 2-1

2.1 Labadie Energy Center 2-1

2.2 Regional Background 2-1

3.0 Dispersion Modeling Approach 3-1

3.1 Good Engineering Practice Stack Height Analysis 3-1

3.2 Dispersion Environment 3-2

3.3 Model Receptor Grid and Terrain 3-2

3.4 Meteorological Data Processing 3-2

3.5 Emissions and Stack Parameters 3-2

4.0 AERMOD Modeling Results 4-1

Appendix A Alternative Model Justification for Low Wind Speed Options (AERMET ADJ_U* and AERMOD LOWWIND3, Version 15181)

Appendix B Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases

Appendix C Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases with AERMET ADJ_U* and AERMOD LOWWIND3 Options

Appendix D Comparison of Wind Roses from Jefferson City and Spirit of St. Louis Airports to Historical Tall-Tower Labadie Meteorological Data

List of Tables

Table 4-1: AERMOD Modeled Design SO_2 Concentration Results 4-1

List of Figures

Figure 1-1 Topographical Map Showing Labadie Site Location 1-4
Figure 2-1: Labadie Energy Center Photograph 2-1
Figure 2-2: SO_2 Background Sources Included in Modeling..... 2-3
Figure 2-3 Nilwood Monitor Location with Respect to Labadie Energy Center..... 2-4
Figure 2-4: 2012-2014 3-year Average of Maximum Concentration by Season and Hour of Day at Nilwood SO_2 Monitor..... 2-5
Figure 3-2: Labadie Modeling Receptor Grid – Far Field..... 3-3
Figure 3-3: Labadie Modeling Receptor Grid – Near Field 3-4
Figure 3-4: Location of Meteorological Stations Relative to Labadie Energy Center..... 3-5
Figure 3-5: Jefferson City Wind Rose (2012-2014)..... 3-6
Figure 3-6: Spirit of St. Louis Wind Rose (2012-2014)..... 3-7
Figure 4-1: 99th percentile 3-year average 1-hour SO_2 Concentration Isopleths with Default Option 4-2

1.0 Introduction

The United States Environmental Protection Agency (EPA) is implementing the 2010 1-hour SO_2 National Ambient Air Quality Standard (NAAQS)[1] in an approach that involves either a dispersion modeling or monitoring approach to characterize local SO_2 concentrations near isolated emission sources. On March 20, 2015, EPA informed affected states that certain emission sources within their states will be addressed in an expedited[2] round of designations under the 1-hour SO_2 NAAQS due to terms of the SO_2 Consent Decree negotiated between the Sierra Club and EPA. The EPA intends to designate the affected areas as either unclassifiable/attainment, nonattainment or unclassifiable by July 2, 2016 after a review of available modeling or monitoring data to support the SO_2 concentration characterizations. Before then, the states need to recommend designations by September 18, 2015 and the EPA will review these recommendations and issue their comments on these recommendations to the states by January 22, 2016. After a public comment period on the state recommendations and EPA comments ending March 4, 2016 and final input from the states by April 8, 2016, EPA will issue their final designation findings by July 2, 2016.

One of the affected sources is the Labadie Energy Center, located about 50 kilometers west of St. Louis, along the Missouri River (see Figure 1-1 for a map showing the source location and terrain in the vicinity). The purpose of this report is to provide information to the Missouri Department of Natural Resources (MDNR) regarding the results of a dispersion modeling characterization of SO_2 concentrations around Labadie. The plant's 700-ft (213-m) stacks are well above the surrounding terrain (less than 120 m of relief), so that any dispersion modeling application involves simple terrain. As this report describes, the dispersion modeling analysis was conducted using both the current regulatory defaults and using proposed EPA changes to the preferred modeling approaches.

1.1 Report Organization

Section 2 of this report describes the Labadie Energy Center and the other sources modeled. This section also describes the source of regional monitoring data that is used to represent distant source impacts. Section 3 describes the dispersion model approaches used in this study: the current default AERMOD modeling approach as well as the use of EPA-proposed low wind improvements to AERMOD. Justification for the use of the low wind improvements is provided in appendices to the report. Section 4 of the report describes the modeling results, and indicates that with modeling conducted in accordance with the Modeling Technical Assistance Document[3], the characterization of SO_2 concentrations results in a finding of NAAQS attainment. Appendices A, B, and C provide documentation for an interim use of the low wind options as a non-default model. Appendix D compares Jefferson City and Spirit of St. Louis airport data to historical tall-tower meteorological data taken near Labadie.

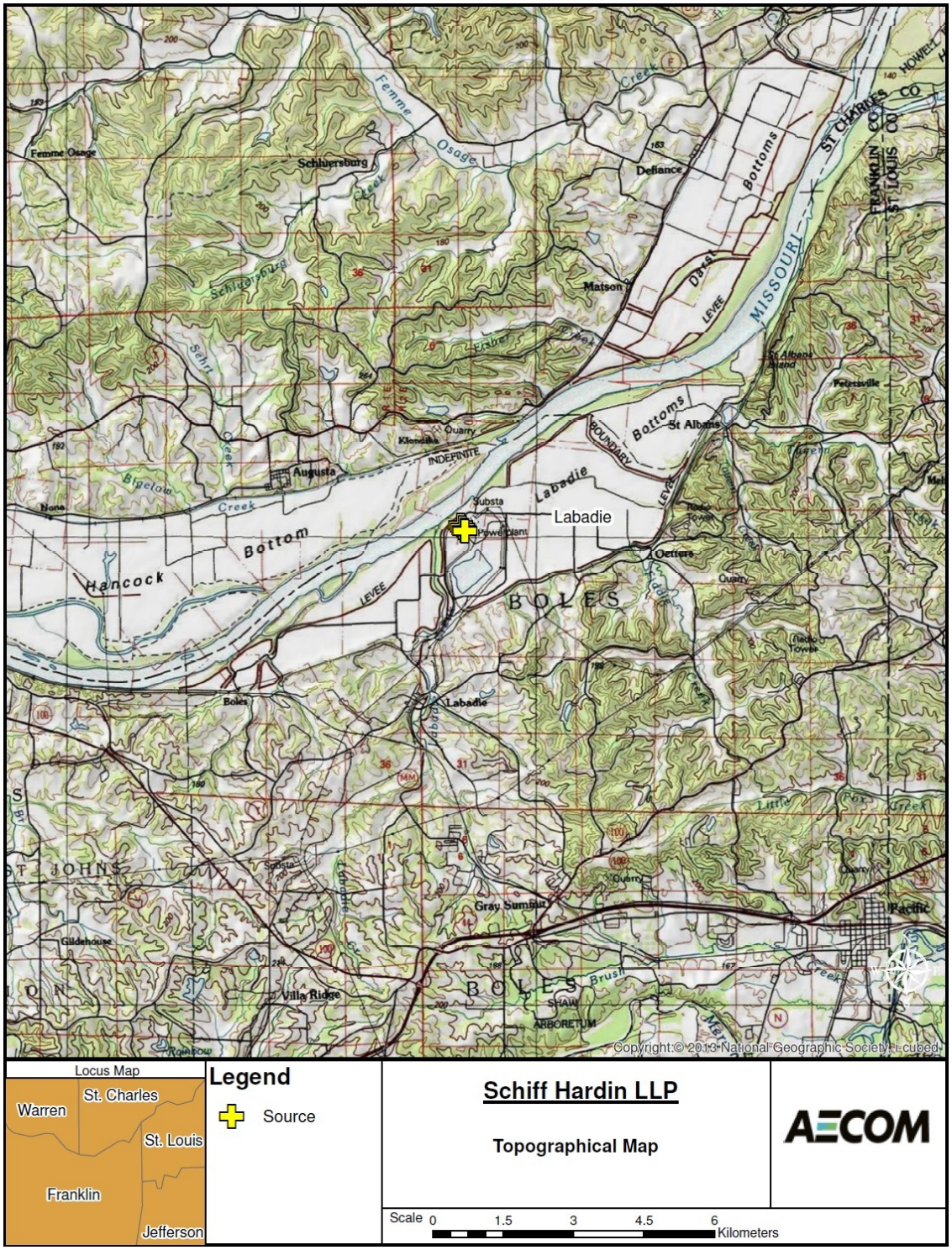
---

[1] 75 FR 35571 is the final rule for the 2010 SO_2 NAAQS.

[2] Information on the "SO_2 Consent Decree" is available at http://www.epa.gov/so2designations/data.html.

[3] http://www.epa.gov/airquality/sulfurdioxide/pdfs/SO2ModelingTAD.pdf.

Figure 1-1 Topographical Map Showing Labadie Site Location



2.0 Description of Modeled Emission Sources

2.1 Labadie Energy Center

Labadie Energy Center is a 2,407-megawatt coal-fired power plant located in Labadie, Missouri. The station operates four boilers exhausting through three 213-meter tall stacks (Units 3 and 4 emit from a dual-flue stack), as shown in Figure 2-1. The area surrounding Labadie is considered rural with mostly simple terrain out to approximately 50 km from the facility.

Figure 2-1: Labadie Energy Center Photograph

Credit: St. Louis Post-Dispatch; see http://www.stltoday.com/news/opinion/columns/the-platform/labadie-power-plant/image_740dccb2-a72b-11df-ac73-00127992bc8b.html.

2.2 Regional Background

According to the EPA March 1, 2011 Memorandum[4] and the analysis presented at the 2011 EPA modeling workshop[5], selection of regional background sources should be limited to 10 kilometers from the source location. Figure 2-2 shows the 10-km radius circle around Labadie Energy Center and two

[4] http://www.epa.gov/scram001/guidance/clarification/Additional_Clarifications_AppendixW_Hourly-NO2-NAAQS_FINAL_03-01-2011.pdf

[5] Page 5 http://www.cleanairinfo.com/regionalstatelocalmodelingworkshop/archive/2011/Presentations/6-Thursday_AM/6-3_AB-3_Presentation_at_EPA_Modeling_Workshop.pdf

small SO_2 emission sources that emit less than 1 TPY that MDNR considered in this review. The nearest large SO_2 sources are more than 28 km away, which would place them at a distance for which a uniform background influence would be expected. Therefore, these more distant sources would not be expected to interact with Labadie to cause a significant concentration gradient near Labadie. The total concentration for 1-hour SO_2 NAAQS compliance was computed by adding the modeled concentration to the regional background concentrations from the Nilwood, Illinois monitor, shown in Figure 2-3.

The background concentration was calculated as a 3-year (2012-2014) average of the maximum concentration by season and hour-of-day and added internally in AERMOD to the AERMOD-predicted concentration for comparison with the 1-hour SO_2 National Ambient Air Quality Standard (NAAQS) of 196.5 $\mu g/m^3$. The Nilwood seasonal SO_2 concentrations are displayed in Figure 2-4. Previous modeling by MDNR used a constant background value of 9 ppb derived from data collected at the East St. Louis, Illinois SO_2 monitor. MDNR excluded data from a large sector based on a wind trajectory analysis to avoid double counting of modeled sources. In this case, where Labadie is in a rural area with no other nearby sources, using background data from an urban monitor such as East St. Louis is conservative. The Nilwood monitor is located in a rural area of Illinois, similar to that of Labadie.

Figure 2-2: SO_2 Background Sources Included in Modeling

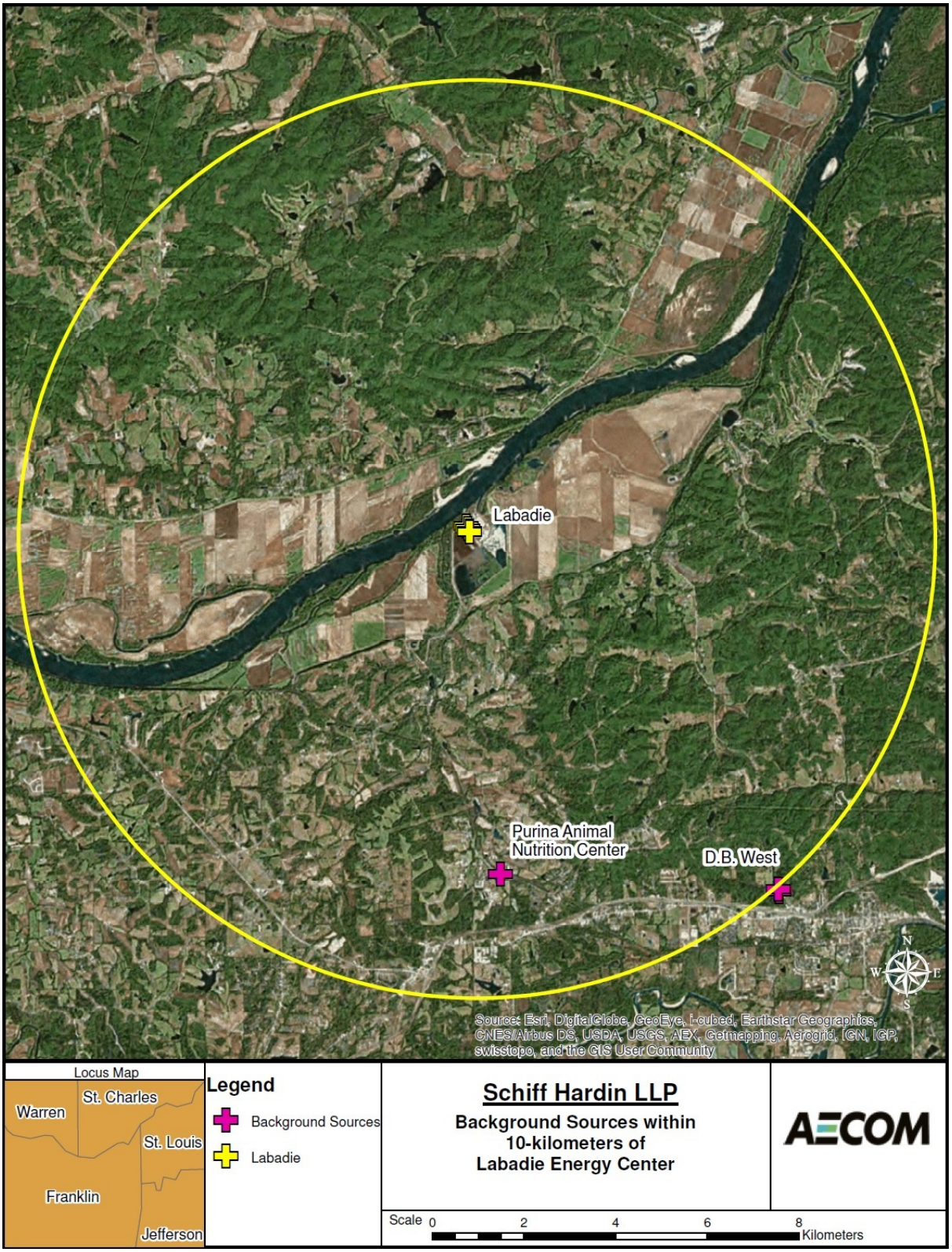


Figure 2-3 Nilwood Monitor Location with Respect to Labadie Energy Center

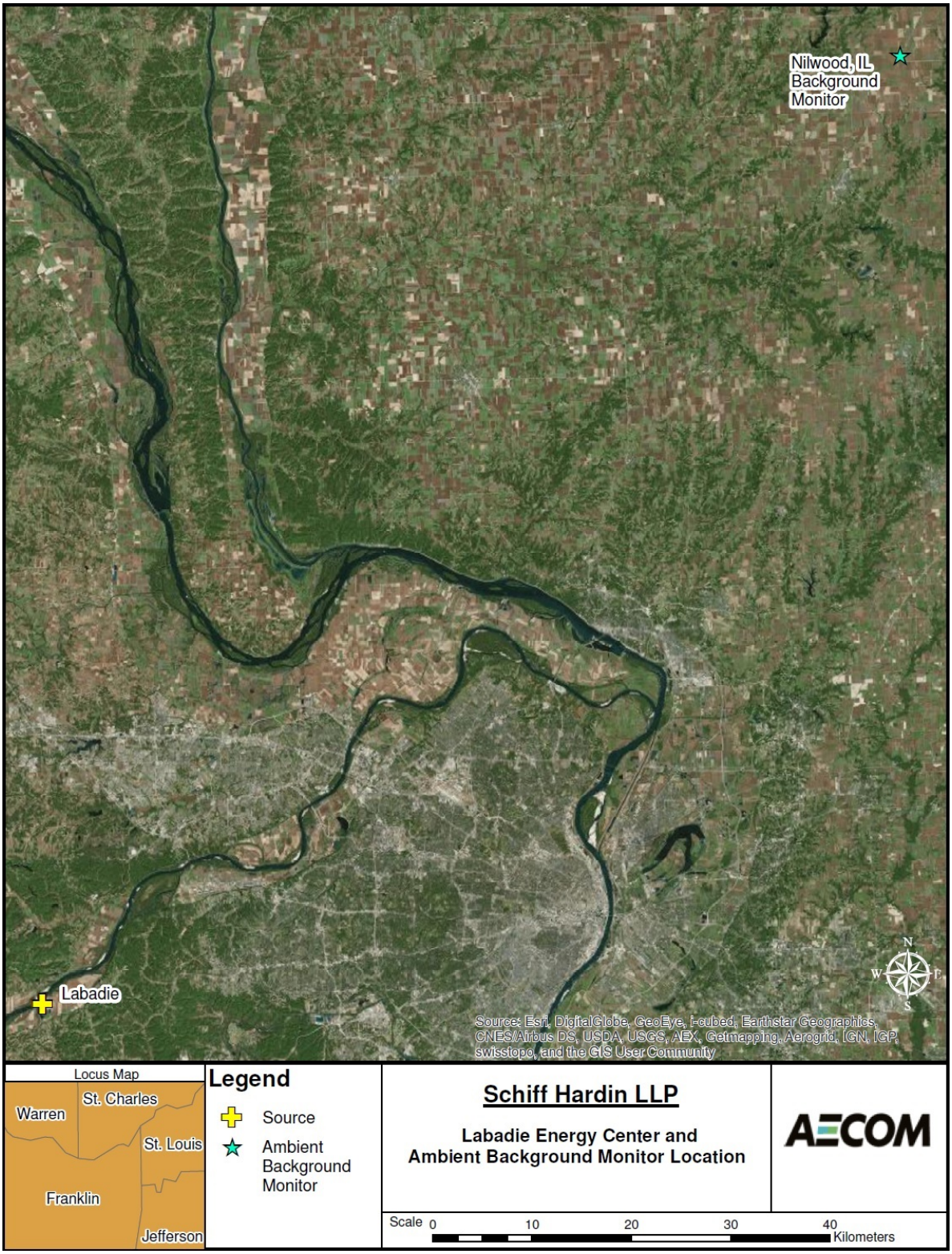
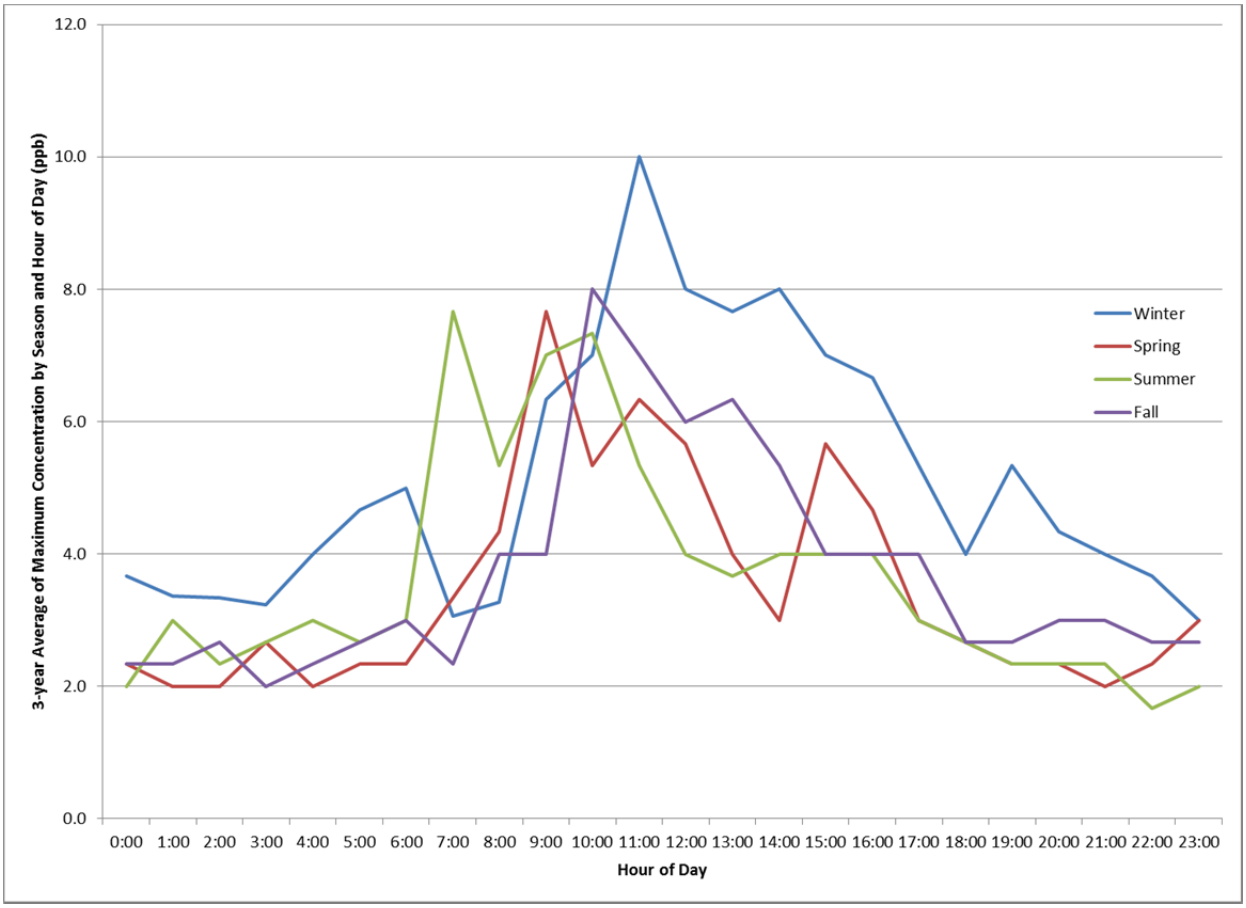


Figure 2-4: 2012-2014 3-year Average of Maximum Concentration by Season and Hour of Day at Nilwood SO_2 Monitor



3.0 Dispersion Modeling Approach

The suitability of an air quality dispersion model for a particular application is dependent upon several factors. The following selection criteria have been evaluated:

- stack height relative to nearby structures;
- dispersion environment;
- local terrain; and
- representative meteorological data.

The US EPA Guideline on Air Quality Models (Appendix W[6]) prescribes a set of approved models for regulatory applications for a wide range of source types and dispersion environments. Based on a review of the factors discussed below, the latest version of AERMOD (15181) was used to assess air quality impacts for the Labadie Energy Center. Previous modeling by MDNR used the previous version of AERMOD (version 14134). AERMOD version 15181 has "bug fixes" included that correct some errors in version 14134, so we have used the most recent version in this modeling.

In a proposed rulemaking published in the July 29, 2015 Federal Register (80 FR 45340), the United States Environmental Protection Agency (EPA) released a revised version of AERMOD (15181), which replaces the previous version of AERMOD dated 14134. EPA proposed refinements to its preferred short-range model, AERMOD, involving low wind conditions. These refinements involve an adjustment to the computation of the friction velocity ("ADJ_U*") in the AERMET meteorological pre-processor and a higher minimum lateral wind speed standard deviation, sigma-v (σ_v), as incorporated into the "LOWWIND3" option. The proposal indicates that "the LOWWIND3 BETA option increases the minimum value of sigma-v from 0.2 to 0.3 m/s, uses the FASTALL approach to replicate the centerline concentration accounting for horizontal meander, but utilizes an effective sigma-y and eliminates upwind dispersion".[7]

As this report describes, the dispersion modeling analysis was conducted using both the current regulatory defaults and using proposed EPA changes to the preferred modeling approaches with beta ADJ_U* and LOWWIND3 option. Documentation for an interim use of the low wind options as a non-default model are provided in Appendices A, B, and C. However, consistent with the EPA Appendix W, we anticipate that these proposed options will be promulgated as default options prior to the July 2, 2016 Consent Decree designation deadline, and therefore should be considered as more appropriate technical options to use at this time.

3.1 Good Engineering Practice Stack Height Analysis

Good engineering practice (GEP) stack height is defined as the stack height necessary to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant as a result of

---

[6] http://www.epa.gov/ttn/scram/guidance/guide/appw_05.pdf

[7] Addendum User's Guide for the AMS/EPA Regulatory Model – AERMOD http://www.epa.gov/ttn/scram/models/aermod/aermod_userguide.zip

atmospheric downwash, wakes, or eddy effects created by the source, nearby structures, or terrain features. AECOM used the BPIP downwash parameters provided by MDNR in their modeling files.

3.2 Dispersion Environment

The application of AERMOD requires characterization of the local (within 3 kilometers) dispersion environment as either urban or rural, based on a US EPA-recommended procedure that characterizes an area by prevalent land use. This land use approach classifies an area according to 12 land use types. In this scheme, areas of industrial, commercial, and compact residential land use are designated urban. According to US EPA modeling guidelines, if more than 50% of an area within a 3-km radius of the facility is classified as rural, then rural dispersion coefficients are to be used in the dispersion modeling analysis. Conversely, if more than 50% of the area is urban, urban dispersion coefficients are used. As shown in Figure 1-1, the 3-km area surrounding Labadie Energy Center is rural. Therefore, rural dispersion was assumed.

3.3 Model Receptor Grid and Terrain

AECOM used the same receptor grid that MDNR used in their 1-hour SO_2 modeling. Figures 3-1 and 3-2 show the receptor network used in this analysis.

3.4 Meteorological Data Processing

MDNR conducted an analysis to determine the most appropriate meteorological station for use in the 1-hour SO_2 modeling. Another nearby station, the Spirit of St. Louis airport in Chesterfield, was considered. Although this station is closer to Labadie and in an area along the Missouri River with a similar orientation, MDNR chose the Jefferson City airport due to land use similarities. It is also evident from a comparison to historical tall-tower data taken near Labadie that the Jefferson City airport wind pattern is more representative Labadie stack-top winds than the Spirit of St. Louis wind pattern is (see Appendix D). For a sensitivity study, AECOM used the Jefferson City and the Spirit of St. Louis airports in this modeling analysis and found that the Jefferson City modeled results were slightly higher than the Spirit of St. Louis airport results. Therefore, we reported results for the Jefferson City data.

Figure 3-3 shows the locations of the meteorological stations mentioned above in relation to the Labadie Energy Center. Figures 3-4 and 3-5 show the 3-year wind rose for each station considered in the analysis.

3.5 Emissions and Stack Parameters

Schiff Hardin provided AECOM with the latest three years (2012-2014) of hourly SO_2 emissions and hourly stack exhaust parameters for Labadie Energy Center. AECOM reviewed the hourly emission data for this period. For modeling purposes, from the data provided, we created a 3-year (2012-2014) hourly emissions, exit velocity, and temperature file.

Table 3-1 Labadie Stack Locations and 100% Load Exhaust Parameters

Unit	X (UTM83)	Y (UTM83)	Stack Height (m)	Exit Velocity (m/s)	Temperature (K)	Diameter (m)
1	688352.17	4270445.59	213.36	34.72	443.06	6.25
2	688387.01	4270400.40	213.36	35.56	442.49	6.25
3 & 4	688435.47	4270332.33	213.36	34.95	441.71	8.84(1)
(1) Equivalent diameter for merged flues						

Figure 3-1: Labadie Modeling Receptor Grid – Far Field

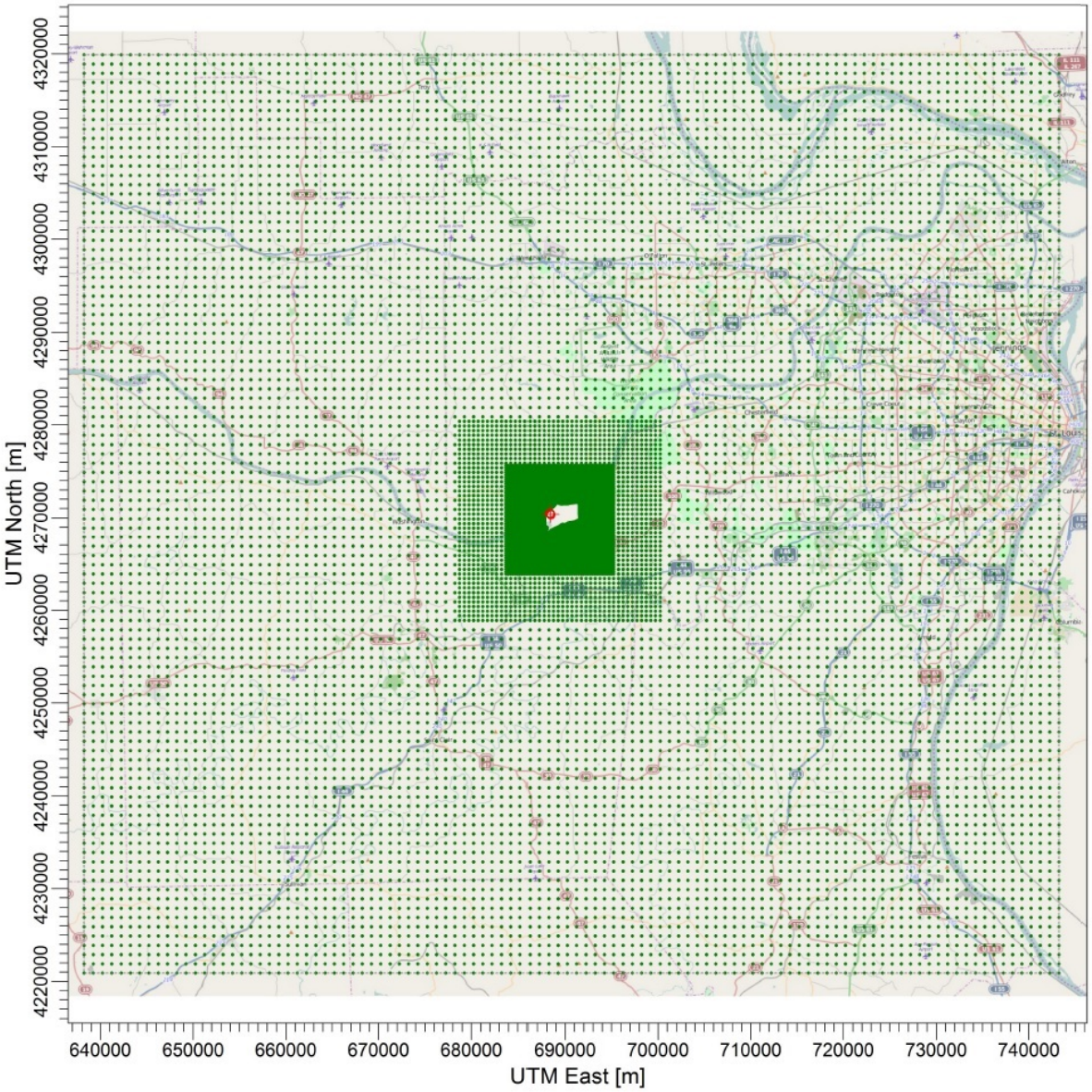


Figure 3-2: Labadie Modeling Receptor Grid – Near Field

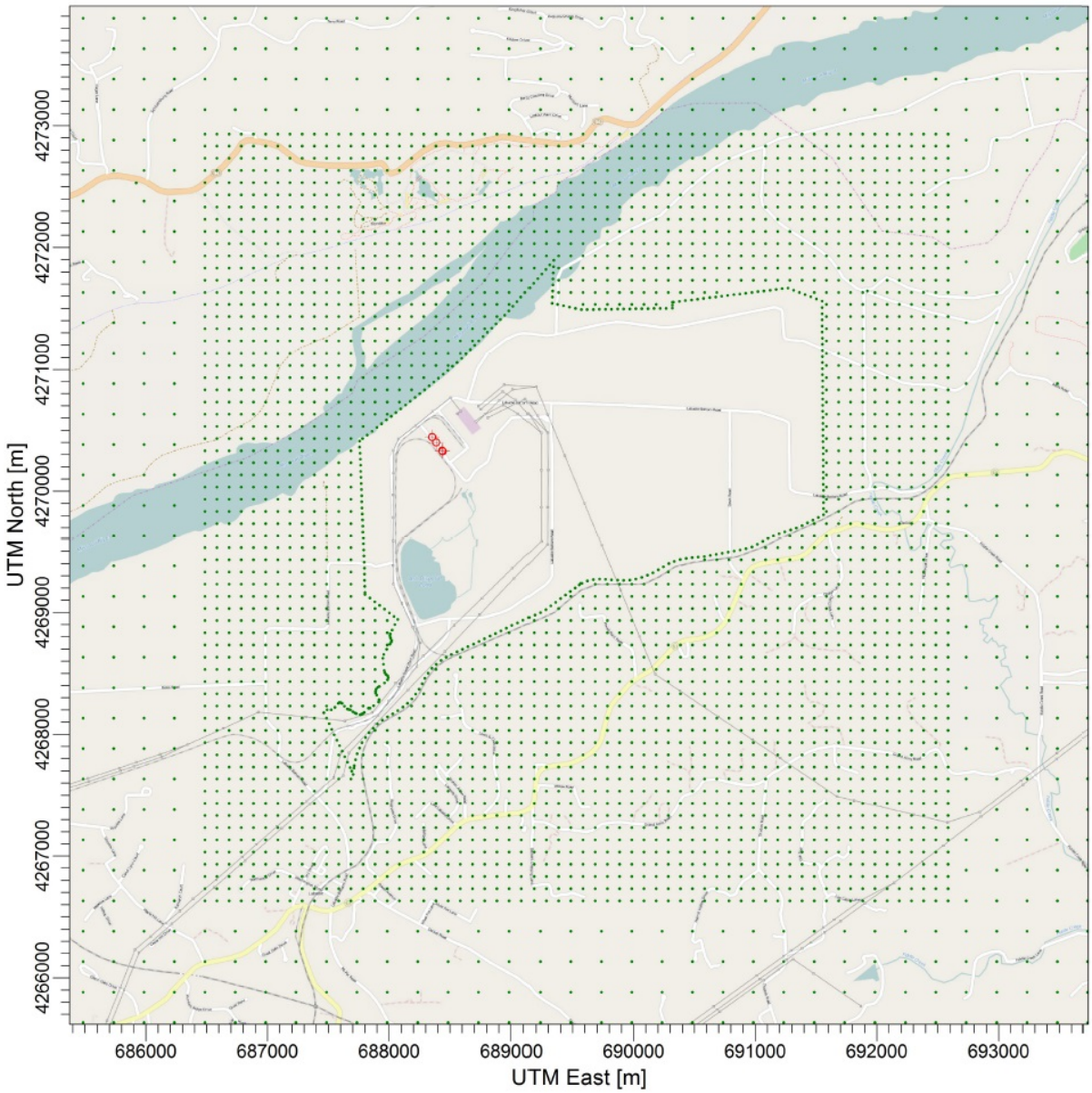


Figure 3-3: Location of Meteorological Stations Relative to Labadie Energy Center

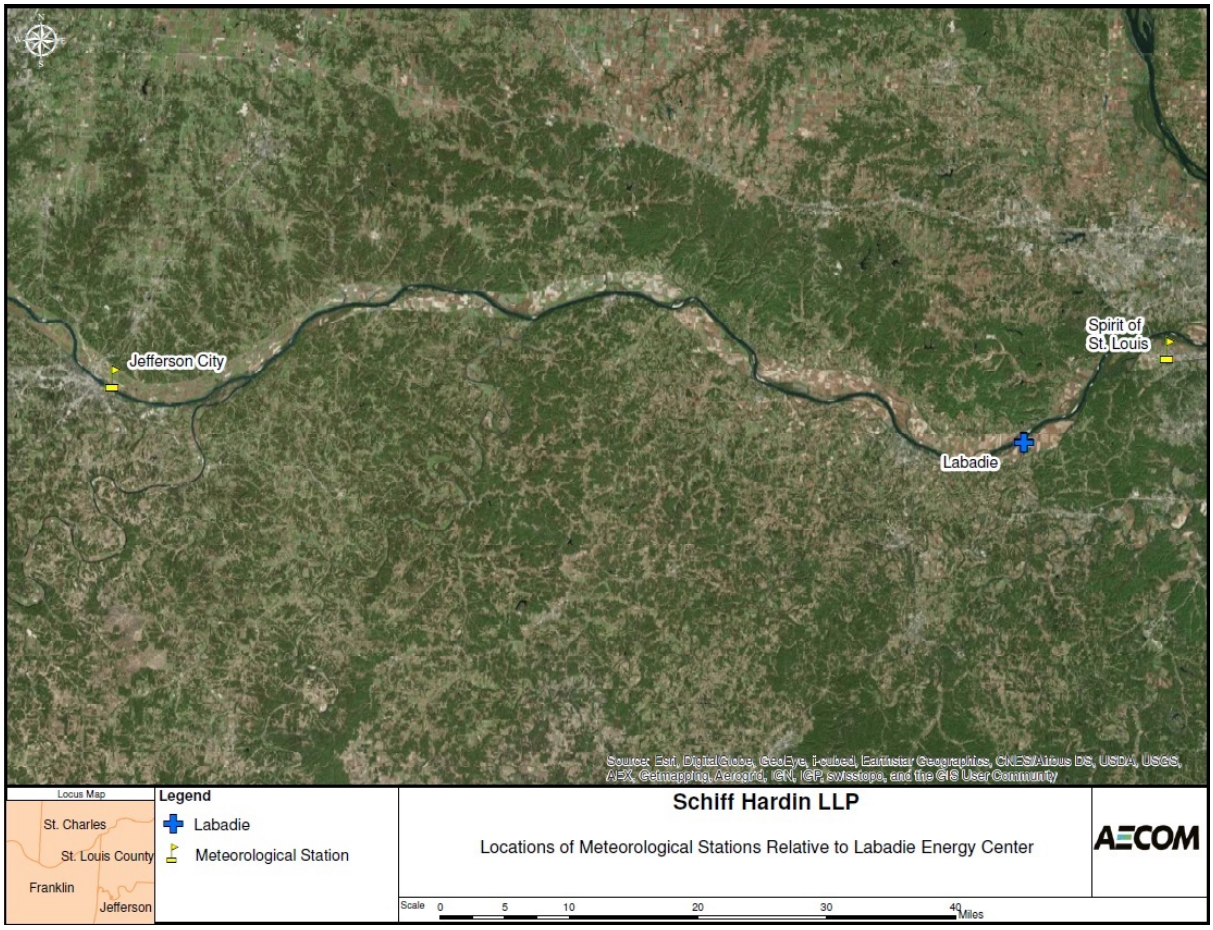


Figure 3-4: Jefferson City Wind Rose (2012-2014)

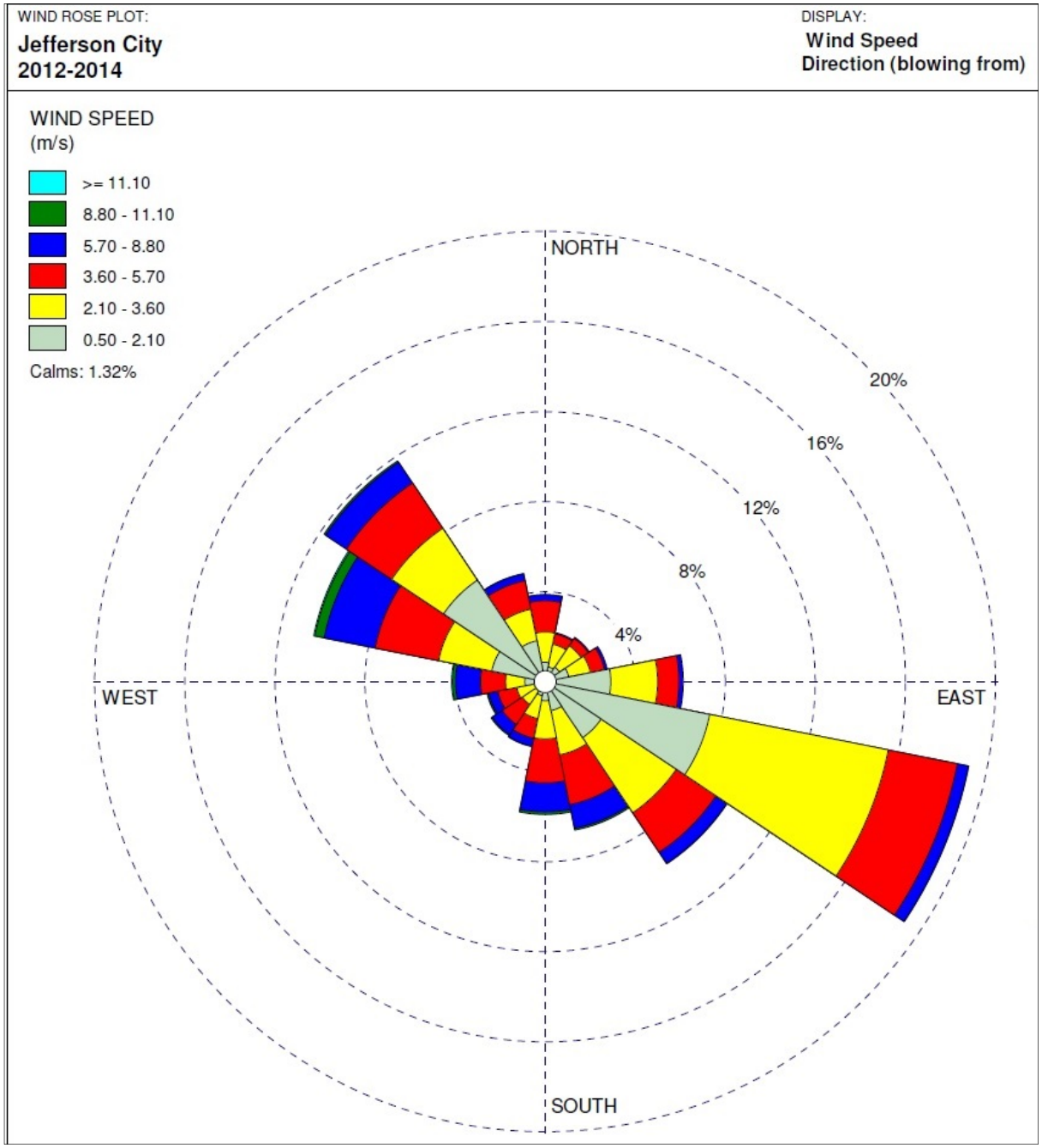
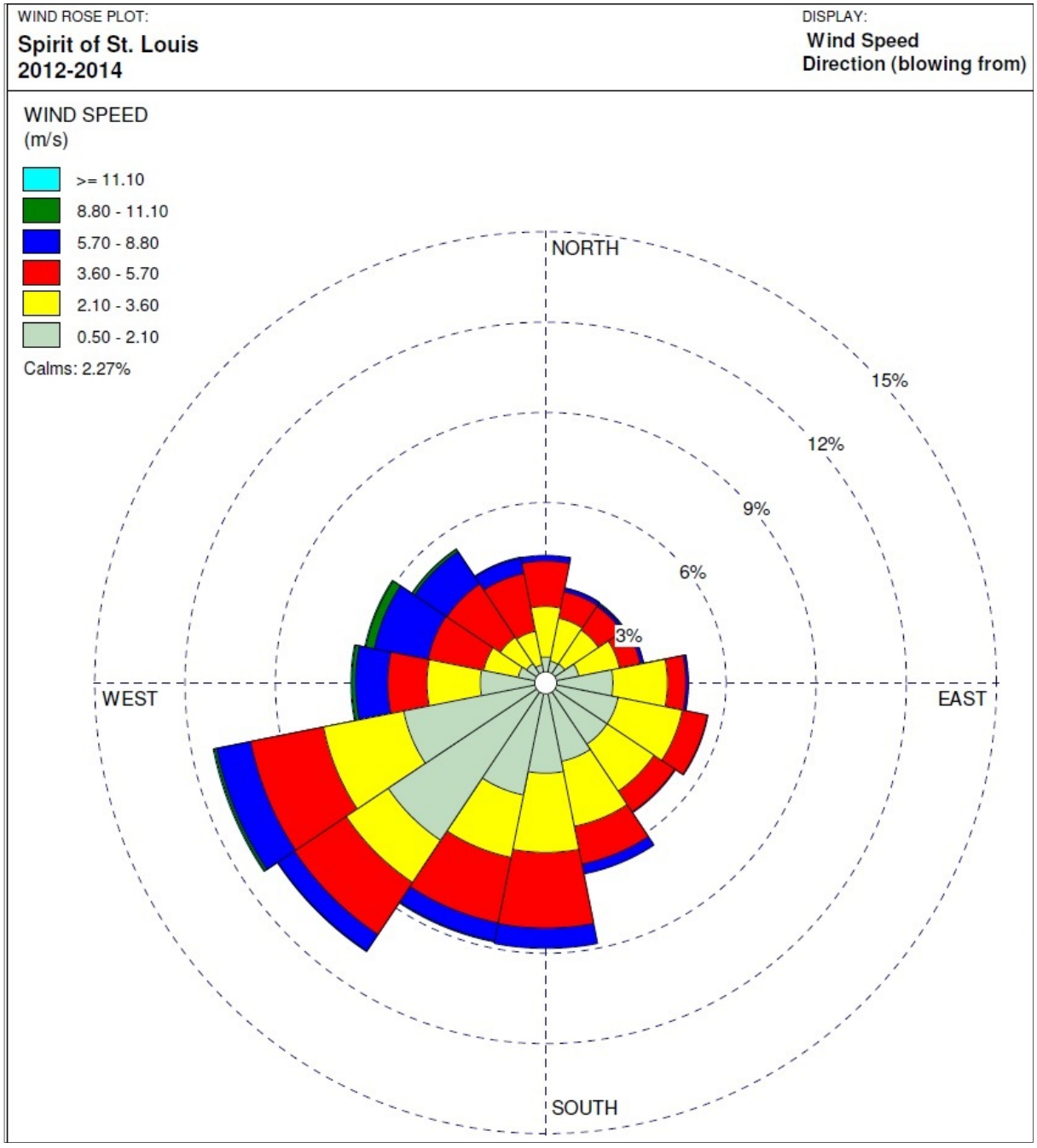


Figure 3-5: Spirit of St. Louis Wind Rose (2012-2014)



4.0 AERMOD Modeling Results

The modeling results of 99th percentile peak daily 1-hour maximum concentrations averaged over the 3 years modeled are presented in Table 4-1. The modeling was conducted with the EPA default option and beta ADJ_U* with LOWWIND3 options. The concentration isopleths for the ADJ_U* and LOWWIND3 options are plotted in Figure 4-1. Peak impacts from Labadie Energy Center occur in about 2 kilometers to the northwest, near the NW monitor installed in 2015.

An analysis of the AERMOD output in a debugging mode indicates that the meteorological and plume conditions associated with the controlling modeled impacts are due to a penetrated plume in convective conditions with a low mixing height. This feature and the tendency of AERMOD to over-predict in these cases are described in a presentation[8] delivered at EPA's 11th Modeling Conference. The presentation documents that the over-prediction tendency of AERMOD in these conditions can range up to 50%, which is generally consistent with the 10-40% uncertainty noted by Appendix W for modeling predictions in general. An over-prediction tendency of up to 50% applied to the results presented in Table 4-1 would show attainment of the NAAQS for both modeling approaches summarized in the table.

This modeling analysis, especially with the EPA-proposed improvements to AERMOD version 15181, supports the designation of the area in the vicinity of the Labadie Energy Center as being either attainment or unclassifiable for the 1-hour SO_2 NAAQS.

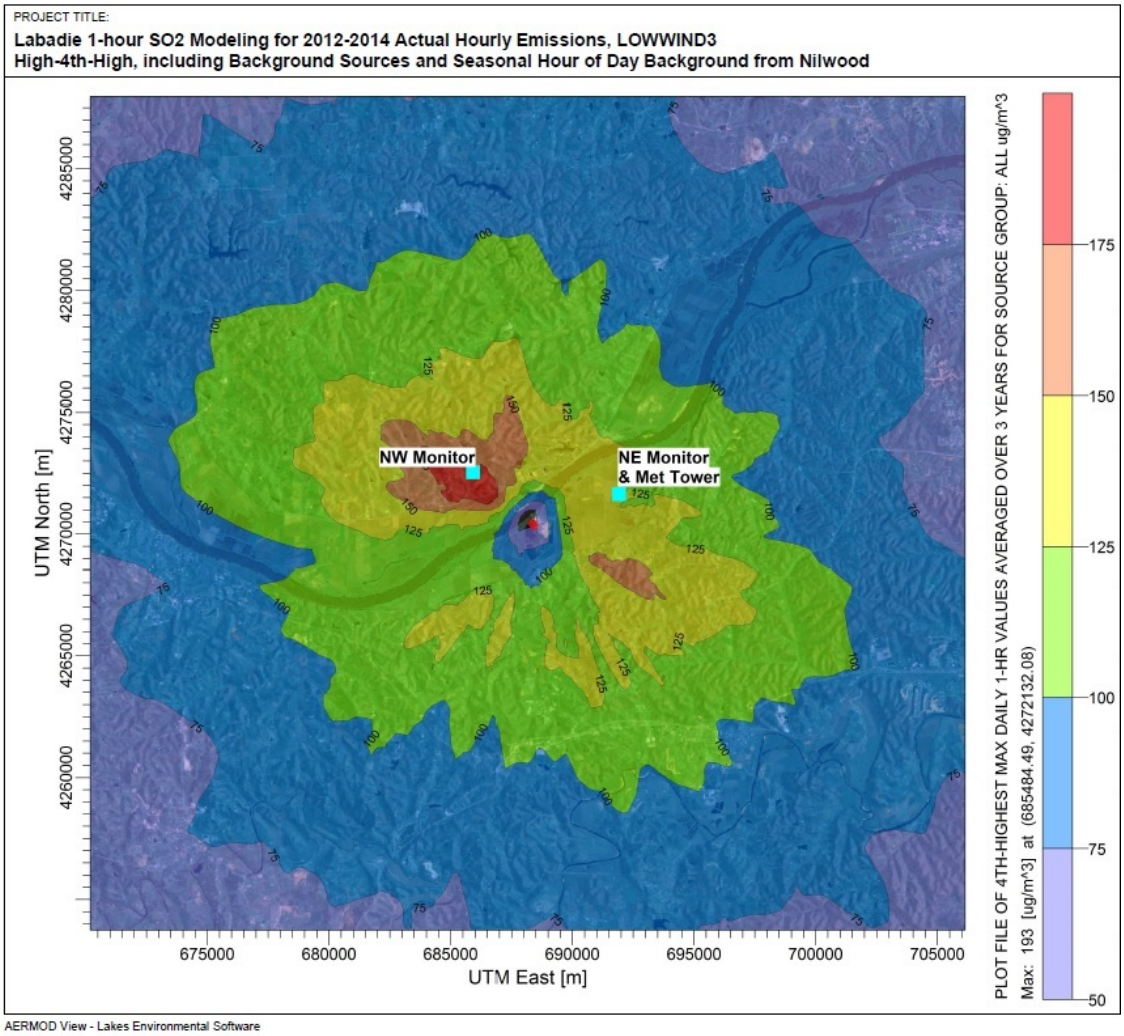
Table 4-1: AERMOD Modeled Design SO_2 Concentration Results

AERMOD Modeling Options	Labadie Concentration ($\mu g/m^3$)	Ambient Background Concentration from Nilwood ($\mu g/m^3$)	Modeled Design Concentration (2012-2014) with Seasonal Hourly Background from Nilwood ($\mu g/m^3$) (1)	NAAQS ($\mu g/m^3$)
Current Default (overall design conc.)	0.0	7.85	282.9(2)	196.5
Current Default (Labadie-caused design conc.)	212.30	20.64	232.9	196.5
ADJ_U* and LOWWIND3	172.36	20.64	193.0	196.5

(1) The "design concentration" is the 99th percentile peak daily 1-hour maximum concentration, averaged over the 3 years.
(2) This localized peak concentration near the D.B. West background source may be due to a conservative manner in which the stack source is characterized by MDNR.

[8] http://www.epa.gov/ttn/scram/11thmodconf/presentations/2-4_Penetrated_Plume_Issues.pdf.

Figure 4-1: 99th percentile 3-year average 1-hour SO_2 Concentration Isopleths with ADJ_U* and LOWWIND3 Options



Appendix A

Alternative Model Justification for Low Wind Speed Options (AERMET ADJ_U* and AERMOD LOWWIND3, Version 15181)

Alternative Model Justification for Low Wind Speed Beta Options:

AERMET and AERMOD

Appendix W, Section 3.2.2 provides an approach for approval of an alternative model to determine whether it is more appropriate for this modeling application. The principle sources involve tall stack buoyant releases.

EPA indicates that for this purpose, an alternative refined model may be used provided that:

1. The model has received a scientific peer review;
2. The model can be demonstrated to be applicable to the problem on a theoretical basis;
3. The data bases which are necessary to perform the analysis are available and adequate;
4. Appropriate performance evaluations of the model have shown that the model is not biased toward underestimates; and
5. A protocol on methods and procedures to be followed has been established.

These five points are discussed below.

The model selected for this modeling application is the EPA-proposed updates to the AERMOD modeling system version 15181, including the AERMET ADJ_U* option, combined with the AERMOD LOWWIND3 option. EPA has indicated support for these changes in the Appendix W proposal and in the Roger Brode presentation made at the 11th Modeling Conference on August 12, 2015 (see presentation at http://www.epa.gov/ttn/scram/11thmodconf/presentations/1-5_Proposed_Updates_AERMOD_System.pdf).

1. The model has received a scientific peer review

The AERMET changes reference a Boundary-Layer Meteorology peer-reviewed paper[1] that is the source of the AERMET formulation for changes in the friction velocity computation for low wind speeds. The combination of the AERMET changes and the AERMOD changes (version 14134 LOWWIND2, similar to version 15181 LOWWIND3) has been evaluated and the study[2] will be published in a forthcoming issue of the Journal of the Air & Waste Management Association (JAWMA). The manuscript associated with the JAWMA article is provided in Appendix B. A supplemental evaluation exercise with AERMET/AERMOD version 15181 is provided in Appendix C that shows consistent evaluation results (with a slight improvement) for the proposed AERMOD modeling application.

2. The model can be demonstrated to be applicable to the problem on a theoretical basis.

There is no theoretical limitation to the application of the AERMET and AERMOD low wind changes – they are generally applicable. The current default algorithm in AERMET has been demonstrated to be

[1] Qian, W., and A. Venkatram. Performance of Steady-State Dispersion Models Under Low Wind-Speed Conditions. Boundary-Layer Meteorology 138:475–491. (2011)

[2] Paine, R., Samani, O., Kaplan, M. Knipping, E., and Kumar, N. Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases. Pending publication (as of August, 2015) in the Journal of Air & Waste Management Association.

faulty and needs to be replaced by the ADJ_U* approach. The improvements due to the LOWWIND3 algorithm are demonstrated with the low wind model evaluations reported by the presentations[3] at the 11th EPA modeling conference

3. The data bases which are necessary to perform the analysis are available and adequate.

Routine meteorological databases that are already available are sufficient for exercising this low wind options. There are no special database requirements for the use of these options.

4. Appropriate performance evaluations of the model have shown that the model is not biased toward underestimates.

The studies cited above by EPA and AECOM provide this demonstration.

5. A protocol on methods and procedures to be followed has been established.

This report documents the methods and procedures to be followed.

[3] http://www.epa.gov/ttn/scram/11thmodconf/presentations/1-5_Proposed_Updates_AERMOD_System.pdf and http://www.epa.gov/ttn/scram/11thmodconf/presentations/2-3_Low_Wind_Speed_Evaluation_Study.pdf.

Appendix B

Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases

This article was downloaded by: [Robert Paine]
On: 25 August 2015, At: 04:31
Publisher: Taylor & Francis
Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: 5 Howick Place, London, SW1P 1WG

Click for updates

Journal of the Air & Waste Management Association
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/uawm20

Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases

Robert Paine[a], Olga Samani[a], Mary Kaplan[a], Eladio Knipping[b] & Naresh Kumar[b]
[a] AECOM, 250 Apollo Drive, Chelmsford, MA 01824
[b] Electric Power Research Institute, 3420 Hillview Avenue, Palo Alto, CA 94304
Accepted author version posted online: 24 Aug 2015.

To cite this article: Robert Paine, Olga Samani, Mary Kaplan, Eladio Knipping & Naresh Kumar (2015): Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases, Journal of the Air & Waste Management Association, DOI: 10.1080/10962247.2015.1085924

To link to this article: http://dx.doi.org/10.1080/10962247.2015.1085924

Disclaimer: This is a version of an unedited manuscript that has been accepted for publication. As a service to authors and researchers we are providing this version of the accepted manuscript (AM). Copyediting, typesetting, and review of the resulting proof will be undertaken on this manuscript before final publication of the Version of Record (VoR). During production and pre-press, errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal relate to this version also.

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at http://www.tandfonline.com/page/terms-and-conditions

Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases

Robert Paine, Olga Samani, and Mary Kaplan

AECOM, 250 Apollo Drive, Chelmsford, MA 01824

Eladio Knipping and Naresh Kumar

Electric Power Research Institute, 3420 Hillview Avenue, Palo Alto, CA 94304

Robert Paine, CCM, QEP, is an associate vice president and technical director, **Olga Samani** and **Mary Kaplan** are senior air quality meteorologists with AECOM's Air Quality Modeling group in Chelmsford, MA.

Eladio Knipping is a principal technical leader in the Environment Sector at the Electric Power Research Institute office in Washington, DC.

Naresh Kumar is a senior program manager of air quality in the environment sector at the Electric Power Research Institute office in Palo Alto, CA.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Abstract

The performance of the AERMOD air dispersion model under low wind speed conditions, especially for applications with only one level of meteorological data and no direct turbulence measurements or vertical temperature gradient observations, is the focus of this study. The analysis documented in this paper addresses evaluations for low wind conditions involving tall stack releases for which multiple years of concurrent emissions, meteorological data, and monitoring data are available.

AERMOD was tested on two field study databases involving several SO_2 monitors and hourly emissions data that had sub-hourly meteorological data (e.g., 10-minute averages) available using several technical options: default mode, with various low wind speed beta options, and

using the available sub-hourly meteorological data. These field study databases included: 1) Mercer County, a North Dakota database featuring five SO_2 monitors within 10 kilometers of the Dakota Gasification Company's plant and the Antelope Valley Station power plant in an area of both flat and elevated terrain, and 2) a flat-terrain setting database with four SO_2 monitors within 6 kilometers of the Gibson Generating Station in southwest Indiana. Both sites featured regionally representative 10-meter meteorological databases, with no significant terrain obstacles between the meteorological site and the emission sources.

The low wind beta options show improvement in model performance helping to reduce some of the over-prediction biases currently present in AERMOD when run with regulatory default options. The overall findings with the low wind speed testing on these tall stack field study databases indicate that AERMOD low wind speed options have a minor effect for flat terrain locations, but can have a significant effect for elevated terrain locations. The performance of AERMOD using low wind speed options leads to improved consistency of meteorological conditions associated with the highest observed and predicted concentration events. The available sub-hourly modeling results using the Sub-Hourly AERMOD Run Procedure (SHARP) are relatively unbiased and show that this alternative approach should be seriously considered to address situations dominated by low-wind meander conditions.

Implications

AERMOD was evaluated with two tall stack databases (in North Dakota and Indiana) in areas of both flat and elevated terrain. AERMOD cases included the regulatory default mode, low wind speed beta options, and use of the Sub-Hourly AERMOD Run Procedure (SHARP). The low

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

wind beta options show improvement in model performance (especially in higher terrain areas), helping to reduce some of the over-prediction biases currently present in regulatory default AERMOD. The SHARP results are relatively unbiased and show that this approach should be seriously considered to address situations dominated by low-wind meander conditions.

Introduction

During low wind speed (LWS) conditions, the dispersion of pollutants is limited by diminished fresh air dilution. Both monitoring observations and dispersion modeling results of this study indicate that high ground-level concentrations can occur in these conditions. Wind speeds less than 2 m/sec are generally considered to be "low", with steady-state modeling assumptions compromised at these low speeds (Pasquill et al., 1983). Pasquill and Van der Hoven (1976) recognized that for such low wind speeds, a plume is unlikely to have any definable travel. Wilson et al. (1976) considered this wind speed (2 m/sec) as the upper limit for conducting tracer experiments in low wind speed conditions.

Anfossi et al. (2005) noted that in LWS conditions, dispersion is characterized by meandering horizontal wind oscillations. They reported that as the wind speed decreases, the standard deviation of the wind direction increases, making it more difficult to define a mean plume direction. Sagendorf and Dickson (1974) and Wilson et al. (1976) found that under LWS conditions, horizontal diffusion was enhanced because of this meander and the resulting ground-level concentrations could be much lower than that predicted by steady-state Gaussian plume models that did not account for the meander effect.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

A parameter that is used as part of the computation of the horizontal plume spreading in the United States Environmental Protection Agency's (EPA) preferred model, AERMOD (Cimorelli et al., 2005), is the standard deviation of the crosswind component, σ_v, which can be parameterized as being proportional to the friction velocity, u_* (Smedman, 1988; Mahrt, 1998). These investigators found that there was an elevated minimum value of σ_v that was attributed to meandering. While at higher wind speeds, small-scale turbulence is the main source of variance, lateral meandering motions appear to exist in all conditions. Hanna (1990) found that σ_v maintains a minimum value of about 0.5 m/sec even as the wind speed approaches zero. Chowdhury et al. (2014) noted that a minimum σ_v of 0.5 m/s is a part of the formulation for the SCICHEM model.

Anfossi (2005) noted that meandering exists under all meteorological conditions regardless of the stability or wind speed, and this phenomenon sets a lower limit for the horizontal wind component variances as noted by Hanna (1990) over all types of terrain.

An alternative method to address wind meander was attempted by Sagendorf and Dickson (1974), who used a Gaussian model, but divided each computation period into sub-hourly (2-minute) time intervals and then combined the results to determine the total hourly concentration. This approach directly addresses the wind meander during the course of an hour by using the sub-hourly wind direction for each period modeled. As we discuss below, this approach has some appeal because it attempts to use direct wind measurements to account for sub-hourly wind meander. However, the sub-hourly time interval must not be so small as to distort the basis of the horizontal plume dispersion formulation in the dispersion model (e.g., AERMOD). Since

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

the horizontal dispersion shape function for stable conditions in AERMOD is formulated with parameterizations derived from the 10-minute release and sampling times of the Prairie Grass experiment (Barad,1958), it is appropriate to consider a minimum sub-hourly duration of 10 minutes for such modeling using AERMOD. The Prairie Grass formulation that is part of AERMOD may also result in an underestimate of the lateral plume spread shape function in some cases, as reported by Irwin (2014) for Kincaid SF_6 releases. From analyses of hourly samples of SF_6 taken at Kincaid (a tall stack source), Irwin determined that the lateral dispersion simulated by AERMOD could underestimate the lateral dispersion (by 60%) for near-stable conditions (conditions for which the lateral dispersion formulation that was fitted to the Project Prairie Grass data could affect results).

It is clear from the discussion above that the simulation of pollutant dispersion in LWS conditions is challenging. In the United States, the use of steady-state plume models before the introduction of AERMOD in 2005 was done with the following rule implemented by EPA: "when used in steady-state Gaussian plume models, measured site-specific wind speeds of less than 1 m/sec but higher than the response threshold of the instrument should be input as 1 m/sec" (EPA, 2004).

With EPA's implementation of a new model, AERMOD, in 2005 (EPA, 2005), input wind speeds lower than 1 m/sec were allowed due to the use of a meander algorithm that was designed to account for the LWS effects As noted in the AERMOD formulation document (EPA, 2004), "AERMOD accounts for meander by interpolating between two concentration limits: the coherent plume limit (which assumes that the wind direction is distributed about a well-defined

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

mean direction with variations due solely to lateral turbulence) and the random plume limit, (which assumes an equal probability of any wind direction)."

A key aspect of this interpolation is the assignment of a time scale (= 24 hours) at which mean wind information at the source is no longer correlated with the location of plume material at a downwind receptor (EPA, 2004). The assumption of a full diurnal cycle relating to this time scale tends to minimize the weighting of the random plume component relative to the coherent plume component for 1-hour time travel. The resulting weighting preference for the coherent plume can lead to a heavy reliance on the coherent plume, ineffective consideration of plume meander, and a total concentration overprediction.

For conditions in which the plume is emitted aloft into a stable layer or in areas of inhomogenous terrain, it would be expected the decoupling of the stable boundary layer relative to the surface layer could significantly shorten this time scale. These effects are discussed by Brett and Tuller (1991), where they note that lower wind autocorrelations occur in areas with a variety of roughness and terrain effects. Perez et al. (2004) noted that the autocorrelation is reduced in areas with terrain and in any terrain setting with increasing height in stable conditions when decoupling of vertical motions would result in a "loss of memory" of surface conditions. Therefore, the study reported in this paper has reviewed the treatment of AERMOD in low wind conditions for field data involving terrain effects in stable conditions as well as for flat terrain conditions, for which convective (daytime) conditions are typically associated with peak modeled predictions.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

The computation of the AERMOD coherent plume dispersion and the relative weighting of the coherent and random plumes in stable conditions are strongly related to the magnitude of σ_v, which is directly proportional to the magnitude of the friction velocity. Therefore, the formulation of the friction velocity calculation and the specification of a minimum σ_v value were also considered in this paper. The friction velocity also affects the internally-calculated vertical temperature gradient, which affects plume rise and plume-terrain interactions, which are especially important in elevated terrain situations.

Qian and Venkatram (2011) discuss the challenges of LWS conditions in which the time scale of wind meandering is large, and the horizontal concentration distribution can be non-Gaussian. It is also quite possible that wind instrumentation cannot adequately detect the turbulence levels that would be useful for modeling dispersion. They also noted that an analysis of data from the Cardington tower indicates that Monin-Obukhov similarity theory underestimates the surface friction velocity at low wind speeds. This finding was also noted by Paine et al. (2010) in an independent investigation of Cardington data as well as data from two other research-grade databases. Both Qian and Venkatram and Paine et al. proposed similar adjustments to the calculation of the surface friction velocity by AERMET, the meteorological processor for AERMOD. EPA incorporated the Qian and Venkatram suggested approach as a "beta option" in AERMOD in late 2012 (EPA, 2012). The same version of AERMOD also introduced low wind modeling options affecting the minimum value of σ_v and the weighting of the meander component that were used in the Test Cases 2-4 described below.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

AERMOD's handling of low wind speed conditions, especially for applications with only one level of meteorological data and no direct turbulence measurements or vertical temperature gradient observations, is the focus of this study. Previous evaluations of AERMOD for low wind speed conditions (e.g., Paine et al., 2010) have emphasized low-level tracer release studies conducted in the 1970s and have utilized results of researchers such as Luhar and Rayner (2009). The focus of the study reported here is a further evaluation of AERMOD, but focusing upon tall-stack field databases. One of these databases was previously evaluated (Kaplan et al., 2012) with AERMOD Version 12345, featuring a database in Mercer County, North Dakota. This database features five SO_2 monitors in the vicinity of the Dakota Gasification Company's plant and the Antelope Valley Station power plant in an area of both flat and elevated terrain. In addition to the Mercer County, ND database, this study considers an additional field database for the Gibson Generating Station tall stack in flat terrain in southwest Indiana.

EPA released AERMOD version 14134 with enhanced low wind model features that can be applied in more than one combination. There is one low wind option (beta u_*) applicable to the meteorological pre-processor, AERMET, affecting the friction velocity calculation, and a variety of options available for the dispersion model, AERMOD, that focus upon the minimum σ_v specification. These beta options have the potential to reduce the over-prediction biases currently present in AERMOD when run for neutral to stable conditions with regulatory default options (EPA, 2014 a,b). These new low wind options in AERMET and AERMOD currently require additional justification for each application in order to be considered for use in the United States. While EPA has conducted evaluations on low-level, non-buoyant studies with the AERMET and AERMOD low wind speed beta options, they have not conducted any new

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

evaluations on tall stack releases (U.S. EPA, 2014 a, b). One of the purposes of this study was to augment the evaluation experiences for the low wind model approaches for a variety of settings for tall stack releases.

This study also made use of the availability of sub-hourly meteorological observations to evaluate another modeling approach. This approach employs AERMOD with sub-hourly meteorological data and is known as the "Sub-Hourly AERMOD Run Procedure" or SHARP (EPRI, 2013). Like the procedure developed by Sagendorf and Dickson as described above, SHARP merely subdivides each hour's meteorology (e.g., into six 10-minute periods) and AERMOD is run multiple times with the meteorological input data (e.g., minutes 1-10, 11-20, etc.) treated as "hourly" averages for each run. Then, the results of these runs are combined (averaged). In our SHARP runs, we did not employ any observed turbulence data as input. This alternative modeling approach (our Test Case 5 as discussed below) has been compared to the standard hourly AERMOD modeling approach for default and low wind modeling options (Test Cases 1-4 described below, using hourly averaged meteorological data) to determine whether it should be further considered as a viable technique. This study provides a discussion of the various low wind speed modeling options and the field study databases that were tested, as well as the modeling results.

Modeling Options and Databases for Testing

Five AERMET/AERMOD model configurations were tested for the two field study databases, as listed below. All model applications used one wind level, a minimum wind speed of 0.5 m/sec,

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

and also used hourly average meteorological data with the exception of SHARP applications. As noted above, Test Cases 1-4 used options available in the current AERMOD code. The selections for Test Cases 1-4 exercised these low wind speed options over a range of reasonable choices extended from no low wind enhancements to a full treatment that incorporates the Qian and Venkatram (2011) u_* recommendations as well as the Hanna (1990) and Chowdhury (2014) minimum σ_v recommendations (0.5 m/sec). Test Case 5 used sub-hourly meteorological data processed with AERMET using the beta u_* option for SHARP applications. We discuss later in this document our recommendations for SHARP modeling without the AERMOD meander component included.

Test Case 1: AERMET and AERMOD in default mode.

Test Case 2: Low wind beta option for AERMET and default options for AERMOD (minimum σ_v value of 0.2 m/sec).

Test Case 3: Low wind beta option for AERMET and the LOWWIND2 option for AERMOD (minimum σ_v value of 0.3 m/sec).

Test Case 4: Low wind beta option for AERMET and the LOWWIND2 option for AERMOD (minimum σ_v value of 0.5 m/sec).

Test Case 5: Low wind beta option for AERMET and AERMOD run in sub-hourly mode (SHARP) with beta u*option.

The databases that were selected for the low wind model evaluation are listed in Table 1 and described below. They were selected due to the following attributes:

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

- They feature multiple years of hourly SO_2 monitoring at several sites.

- Emissions are dominated by tall stack sources that are available from continuous emission monitors.

- They include sub-hourly meteorological data so that the SHARP modeling approach could be tested as well.

- There is representative meteorological data from a single-level station typical of (or obtained from) airport-type data.

Table 1 here.

1) Mercer County, North Dakota

An available 4-year period of 2007-2010 was used for the Mercer County, ND database with five SO_2 monitors within 10 km of two nearby emission facilities (Antelope Valley and Dakota Gasification Company), site-specific meteorological data at the DGC#12 site (10-m level data in a low-cut grassy field in the location shown in Figure 1), and hourly emissions data from 15 point sources. The terrain in the area is rolling and features three of the monitors (Beulah, DGC#16, and especially DGC#17) being above or close to stack top for some of the nearby emission sources; see Figure 2 for more close-up terrain details. Figure 1 shows a layout of the sources, monitors, and the meteorological station. Tables 2 and 3 provide details about the emission sources and the monitors. Although this modeling application employed sources as far away as 50 km, the proximity of the monitors to the two nearby emission facilities meant that

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

emissions from those facilities dominated the impacts. However, to avoid criticism from reviewers that other regional sources that should have been modeled were omitted, other regional lignite-fired power plants were included in the modeling.

2) Gibson Generating Station, Indiana

An available 3-year period of 2008-2010 was used for the Gibson Generating Station in southwest Indiana with four SO_2 monitors within 6 km of the plant, airport hourly meteorological data (from Evansville, Indiana 1-minute data, located about 40 km SSE of the plant), and hourly emissions data from one electrical generating station (Gibson). The terrain in the area is quite flat and the stacks are tall. Figure 3 depicts the locations of the emission source and the four SO_2 monitors. Although the plant had an on-site meteorological tower, EPA (EPA, 2013a) noted that the tower's location next to a large lake resulted in non-representative boundary-layer conditions for the area, and that the use of airport data would be preferred. Tables 2 and 3 provide details about the emission sources and the monitors. Due to the fact that there are no major SO_2 sources within at least 30 km of Gibson, we modeled emissions from only that plant.

Figure 1 here.

Figure 2 here.

Figure 3 here.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Meteorological Data Processing

For the North Dakota and Gibson database evaluations, the hourly surface meteorological data were processed with AERMET, the meteorological preprocessor for AERMOD. The boundary layer parameters were developed according to the guidance provided by EPA in the current AERMOD Implementation Guide (EPA, 2009). For the first modeling evaluation option, Test Case 1, AERMET was run using the default options. For the other four model evaluation options, Test Case 2 to 5, AERMET was run with the beta u_* low wind speed option.

North Dakota Meteorological Processing

Four years (2007-2010) of the 10-meter meteorological data collected at the DGC#12 monitoring station (located about 7 km SSE of the central emission sources) were processed with AERMET. The data measured at this monitoring station were wind direction, wind speed, and temperature. Hourly cloud cover data from the Dickinson Theodore Roosevelt Regional Airport, North Dakota (KDIK) ASOS station (85 km to the SW) were used in conjunction with the monitoring station data. Upper air data were obtained from the Bismarck Airport, North Dakota (KBIS; about 100 km to the SE), twice-daily soundings.

In addition, the sub-hourly (10-minute average) 10-meter meteorological data collected at the DGC#12 monitoring station were also processed with AERMET. AERMET was set up to read six 10-minute average files with the tower data and output six 10-minute average surface and profile files for use in SHARP. SHARP then used the sub-hourly output of AERMET to

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

calculate hourly modeled concentrations, without changing the internal computations of AERMOD. The SHARP user's manual (EPRI, 2013) provides detailed instructions on processing sub-hourly meteorological data and executing SHARP.

Gibson Meteorological Processing

Three years (2008-2010) of hourly surface data from the Evansville Airport, Indiana (KEVV) ASOS station (about 40 km SSE of Gibson) were used in conjunction with the twice-daily soundings upper air data from the Lincoln Airport, Illinois (KILX, about 240 km NW of Gibson). The 10-minute sub-hourly data for SHARP were generated from the 1-minute meteorological data collected at Evansville Airport.

Emission Source Characteristics

Table 2 summarizes the stack parameters and locations of the modeled sources for the North Dakota and Gibson databases. Actual hourly emission rates, stack temperatures, and stack gas exit velocities were used for both databases.

Table 2 here.

Model Runs and Processing

For each evaluation database, the candidate model configurations were run with hourly emission rates provided by the plant operators. In the case of rapidly-varying emissions (startup and

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

shutdown), the hourly averages may average intermittent conditions occurring during the course of the hour. Actual stack heights were used, along with building dimensions used as input to the models tested. Receptors were placed only at the location of each monitor to match the number of observed and predicted concentrations.

The monitor (receptor) locations and elevations are listed in Table 3. For the North Dakota database, the DGC#17 monitor is located in the most elevated terrain of all monitors. The monitors for the Gibson database were located at elevations at or near stack base, with stack heights ranging from 152 to 189 meters.

Table 3 here.

Tolerance Range for Modeling Results

One issue to be aware of regarding SO_2 monitored observations is that they can exhibit over- or under-prediction tendencies up to 10% and still be acceptable. This is related to the tolerance in the EPA procedures (EPA, 2013b) associated with quality control checks and span checks of ambient measurements. Therefore, even ignoring uncertainties in model input parameters and other contributions (e.g., model science errors and random variations) that can also lead to modeling uncertainties, just the uncertainty in measurements indicate that modeled-to-monitored ratios between 0.9 and 1.1 can be considered as "unbiased". In the discussion below, we consider model performance to be "relatively unbiased" if its predicted model to monitor ratio is between 0.75 and 1.25.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Model Evaluation Metrics

The model evaluation employed metrics that address three basic areas, as described below.

1) 1-hour SO_2 NAAQS Design Concentration

An operational metric that is tied to the form of the 1-hour SO_2 NAAQS is the "design concentration" (99th percentile of the peak daily 1-hour maximum values). This tabulated statistic was developed for each modeled case and for each individual monitor for each database evaluated.

2) Quantile-Quantile Plots

Operational performance of models for predicting compliance with air quality regulations, especially those involving a peak or near-peak value at some unspecified time and location, can be assessed with quantile-quantile (Q-Q) plots (Chambers et al., 1983), which are widely used in AERMOD evaluations. Q-Q plots are created by independently ranking (from largest to smallest) the predicted and the observed concentrations from a set of predictions initially paired in time and space. A robust model would have all points on the diagonal (45-degree) line. Such plots are useful for answering the question, "Over a period of time evaluated, does the distribution of the model predictions match those of observations?" Therefore, the Q-Q plot instead of the scatterplot is a pragmatic procedure for demonstrating model performance of applied models, and it is widely used by EPA (e.g., Perry et al. 2005). Venkatram et al. (2001)

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

support the use of Q-Q plots for evaluating regulatory models. Several Q-Q plots are included in this paper in the discussion provided below.

3) Meteorological Conditions Associated with Peak Observed vs. Modeled Concentrations

Lists of the meteorological conditions and hours/dates of the top several predictions and observations provide an indication as to whether these conditions are consistent between the model and monitoring data. For example, if the peak observed concentrations generally occur during daytime hours, we would expect that a well-performing model would indicate that the peak predictions are during the daytime as well. Another meteorological variable of interest is the wind speed magnitudes associated with observations and predictions. It would be expected, for example, that if the wind speeds associated with peak observations are low, then the modeled peak predicted hours would have the same characteristics. A brief qualitative summary of this analysis is included in this paper and supplemental files contain the tables of the top 25 (unpaired) predictions and observations for all monitors and cases tested.

North Dakota Database Model Evaluation Procedures and Results

AERMOD was run for five test cases to compute the 1-hour daily maximum 99th percentile averaged over four years at the five ambient monitoring locations listed in Table 3.

A regional background of 10 μg/m^3 was added to the AERMOD modeled predictions. The 1-hour 99th percentile background concentration was computed from the 2007-2010 lowest hourly

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

monitored concentration among the five monitors so as to avoid double-counting impacts from sources already being modeled.

The ratios of the modeled (including the background of 10 $\mu g/m^3$) to monitored design concentrations are summarized in Table 4 and graphically plotted in Figure 4 and are generally greater than 1. (Note that the background concentration is a small fraction of the total concentration, as shown in Table 4). For the monitors in simple terrain (DGC#12, DGC#14, and Beulah), the evaluation results are similar for both the default and beta options and are within 5-30% of the monitored concentrations depending on the model option. The evaluation result for the monitor in the highest terrain (DGC#17) shows that the ratio of modeled to monitored concentration is more than 2, but when this location is modeled with the AERMET and AERMOD low wind beta option, the ratio is significantly better, at less than 1.3. It is noteworthy that the modeling results for inclusion of just the beta u_* option are virtually identical to the default AERMET run for the simple terrain monitors, but the differences are significant for the higher terrain monitor (DGC#17). For all of the monitors, it is evident that further reductions of AERMOD's over-predictions occur as the minimum σ_v in AERMOD is increased from 0.3 to 0.5 m/sec. For a minimum σ_v of 0.5 m/sec at all the monitors, AERMOD is shown to be conservative with respect to the design concentration.

The Q-Q plots of the ranked top fifty daily maximum 1-hour SO_2 concentrations for predictions and observations are shown in Figure 5. For the convenience of the reader, a vertical dashed line is included in each Q-Q plot to indicate the observed design concentration. In general, the Q-Q plots indicate the following:

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

- For all of the monitors, to the left of the design concentration line, the AERMOD hourly runs all show ranked predictions at or higher than observations. To the right of the design concentration line, the ranked modeled values for specific test cases and monitors are lower than the ranked observed levels, and the slope of the line formed by the plotted points is less than the slope of the 1:1 line. For model performance goals that would need to predict well for the peak concentrations (rather than the 99th percentile statistic), this area of the Q-Q plots would be of greater importance.

- The very highest observed value (if indeed valid) is not matched by any of the models for all of the monitors, but since the focus is on the 99th percentile form of the United States ambient standard for SO_2, this area of model performance is not important for this application.

- The ranked SHARP modeling results are lower than all of the hourly AERMOD runs, but at the design concentration level, they are, on average, relatively unbiased over all of the monitors. The AERMOD runs for SHARP included the meander component, which probably contributed to the small under-predictions noted for SHARP. In future modeling, we would advise users of SHARP to employ the AERMOD LOWWIND1 option to disable the meander component.

Table 4 here.

Figure 4 here.

Figure 5 here.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Gibson Generating Station Database Model Evaluation Procedures and Results

AERMOD was run for five test cases for this database as well in order to compute the 1-hour daily maximum 99th percentile averaged over three years at the four ambient monitoring locations listed in Table 3.

A regional background of 18 μg/m^3 was added to the AERMOD modeled predictions. The 1-hour 99th percentile background concentration was computed from the 2008-2010 lowest hourly monitored concentration among the four monitors so as to avoid impacts from sources being modeled.

The ratio of the modeled (including the background of 18 μg/m^3) to monitored concentrations is summarized in Table 5 and graphically plotted in Figure 6 and are generally greater than 1.0. (Note that the background concentration is a small fraction of the total concentration, as shown in Table 5.) Figure 6 shows that AERMOD with hourly averaged meteorological data over-predicts by about 40-50% at Mt. Carmel and Gibson Tower monitors and by about 9-31% at East Mt. Carmel and Shrodt monitors. As expected (due to dominance of impacts with convective conditions), the AERMOD results do not vary much with the various low wind speed options in this flat terrain setting. AERMOD with sub-hourly meteorological data (SHARP) has the best (least biased predicted-to-observed ratio of design concentrations) performance among the five

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

cases modeled. Over the four monitors, the range of predicted-to-observed ratios for SHARP is a narrow one, ranging from a slight under-prediction by 2% to an over-prediction by 14%.

The Q-Q plots of the ranked top fifty daily maximum 1-hour SO_2 concentrations for predictions and observations are shown in Figure 7. It is clear from these plots that the SHARP results parallel and are closer to the 1:1 line for a larger portion of the concentration range than any other model tested. In general, AERMOD modeling with hourly data exhibits an over-prediction tendency at all of the monitors for the peak ranked concentrations at most of the monitors. The AERMOD/SHARP models predicted lower relative to observations at the East Mt. Carmel monitor for the very highest values, but match well for the 99th percentile peak daily 1-hour maximum statistic.

Table 5 here.

Figure 6 here.

Figure 7 here.

Evaluation Results Discussion

The modeling results for these tall stack releases are sensitive to the source local setting and proximity to complex terrain. In general, for tall stacks in simple terrain, the peak ground-level impacts mostly occur in daytime convective conditions. For settings with a mixture of simple and complex terrain, the peak impacts for the higher terrain are observed to occur during both daytime and nighttime conditions, while AERMOD tends to favor stable conditions only without

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

low wind speed enhancements. Exceptions to this "rule of thumb" can occur for stacks with aerodynamic building downwash effects. In that case, high observed and modeled predictions are likely to occur during high wind events during all times of day.

The significance of the changes in model performance for tall stacks (using a 90th percentile confidence interval) was independently tested for a similar model evaluation conducted for Eastman Chemical Company (Paine et al., 2013; Szembek et al., 2013), using a modification of the Model Evaluation Methodology (MEM) software that computed estimates of the hourly stability class (Strimaitis et al., 1993). That study indicated that relative to a perfect model, a model that over-predicted or under-predicted by less than about 50% would likely show a performance level that was not significantly different. For a larger difference in bias, one could expect a statistically significant difference in model performance. This finding has been adopted as an indicator of the significance of different modeling results for this study.

A review of the North Dakota ratios of monitored to modeled values in Figure 4 generally indicates that for DGC#12, DGC#14, and Beulah, the model differences were not significantly different. For DGC#16, it could be concluded that the SHARP results were significantly better than the default AERMOD results, but other AERMOD variations were not significantly better. For the high terrain monitor, DGC#17, is it evident that all of the model options departing from default were significantly better than the default option, especially the SHARP approach.

For the Gibson monitors (see Figure 6), the model variations did not result in significantly different performance except for the Gibson Tower (SHARP vs. the hourly modes of running AERMOD).

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

General conclusions from the review of meteorological conditions associated with the top observed concentrations at the North Dakota monitors , provided in the supplemental file called "North Dakota Meteorological Conditions Resulting in Top 25 Concentrations", are as follows:

- A few peak observed concentrations occur at night with light winds. Majority of observations for the DGC#12 monitor are mostly daytime conditions with moderate to strong winds.

- Peak observations for the DGC#14 and Beulah monitors are mostly daytime conditions with a large range of wind speeds. Once again, a minority of the peak concentrations occur at night with a large range of wind speeds.

- Peak observed concentrations for the DGC#16 and DGC#17 monitors occur at night with light winds. Majority of observations are mixed between daytime and nighttime conditions with a large range of wind speeds for both. The DGC#17 monitor is located in elevated terrain.

The conclusions from the review of the meteorological conditions associated with peak AERMOD or SHARP predictions are as follows:

- AERMOD hourly peak predictions for the DGC#12 and Beulah monitors are consistently during the daytime with light to moderate wind speeds and limited mixing heights. This is a commonly observed situation that is further discussed below.

- There are similar AERMOD results for DGC#14, except that there are more periods with high winds and higher mixing heights.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

- The AERMOD results for DGC#16 still features mostly daytime hours, but with more high wind conditions.

- The default AERMOD results for DGC#17 are distinctly different from the other monitors, with most hours featuring stable, light winds. There are also a few daytime hours of high predictions with low winds and low mixing heights. This pattern changes substantially with the beta u_* options employed, when the majority of the peak prediction hours are daytime periods with light to moderate wind speeds. This pattern is more consistent with the peak observed concentration conditions.

- The SHARP peak predictions at the North Dakota monitors were also mostly associated with daytime hours with a large range of wind speeds for all of the monitors.

The North Dakota site has some similarities due to a mixture of flat and elevated terrain to the Eastman Chemical Company model evaluation study in Kingsport, Tennessee (this site features three coal-fired boiler houses with tall stacks). In that study (Paine et al. 2013; Szembek et al., 2013), there was one monitor in elevated terrain and two monitors in flat terrain with a full year of data. Both the North Dakota and Eastman sites featured observations of the design concentration being within about 10% of the mean design concentration over all monitors. Modeling results using default options in AERMOD for both of these sites indicated a large spread of the predictions, with predictions in high terrain exceeding observations by more than a factor of 2. In contrast, the predictions in flat terrain, while higher than observations, showed a lower overprediction bias. The use of low wind speed improvements in AERMOD (beta u_* in

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

AERMET and an elevated minimum σ_v value) did improve model predictions for both databases.

The conclusions from the review of the meteorological conditions associated with peak observations , provided in the supplemental file called "Gibson Meteorological Conditions Resulting in Top 25 Concentrations", are as follows:

- Peak observations for the Mt. Carmel and East Mt. Carmel monitors occur during both light wind convective conditions and strong wind conditions (near neutral, both daytime and nighttime).

- Nighttime peaks that are noted at Mt. Carmel and East Mt. Carmel could be due to downwash effects with southerly winds.

- Gibson Tower and Shrodt monitors were in directions with minimal downwash effects; therefore, the peak impacts at these monitors occur with convective conditions.

- The Gibson Tower and Shrodt monitor peak observation conditions were similarly mixed for wind speeds, but they were consistently occurring during the daytime only.

AERMOD (hourly) modeling runs and SHARP runs are generally consistent with the patterns of observed conditions for Shrodt and Gibson Tower monitors. Except for downwash effects, the peak concentrations were all observed and predicted during daytime hours. There are similar AERMOD results for Mt. Carmel and East Mt. Carmel, except that there are more nighttime periods and periods with strong wind conditions.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

As noted above, AERMOD tends to focus its peak predictions for tall stacks in simple terrain (those not affected by building downwash) for conditions with low mixing heights in the morning. However, a more detailed review of these conditions indicates that the high predictions are not simply due to plumes trapped within the convective mixed layer, but instead due to plumes that initially penetrate the mixing layer, but then emerge (after a short travel time) into the convective boundary layer in concentrated form with a larger-than-expected vertical spread. Tests of this condition were undertaken by Dr. Ken Rayner of the Western Australia Department of Environmental Regulation (2013), who found the same condition occurring for tall stacks in simple terrain for a field study database in his province. Rayner found that AERMOD tended to over-predict peak concentrations by a factor of about 50% at a key monitor, while with the penetrated plume removed from consideration, AERMOD would underpredict by about 30%. Therefore, the correct treatment might be a more delayed entrainment of the penetrated plume into the convective mixed layer. Rayner's basic conclusions were that:

- A plume penetrates and disperses within a 1-hour time step in AERMOD, while in the real world, dispersion of a penetrated puff may occur an hour or more later, after substantial travel time.

- A penetrated plume initially disperses via a vertical Gaussian formula, not a convective probability density function. Because penetrated puffs typically have a very small vertical dispersion, they are typically fully entrained (in AERMOD) in a single hour by a growing mixed layer, and dispersion of a fully entrained puff is via convective mixing, with relatively rapid vertical dispersion, and high ground-level concentrations.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Conclusions and Recommendations for Further Research

This study has addressed additional evaluations for low wind conditions involving tall stack releases for which multiple years of concurrent emissions, meteorological data, and monitoring data were available. The modeling cases that were the focus of this study involved applications with only one level of meteorological data and no direct turbulence measurements or vertical temperature gradient observations.

For the North Dakota evaluation, the AERMOD model over-predicted, using the design concentration as the metric for each monitor. For the relatively low elevation monitors, the results were similar for both the default and beta options and are within 5-30% of the monitored concentrations depending on the model option. The modeling result for the elevated DGC#17 monitor showed that this location is sensitive to terrain as the ratio of modeled to monitored concentration is over 2. However, when this location was modeled with the low wind beta option, the ratio was notably better, at less than 1.3. Furthermore, the low wind speed beta option changed the AERMOD's focus on peak predictions conditions from mostly nighttime to mostly daytime periods, somewhat more in line with observations. Even for a minimum σ_v as high as 0.5 m/sec, all of the AERMOD modeling results were conservative or relatively unbiased (for the design concentration). The North Dakota evaluation results for the sub-hourly (SHARP) modeling were, on average, relatively unbiased, with a predicted-to-observed design concentration ratio ranging from 0.89 to 1.2. With a 10% tolerance in the SO_2 monitored values,

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

we find that the SHARP performance is quite good. Slightly higher SHARP predictions would be expected if AERMOD were run with the LOWWIND1 option deployed.

For the Gibson flat terrain evaluation, AERMOD with hourly averaged meteorological data over-predicted at three of the four monitors between 30-50 %, and about 10% at the fourth monitor. The AERMOD results did not vary much with the various low wind speed options in this flat terrain setting. AERMOD with sub-hourly meteorological data (SHARP) had the best (least biased predicted-to-observed ratio of design concentrations) performance among the five cases modeled. Over the four monitors, the range of predicted-to-observed ratios for SHARP was a narrow one, ranging from a slight under-prediction by 2% to an over-prediction by 14%. All other modeling options had a larger range of results.

The overall findings with the low wind speed testing on these tall stack databases indicate that:

- The AERMOD low wind speed options have a minor effect for flat terrain locations.

- The AERMOD low wind speed options have a more significant effect with AERMOD modeling for elevated terrain locations, and the use of the LOWWIND2 option with a minimum σ_v on the order of 0.5 m/sec is appropriate.

- The AERMOD sub-hourly modeling (SHARP) results are mostly in the unbiased range (modeled to observed design concentration ratios between 0.9 and 1.1) for the two databases tested with that option.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

- The AERMOD low wind speed options improve the consistency of meteorological conditions associated with the highest observed and predicted concentration events.

Further analysis of the low wind speed performance of AERMOD with either the SHARP procedure or the use of the minimum σ_v specifications by other investigators is encouraged. However, SHARP can only be used if sub-hourly meteorological data is available. For Automated Surface Observing Stations (ASOS) with 1-minute data, this option is a possibility if the 1-minute data are obtained and processed.

Although the SHARP results reported in this paper are encouraging, further testing is recommended to determine the optimal sub-hourly averaging time (no less than 10 minutes is recommended) and whether other adjustments to AERMOD (e.g., total disabling of the meander option) is recommended. Another way to implement the sub-hourly information in AERMOD and to avoid the laborious method of running AERMOD several times for SHARP would be to include a distribution, or range, of the sub-hourly wind directions to AERMOD so that the meander calculations could be refined.

For most modeling applications that use hourly averages of meteorological data with no knowledge of the sub-hourly wind distribution, it appears that the best options with the current AERMOD modeling system are to implement the AERMET beta u_* improvements and to use a minimum σ_v value on the order of 0.5 m/sec/sec.

It is noteworthy that EPA has recently approved (EPA, 2015) as a site-specific model for Eastman Chemical Company the use of the AERMET beta u_* option as well as the LOWWIND2

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

option in AERMOD with a minimum σ_v of 0.4 m/sec. This model, which was evaluated with site-specific meteorological data and 4 SO_2 monitors operated for 1 year, performed well in flat terrain, but overpredicted in elevated terrain, where a minimum σ_v value of 0.6 m/sec actually performed better. This would result in an average value of the minimum σ_v of about 0.5 m/sec, consistent with the findings of Hanna (1990).

The concept of a minimum horizontal wind fluctuation speed on the order of about 0.5 m/sec is further supported by the existence of vertical changes (shears) in wind direction (as noted by Etling, 1990) that can result in effective horizontal shearing of a plume that is not accounted for in AERMOD. Although we did not test this concept here, the concept of vertical wind shear effects, which are more prevalent in de-coupled stable conditions than in well-mixed convective conditions suggests that it would be helpful to have a "split minimum σ_v" approach in AERMOD that enables the user to specify separate minimum σ_v values for stable and unstable conditions. This capability would, of course, be backward-compatible to the current minimum σ_v specification that applies for all stability conditions in AERMOD now.

References

Anfossi, D., D. Oettl, G. Degrazia, A. Goulart. 2005. An analysis of sonic anemometer observations in low wind speed conditions. *Boundary Layer Meteorology* 114, 179–203. doi:10.1007/s10546-004-1984-4

Barad, M.L., 1958. Project Prairie Grass, a field program in diffusion. *Geophys. Res. Pap*. 59. Air Force Cambridge Centre.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Brett, A. C., and S. E. Tuller, 1991. The autocorrelation of hourly wind speed observations. *Journal of Applied Meteorology* 30, 823–833. doi:10.1175/1520-0450(1991)030%3C0823:TAOHWS%3E2.0.CO;2

Chambers, J. M., W. S. Cleveland, B. Kleiner, and P.A. Tukey. 1983. Comparing Data Distributions. Graphical Methods for Data Analysis. Bell Laboratories. Wadsworth International Group and Duxbury Press.

Chowdhury, B., R. I. Sykes, D. Henn, P. Karamchandani. 2014. SCICHEM Version 3.0 (Beta 2) Technical Documentation. Available at http://sourceforge.net/projects/epri-dispersion/files/SCICHEM/SCICHEM3.0b2.zip/download.

Cimorelli, A.J., S.G. Perry, A. Venkatram, J.C. Weil, R.J. Paine, R.B. Wilson, R.F. Lee, W.D. Peters, and R.W. Brode. 2005. AERMOD: A Dispersion Model for Industrial Source Applications. Part I: General Model Formulation and Boundary Layer Characterization. *Journal of Applied Meteorology* 44, 682-693. doi:10.1175/JAM2227.1

Electric Power Research Institute (EPRI). 2013. Sub Hourly AERMOD Run Procedure (SHARP), version 13011 User's Guide. Research Project 1025622. http://sourceforge.net/projects/epri-dispersion/files/SHARP/ (accessed June 10, 2015).

Etling, D. 1990. On Plume Meandering under Stable Stratification. *Atmospheric. Environment* 8, 1979–1985. doi:10.1016/0960-1686(90)90232-C

Hanna, S. R. 1990. Lateral Dispersion in Light-Wind Stable Conditions, *Nuovo Cimento* 13, 889–894. doi:10.1007/BF02514777

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Irwin, J. S. 2014. A suggested method for dispersion model evaluation. *Journal of the Air & Waste Management Association*, 64:3, 255-264. doi:10.1080/10962247.2013.833147

Kaplan, M. and R.J. Paine. 2012. Comparison of AERMOD Modeled 1-Hour SO_2 Concentrations to Observations at Multiple Monitoring Stations in North Dakota. Presented at the 105th Annual Conference and Exhibition of the Air & Waste Management Association, San Antonio, TX.

Luhar, A.K. and K.N. Rayner. 2009. Methods to estimate surface fluxes of momentum and heat from routine weather observations for dispersion applications under stable stratification. *Boundary Layer Meteorology* 132, 437-454. doi:10.1007/s10546-009-9409-z

Mahrt, L. 1998. Stratified Atmospheric Boundary Layers and Breakdown of Models. *Theor. Comput. Fluid Dyn*. 11, 263–279. doi:10.1007/s001620050093

Paine, R., J.A. Connors, and C.D. Szembek, 2010. AERMOD Low Wind Speed Evaluation Study: Results and Implementation. Paper 2010-A-631-AWMA, presented at the 103rd Annual Conference, Air & Waste Management Association, Calgary, Alberta, Canada.

Paine, R., F. Tringale, and S. Gossett, 2013. Resolution of 1-hour SO2 Non-attainment Area in Kingsport, TN: Advanced Meteorological and Monitoring Study. Presented at the Air & Waste Management Association's Specialty Conference. Raleigh, NC. March 2013.

Pasquill, F. and F. B. Smith. 1983. Atmospheric Diffusion. Ellis Horwood. Series in Environmental Science.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Perez, I., M. Garcia, M. Sanchez, B. De Torre. 2004. Autocorrelation Analysis of Meteorological Data from a RASS Sodar. *Journal of Applied Meteorology*, 43: 1213-1223. doi:10.1175/1520-0450(2004)043%3C1213:AAOMDF%3E2.0.CO;2

Perry, S.G., A.J. Cimorelli, R.J. Paine, R.W. Brode, J.C. Weil, A. Venkatram, R.B. Wilson, R.F. Lee, and W.D. Peters. 2005. AERMOD: A Dispersion Model for Industrial Source Applications. Part II: Model Performance against 17 Field Study Databases. *Journal of Applied Meteorology* 44, 694-708. doi:10.1175/JAM2228.1

Qian, W. and A. Venkatram. 2011. Performance of steady-state dispersion models under low wind-speed conditions. *Boundary Layer Meteorology,* 138, pp 475-491. doi:10.1007/s10546-010-9565-1

Rayner, K. 2013. Personal communication with Robert Paine, AECOM.

Sagendorf, J. F. and Dickson, C. R. 1974. Diffusion under Low Windspeed, Inversion Conditions. *NOAA Technical Memorandum* 52, 89 pp.

Smedman, A. S. 1988. Observations of a Multi-Level Turbulence Structure in a Very Stable Atmospheric Boundary Layer. *Boundary Layer Meteorology* 66, 105–126. doi:10.1007/BF00116064

Strimaitis, D., E. Insley, M. Korc, and F. Lurmann.1993. User's Guide for the Model Evaluation Methodology (MEM) System for Comparing Model Performance, Version 1.0. STI-93261-1392-FR. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC 27711.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Szembek, C., R. Paine, and S. Gossett. 2013. Resolution of 1-hour SO2 Non-attainment Area in Kingsport, TN: Model Evaluation Analysis Results to Date. Presented at the Air & Waste Management Association's Specialty Conference. Raleigh, NC. March 2013.

U.S. Environmental Protection Agency. 2004. AERMOD: Description of Model Formulation. EPA-454/R-03-004. http://www.epa.gov/ttn/scram/7thconf/aermod/aermod_mfd.pdf. (accessed June 10, 2015).

U.S. Environmental Protection Agency. 2005. Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions. Final Rule. Federal Register, Volume 70, No. 216, November 9, 2005. http://www.gpo.gov/fdsys/pkg/FR-2005-11-09/html/05-21627.htm. (accessed June 10, 2015).

U.S. Environmental Protection Agency. 2009. AERMOD Implementation Guide (AIG). http://www.epa.gov/ttn/scram/7thconf/aermod/aermod_implmtn_guide_19March2009.pdf (accessed June 10, 2015).

U.S. Environmental Protection Agency. 2012. AERMET 12345 Model Change Bulletin MCB#3. http://www.epa.gov/ttn/scram/7thconf/aermod/aermet_mcb3.txt. (accessed June 10, 2015).

U.S. Environmental Protection Agency. 2013a. Personal communication from Roger Brode, EPA, to Robert Paine, AECOM.

U.S. Environmental Protection Agency. 2013b. Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II, Ambient Air Quality Monitoring Program. http://www.epa.gov/ttnamti1/files/ambient/pm25/qa/QA-Handbook-Vol-II.pdf (accessed June 10, 2015).

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

U.S. Environmental Protection Agency. 2014a. Webinar: AERMOD Modeling System Update, January 15, 2014. http://www.epa.gov/ttn/scram/webinar/AERMOD_13350_Update/AERMOD_System_Update_Webinar_01-14-2014_FINAL.pdf (accessed June 10, 2015).

U.S. Environmental Protection Agency. 2014b. Webinar: AERMOD Modeling System Update, August 14, 2014. http://www.epa.gov/ttn/scram/webinar/AERMOD_14134-NO2_Memo/20140812-Webinar_Slides.pdf (accessed June 10, 2015).

U.S. Environmental Protection Agency. 2015. Approval of Alternative Model Request: Modeling of Sulfur Dioxide Emissions from Eastman Chemical Company, Sullivan County, Tennessee, 2010 Sulfur Dioxide National Ambient Air Quality Standards (NAAQS) Nonattainment Area. Letter to Mr. Barry R. Stephens, Tennessee Department of Environment and Conservation from Beverly H. Bannister, Director of Air, Pesticides and Toxics Management Division (EPA Region 4).

Van der Hoven, I. 1976. A survey of field measurements of atmospheric diffusion under low-wind-speed inversion conditions. *Nuclear. Safety* 17, 223–230.

Venkatram, A., R.W. Brode, A.J. Cimorelli, J.T. Lee, R.J. Paine, S.G. Perry, W.D. Peters, J.C. Weil, and R.B. Wilson. 2001. A complex terrain dispersion model for regulatory applications. *Atmospheric .Environment.* 35, 4211-4221. doi:10.1016/S1352-2310(01)00186-8

Wilson, R. B., Start, G. E., Dickson, C. R., and Ricks, N. R. 1976. Diffusion under low wind speed conditions near Oak Ridge, Tennessee, *NOAA Technical Memorandum* ERL ARL-61, 83 pp.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Table 1. Databases Selected for the Model Evaluation

	Mercer County, North Dakota	**Gibson Generating Station, Indiana**
Number of emission sources modeled	15	5
Number of SO_2 monitors	5 (one above stack top for several sources)	4 (all below stack top)
Type of terrain	Rolling	Flat
Meteorological years and data source	2007-2010 local 10-meter tower data	2008-2010 Evansville airport
Meteorological data time step	Hourly and sub-hourly	Hourly and sub-hourly

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Emissions and exhaust data	Actual hourly variable emissions and velocity, fixed temperature	Actual hourly variable emissions and velocity, fixed temperature

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Table 2. Source Information

Data Base	Source ID	UTM X (m)	UTM Y (m)	Base Elev. (m)	Stack Height (m)	Exit Temp (K)	Stack Dia. (m)
ND	Antelope Valley	285920	5250189	588.3	182.9	Vary	7.0
ND	Antelope Valley	285924	5250293	588.3	182.9	Vary	7.0
ND	Leland Olds	324461	5239045	518.3	106.7	Vary	5.3
ND	Leland Olds	324557	5238972	518.3	152.4	Vary	6.7
ND	Milton R Young	331870	5214952	597.4	171.9	Vary	6.2
ND	Milton R Young	331833	5214891	600.5	167.6	Vary	9.1

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

ND	Coyote	286875	5233589	556.9	151.8	Vary	6.4
ND	Stanton	323642	5239607	518.2	77.7	Vary	4.6
ND	Coal Creek	337120	5249480	602.0	201.2	Vary	6.7
ND	Coal Creek	337220	5249490	602.0	201.2	Vary	6.7
ND	Dakota Gasification Company	285552	5249268	588.3	119.8	Vary	7.0
ND	Dakota Gasification Company	285648	5249553	588.3	68.6	Vary	0.5
ND	Dakota Gasification Company	285850	5248600	588.3	76.2	Vary	1.0
ND	Dakota Gasification	285653	5249502	588.3	30.5	Vary	0.5

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

	Company						
Gibson	Gibson 1	432999	4247189	119.0	189.0	327.2	7.6
Gibson	Gibson 2	432999	4247189	119.0	189.0	327.2	7.6
Gibson	Gibson 3	432923	4247251	118.5	189.0	327.2	7.6
Gibson	Gibson 4	432886	4247340	117.9	152.4	327.2	7.2
Gibson	Gibson 5	432831	4247423	116.3	152.4	327.2	7.2

Notes: SO_2 emission rate and exit velocity vary on hourly basis for each modeled source. Exit temperature varies by hour for the ND sources, but with wet scrubbing, is fixed at 327.2 deg K.

UTM zones are 14 for North Dakota and 16 for Gibson.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Table 3. Monitor/Receptor Locations

Data base	Monitor	UTM X (m)	UTM Y (m)	Monitor Elevation (m)
ND	DGC#12	291011	5244991	593.2
ND	DGC#14	290063	5250217	604.0
ND	DGC#16	283924	5252004	629.1
ND	DGC#17[(a)]	279025	5253844	709.8
ND	Beulah	290823	5242062	627.1
Gibson	Mt. Carmel	432424	4250202	119.0
Gibson	East Mt. Carmel	434654	4249666	119.3
Gibson	Shrodt	427175	4247182	138.0
Gibson	Gibson Tower	434792	4246296	119.0

[(a)] This monitor's elevation is above stack top for several of the ND sources.

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Table 4. North Dakota Ratio of Monitored to Modeled Design Concentrations*

Test Case	Monitor	Observed	Predicted	Ratio
Test Case 1 (Default AERMET, Default AERMOD)	DGC#12	91.52	109.96	1.20
	DGC#14	95.00	116.84	1.23
	DGC#16	79.58	119.94	1.51
	DGC#17	83.76	184.48	2.20
	Beulah	93.37	119.23	1.28
Test Case 2 (Beta AERMET, Default AERMOD)	DGC#12	91.52	109.96	1.20
	DGC#14	95.00	116.84	1.23
	DGC#16	79.58	119.94	1.51
	DGC#17	83.76	127.93	1.53
	Beulah	93.37	119.23	1.28
Test Case 3 (Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.3 m/sec)	DGC#12	91.52	103.14	1.13
	DGC#14	95.00	110.17	1.16
	DGC#16	79.58	111.74	1.40
	DGC#17	83.76	108.69	1.30
	Beulah	93.37	106.05	1.14

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Test Case 4 (Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.5 m/sec)	DGC#12	91.52	95.86	1.05
	DGC#14	95.00	100.50	1.06
	DGC#16	79.58	106.65	1.34
	DGC#17	83.76	101.84	1.22
	Beulah	93.37	92.32	0.99
Test Case 5 (SHARP)	DGC#12	91.52	82.18	0.90
	DGC#14	95.00	84.24	0.89
	DGC#16	79.58	95.47	1.20
	DGC#17	83.76	88.60	1.06
	Beulah	93.37	86.98	0.93
*Design Concentration: 99th percentile peak daily 1-hour maximum, averaged over the years				

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

Table 5. Gibson Ratio of Monitored to Modeled Design Concentrations*

Test Case	Monitor	Observed	Predicted	Ratio
Test Case 1 (Default AERMET, Default AERMOD)	Mt. Carmel	197.25	278.45	1.41
	East Mt. Carmel	206.89	230.74	1.12
	Shrodt	148.16	189.63	1.28
	Gibson Tower	127.12	193.71	1.52
Test Case 2 (Beta AERMET, Default AERMOD)	Mt. Carmel	197.25	287.16	1.46
	East Mt. Carmel	206.89	229.22	1.11
	Shrodt	148.16	189.63	1.28
	Gibson Tower	127.12	193.71	1.52
Test Case 3 (Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.3 m/sec)	Mt. Carmel	197.25	280.32	1.42
	East Mt. Carmel	206.89	224.65	1.09
	Shrodt	148.16	184.82	1.25
	Gibson Tower	127.12	192.22	1.51
Test Case 4 (Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.5 m/sec)	Mt. Carmel	197.25	277.57	1.41
	East Mt. Carmel	206.89	224.65	1.09
	Shrodt	148.16	176.81	1.19
	Gibson Tower	127.12	192.22	1.51
Test Case 5	Mt. Carmel	197.25	225.05	1.14

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

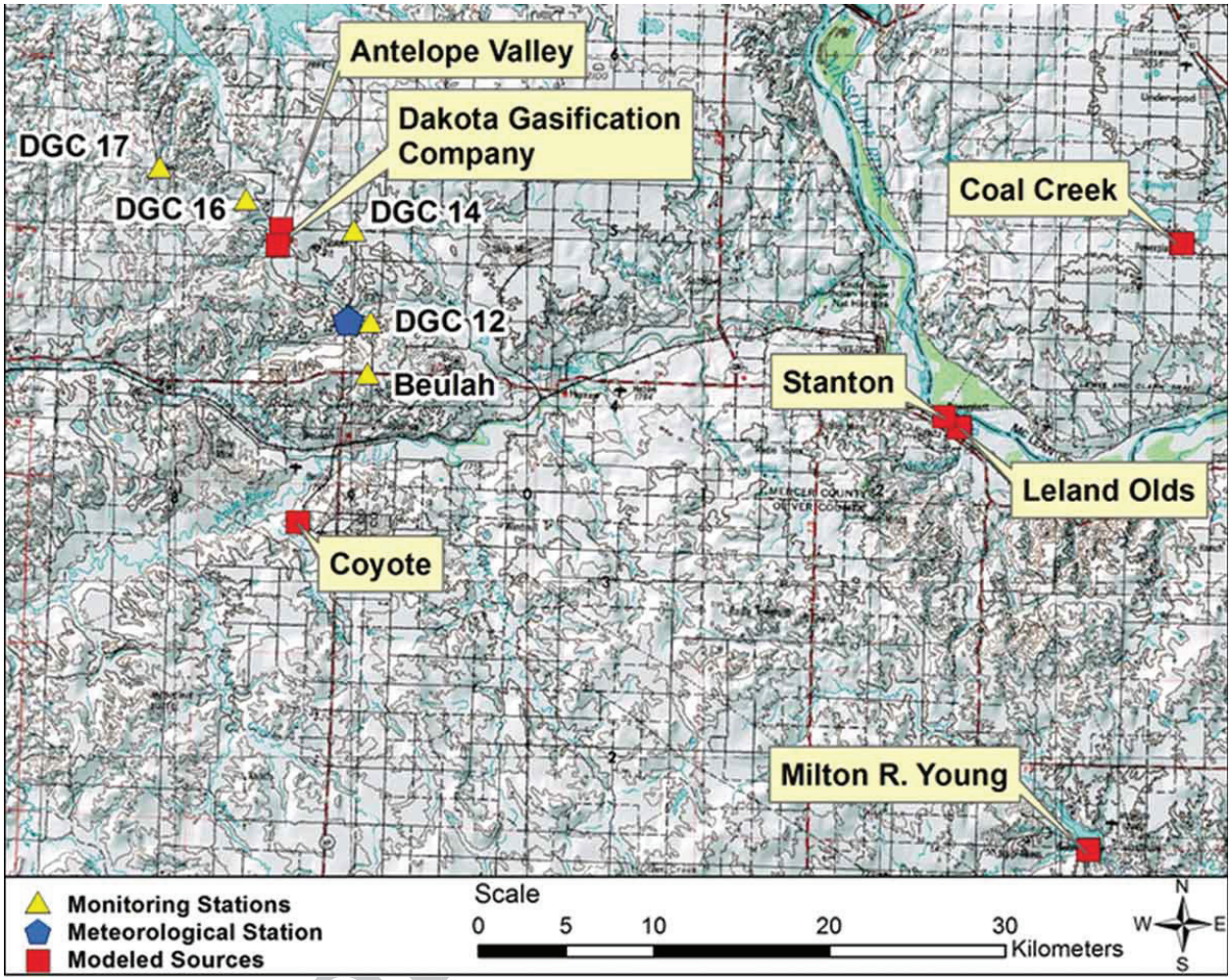
(SHARP)	East Mt. Carmel	206.89	202.82	0.98
	Shrodt	148.16	136.41	0.92
	Gibson Tower	127.12	148.64	1.17

*Design Concentration: 99th percentile peak daily 1-hour maximum, averaged over the years

Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepted Manuscript

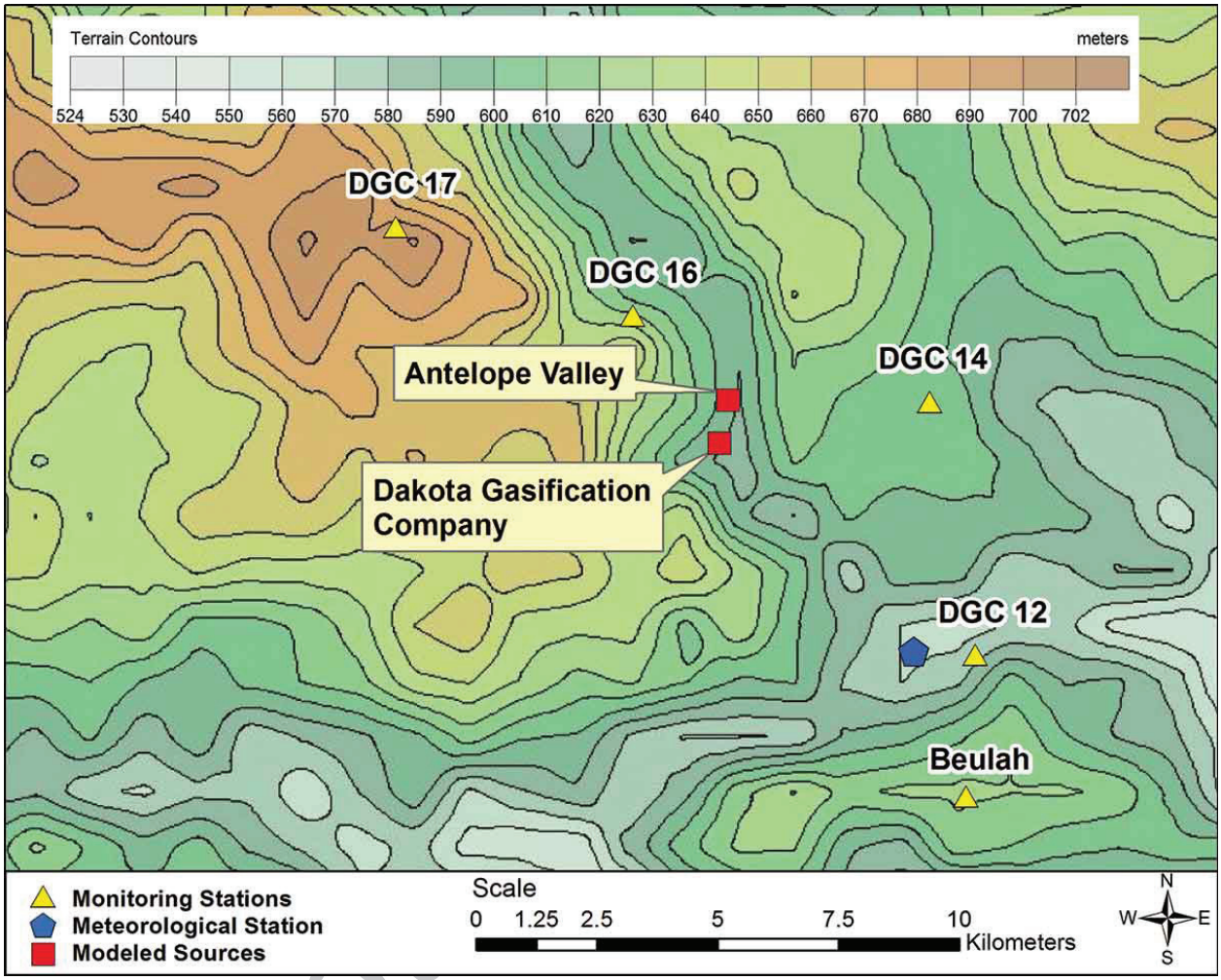
Figure 1. Map of North Dakota Model Evaluation Layout



Downloaded by [Robert Paine] at 04:31 25 August 2015

Accep

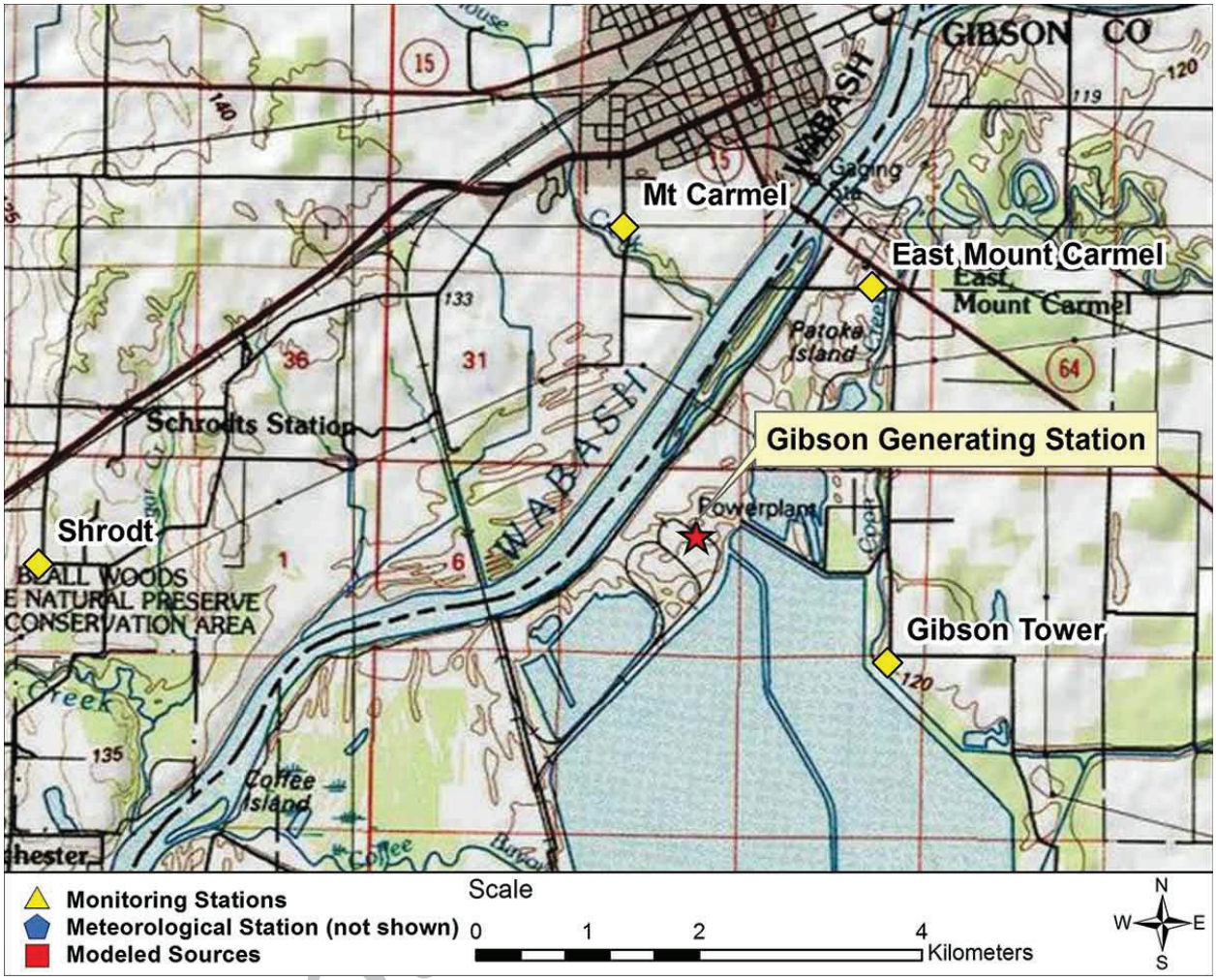
Figure 2. Terrain Around the North Dakota Monitors



Downloaded by [Robert Paine] at 04:31 25 August 2015

Accep

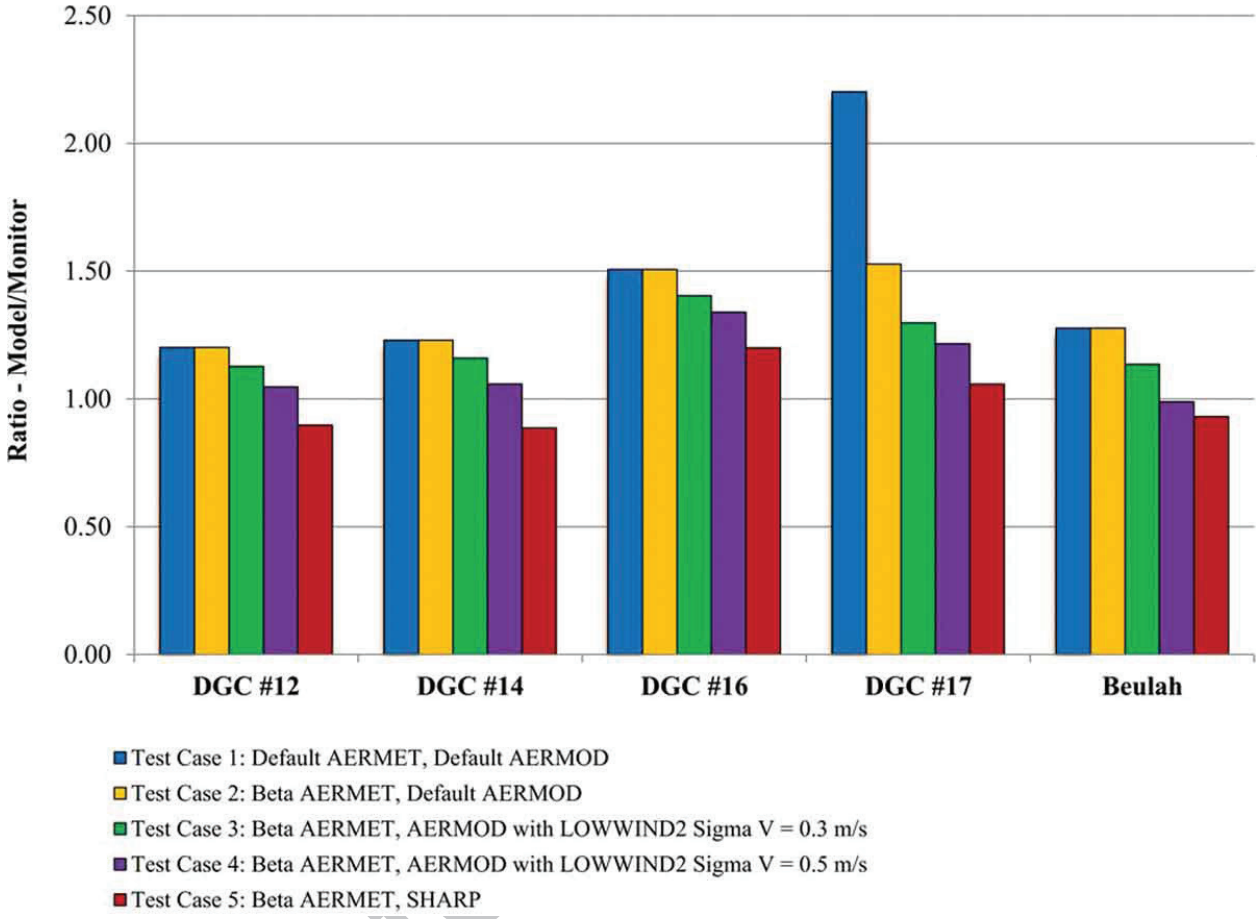
Figure 3. Map of Gibson Model Evaluation Layout



Downloaded by [Robert Paine] at 04:31 25 August 2015

Accep

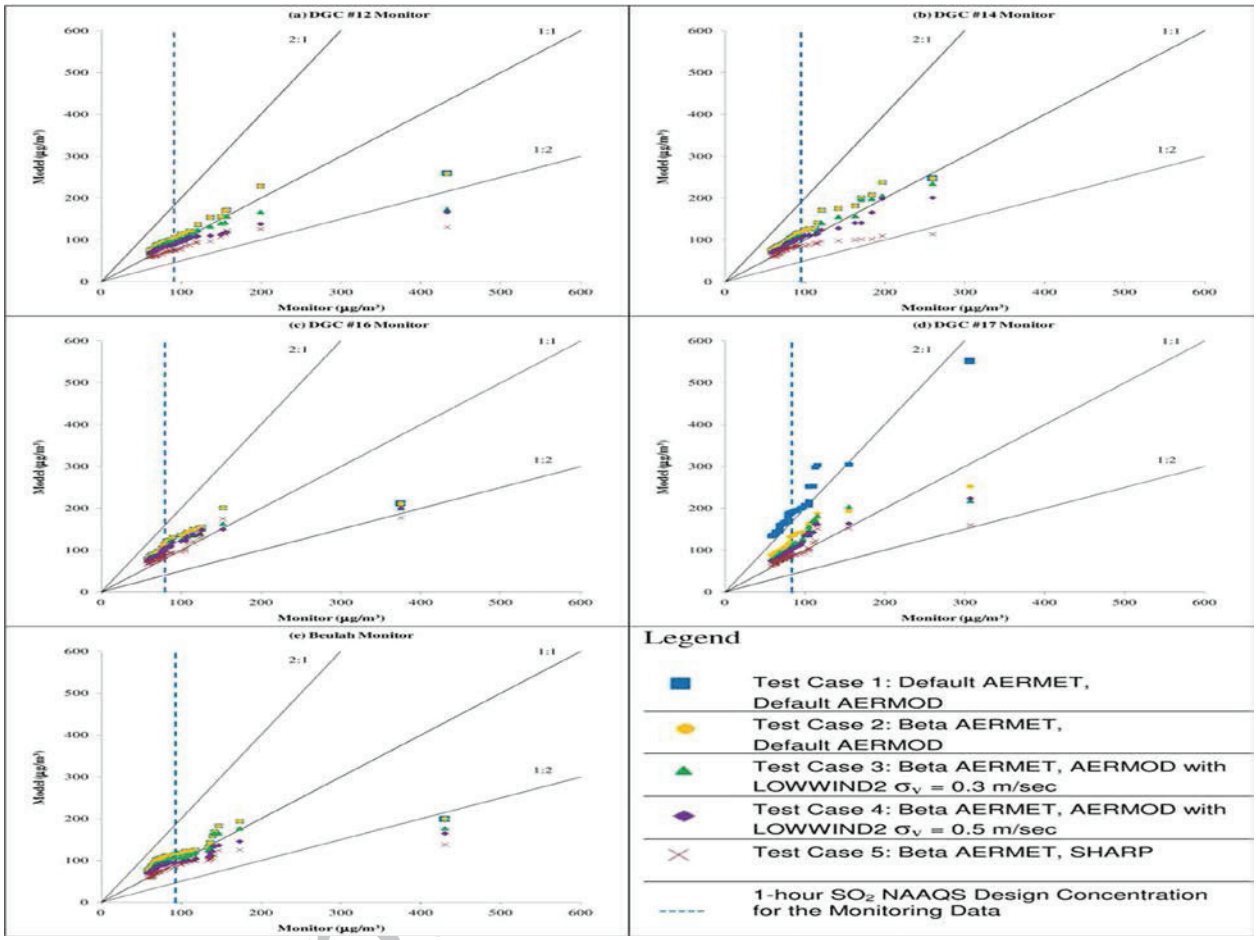
Figure 4. North Dakota Ratio of Monitored to Modeled Design Concentration Values at Specific Monitors



Downloaded by [Robert Paine] at 04:31 25 August 2015

Accepte

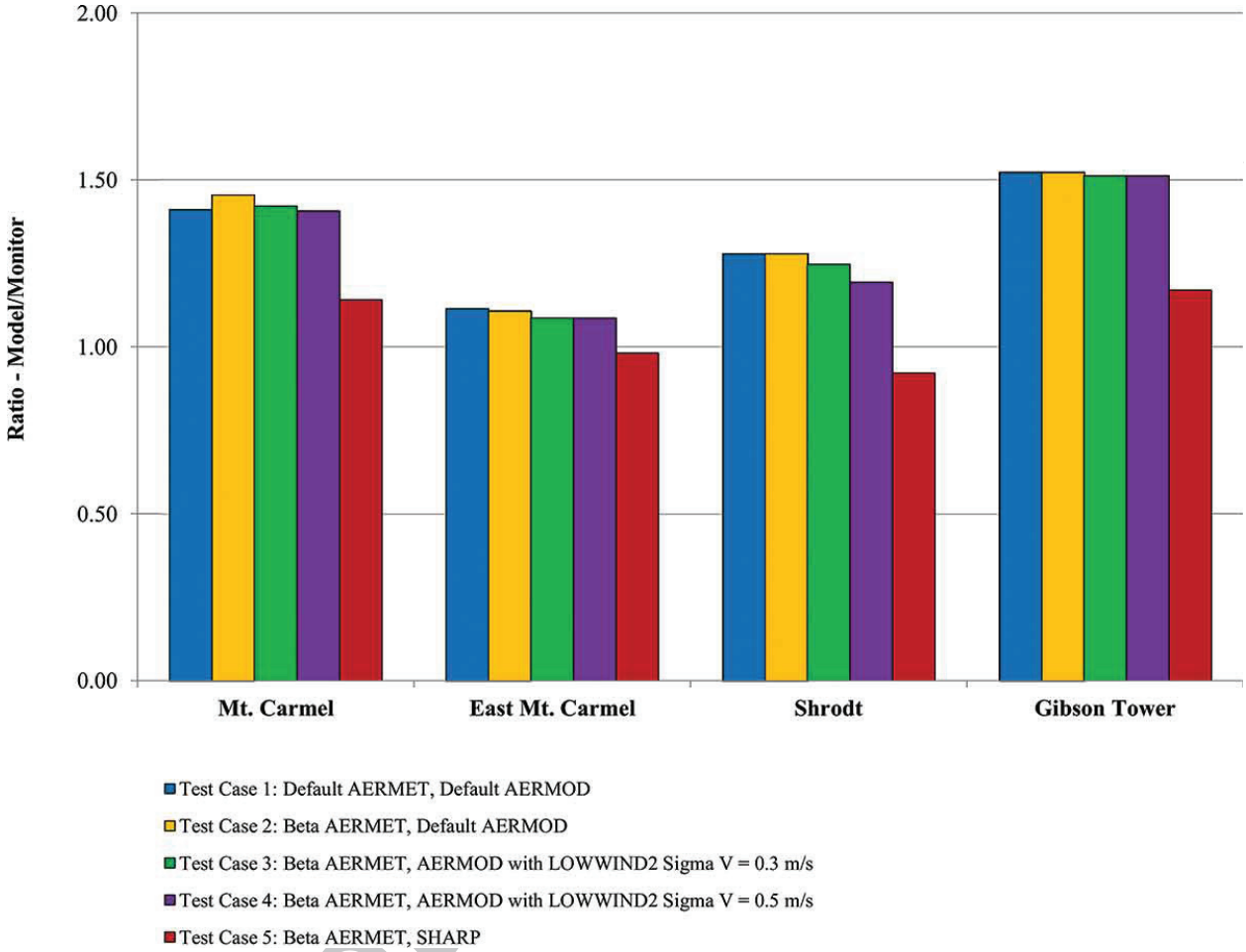
Figure 5. North Dakota Q-Q Plots: Top 50 Daily Maximum 1-hour SO_2 Concentrations. (a) DGC #12 Monitor. (b) DGC#14 Monitor. (c) DGC#16 Monitor. (d) DGC#17 Monitor. (e) Beulah Monitor



Downloaded by [Robert Paine] at 04:31 25 August 2015

Accep

Figure 6. Gibson Ratio of Monitored to Modeled Design Concentration Values at Specific Monitors

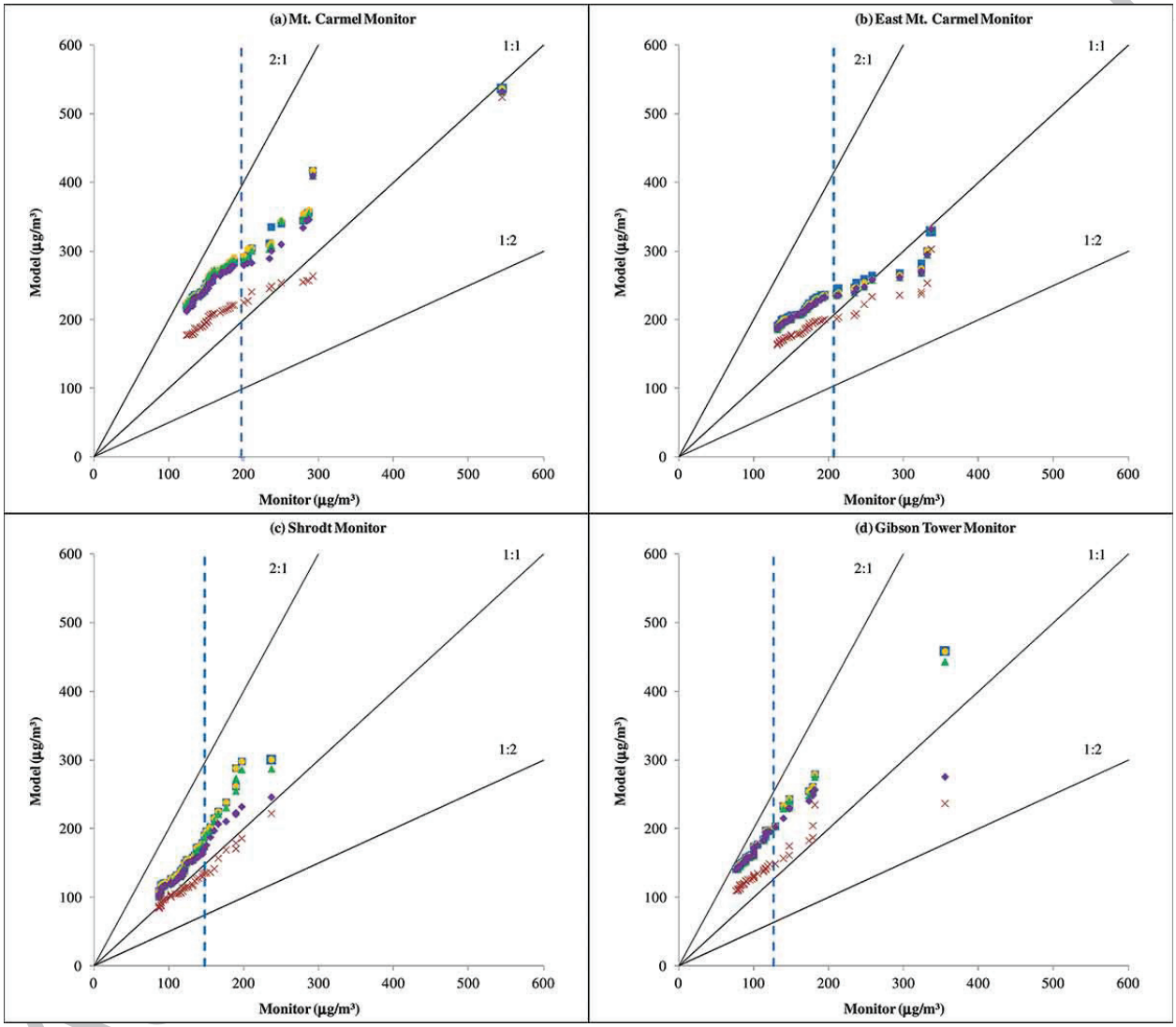


Downloaded by [Robert Paine] at 04:31 25 August 2015

Accep

Figure 7. Gibson Q-Q Plots: Top 50 Daily Maximum 1-hour SO_2 Concentrations.

(a) Mt. Carmel Monitor. (b) East Mt. Carmel Monitor. (c) Shrodt Monitor. (d) Gibson Tower Monitor. For the legend, see Figure 5.



Downloaded by [Robert Paine] at 04:31 25 August 2015

Appendix C

Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases with AERMET ADJ_U* and AERMOD LOWWIND3 Options

Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases with AERMET ADJ_U* and AERMOD LOWWIND3 Options

Olga Samani and Robert Paine, AECOM

August 22, 2015

Introduction

In a proposed rulemaking published in the July 29, 2015 Federal Register (80 FR 45340), the United States Environmental Protection Agency (EPA) released a revised version of AERMOD (15181), which replaces the previous version of AERMOD dated 14134. EPA proposed refinements to its preferred short-range model, AERMOD, involving low wind conditions. These refinements involve an adjustment to the computation of the friction velocity ("ADJ_U*") in the AERMET meteorological pre-processor and a higher minimum lateral lateral wind speed standard deviation, sigma-v (σ_v), as incorporated into the "LOWWIND3" option. The proposal indicates that "the LOWWIND3 BETA option increases the minimum value of sigma-v from 0.2 to 0.3 m/s, uses the FASTALL approach to replicate the centerline concentration accounting for horizontal meander, but utilizes an effective sigma-y and eliminates upwind dispersion".[1]

This document describes the evaluation of the combined ADJ_U* and LOWWIND3 options as recommended by EPA for incorporated as default options in AERMOD version 15181 on two previously evaluated tall-stack databases as described by Paine et al. (2015)[2]. Here we compare the model evaluation results of these new options relative to the various modeling options previously tested model options in AERMOD version 14134.

Modeling Options and Databases for Testing

The meteorological data, emissions, and receptors used in this analysis were identical to Paine et al. (2015) analysis. Two AERMET/AERMOD model configurations were tested for the two field study databases.

- AERMET and AERMOD in default mode with version 15181.
- Low wind beta option for AERMET (ADJ_U*) and the LOWWIND3 option for AERMOD (LOWWIND3 automatically sets minimum σ_v value to 0.3 m/sec) with version 15181.

The results were compared to the five AERMET/AERMOD model configurations previously tested in Paine et al. (2015) with version 13350.

- AERMET and AERMOD in default mode.

---

[1] Addendum User's Guide for the AMS/EPA Regulatory Model – AERMOD http://www.epa.gov/ttn/scram/models/aermod/aermod_userguide.zip

[2] Paine, R., Samani, O., Kaplan, M. Knipping, E., and Kumar, N. Evaluation of Low Wind Modeling Approaches for Two Tall-Stack Databases. Pending publications (as of August, 2015) in the Journal of Air & Waste Management Association.

- Low wind beta option for AERMET and default options for AERMOD (minimum σ_v value of 0.2 m/sec).
- Low wind beta option for AERMET and the LOWWIND2 option for AERMOD (minimum σ_v value of 0.3 m/sec).
- Low wind beta option for AERMET and the LOWWIND2 option for AERMOD (minimum σ_v value of 0.5 m/sec).
- Low wind beta option for AERMET and AERMOD run in sub-hourly mode (SHARP).

All model applications used one wind level, a minimum wind speed of 0.5 m/sec, and also used hourly average meteorological data with the exception of SHARP applications.

The Mercer County, North Dakota and Gibson Generating Station, Indiana databases were selected for the low wind model evaluation due to the following attributes:

- They feature multiple years of hourly SO_2 monitoring at several sites.
- Emissions are dominated by tall stack sources that are available from continuous emission monitors.
- They include sub-hourly meteorological data so that the SHARP modeling approach could be tested as well.
- There is representative meteorological data from a single-level station typical of (or obtained from) airport-type data.

Model Evaluation Results

The model evaluation employed metrics that address two basic areas:

1) 1-hour SO_2 NAAQS Design Concentration averaged over the years modeled at each monitor.

An operational metric that is tied to the form of the 1-hour SO_2 NAAQS is the "design concentration" (99th percentile of the peak daily 1-hour maximum values). This tabulated statistic was developed for each modeled case and for each individual monitor for each database evaluated.

2) Quantile-Quantile Plots for each monitor.

Operational performance of models for predicting compliance with air quality regulations, especially those involving a peak or near-peak value at some unspecified time and location, can be assessed with quantile-quantile (Q-Q) plots, which are widely used in AERMOD evaluations. Q-Q plots are created by independently ranking (from largest to smallest) the predicted and the observed concentrations from a set of predictions initially paired in time and space. A robust model would have all points on the diagonal (45-degree) line.

North Dakota Database Model Evaluation Procedures and Results

AERMOD was run for the two version 15181 configurations described above to compute the 1-hour daily maximum 99th percentile averaged over four years at the five ambient monitoring locations. A regional background of 10 µg/m^3 was added to the AERMOD modeled predictions, as determined from a review of rural monitors unaffected by local sources.

The 1-hour SO_2 design concentrations and ratios of the modeled (including the background of 10 µg/m^3) to monitored design concentrations for the North Dakota evaluation database are summarized in Table 1 and graphically plotted in Figure 2. The results of the Paine et al. (2015) model evaluation analysis for the five options (version 13350) is shown here along with the results of the new evaluation with AERMOD version 15181.

The overall results indicate that the predicted-to-observed ratios are generally greater than 1.0 and AERMOD version 15181 still over-predicts even with use of the proposed ADJ_u* and the LOWWIND3 options. The low wind options show improvement relative to the default options at all monitors, especially the monitor in higher terrain (DGC #17).

As shown in Figure 1, and as expected the results for the new model with low wind options are very close to the AERMOD version 14134 model with ADJ_U* and LOWWIND2. The results of the two model versions with default options are also very close to each other.

The Q-Q plots of the ranked top fifty daily maximum 1-hour SO_2 concentrations for predictions and observations are shown in Figure 2 (a-e) for AERMOD version 15181 default and low wind options. For the convenience of the reader, a vertical dashed line is included in each Q-Q plot to indicate the observed design concentration. In general, the Q-Q plots indicate the following:

- For all of the monitors, to the left of the design concentration line, the ranked predictions are at or higher than observations.
- To the right of the design concentration line, some of the ranked modeled values are lower than the ranked observed levels (although this is not the case for DGC #17).

Gibson Generating Station Database Model Evaluation Procedures and Results

AERMOD was run for the two version 15181 configurations described above to compute the 1-hour daily maximum 99th percentile averaged over three years at the four ambient monitors. A regional background of 18 µg/m^3 was added to the AERMOD modeled predictions.

The ratio of the modeled (including the background of 18 µg/m^3) to monitored concentrations is summarized in Table 2 and graphically plotted in Figure 3, and these ratios are generally greater than 1.0. The current version of AERMOD (version 15181) run in default mode showed no changes from the previous version's default results, still having over-predictions of about 10-50%. The proposed low wind options provided modest improvements in performance relative to the default options, while still showing an over-prediction tendency at each monitor.

The Q-Q plots of the ranked top fifty daily maximum 1-hour SO_2 concentrations for predictions and observations are shown in Figure 4 (a-d). As in the case of the North Dakota evaluation results, the Gibson plots indicate the following:

- For all of the monitors, to the left of the design concentration line, the ranked predictions are at or higher than observations.
- To the right of the design concentration line, some of the ranked modeled values are lower than the ranked observed levels (although this is not the case for Shrodt or Mt. Carmel for the low wind options).

Conclusions

The model evaluation results for the new version of AERMOD (version 15181) on the two databases showed that the proposed low wind options (ADJ_U* and LOWWIND3) perform better than the default options, while still overpredicting the design concentration at each monitor in both databases. Therefore, in conjunction with other evaluations that EPA reported at the 11th modeling conference on August 12, 2015, we recommend that EPA adopt the proposed low wind options default options, and allow their use in the interim for all modeling applications.

Table 1: North Dakota Ratio of Monitored to Modeled Design Concentrations*

Model Version	Test Case	Monitor	Observed	Predicted	Ratio
13350 (previously reported results)	Default AERMET, Default AERMOD	DGC#12	91.52	109.96	1.20
		DGC#14	95.00	116.84	1.23
		DGC#16	79.58	119.94	1.51
		DGC#17	83.76	184.48	2.20
		Beulah	93.37	119.23	1.28
15181	Default AERMET, Default AERMOD	DGC#12	91.52	110.77	1.21
		DGC#14	95.00	117.51	1.24
		DGC#16	79.58	120.30	1.51
		DGC#17	83.76	184.49	2.20
		Beulah	93.37	120.31	1.29
13350 (previously reported results)	Beta AERMET, Default AERMOD	DGC#12	91.52	109.96	1.20
		DGC#14	95.00	116.84	1.23
		DGC#16	79.58	119.94	1.51
		DGC#17	83.76	127.93	1.53
		Beulah	93.37	119.23	1.28
13350 (previously reported results)	Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.3 m/sec	DGC#12	91.52	103.14	1.13
		DGC#14	95.00	110.17	1.16
		DGC#16	79.58	111.74	1.40
		DGC#17	83.76	108.69	1.30
		Beulah	93.37	106.05	1.14
13350 (previously reported results)	Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.5 m/sec	DGC#12	91.52	95.86	1.05
		DGC#14	95.00	100.50	1.06
		DGC#16	79.58	106.65	1.34
		DGC#17	83.76	101.84	1.22
		Beulah	93.37	92.32	0.99
15181	Beta AERMET, AERMOD with LOWWIND3	DGC#12	91.52	98.75	1.08
		DGC#14	95.00	112.09	1.18
		DGC#16	79.58	111.20	1.40
		DGC#17	83.76	108.76	1.30
		Beulah	93.37	99.54	1.07
13350 (previously reported results)	SHARP	DGC#12	91.52	82.18	0.90
		DGC#14	95.00	84.24	0.89
		DGC#16	79.58	95.47	1.20
		DGC#17	83.76	88.60	1.06
		Beulah	93.37	86.98	0.93

*Design Concentration: 99th percentile peak daily 1-hour maximum, averaged over the years modeled and monitored.

Figure 1: North Dakota Ratio of Monitored to Modeled Design Concentration Values

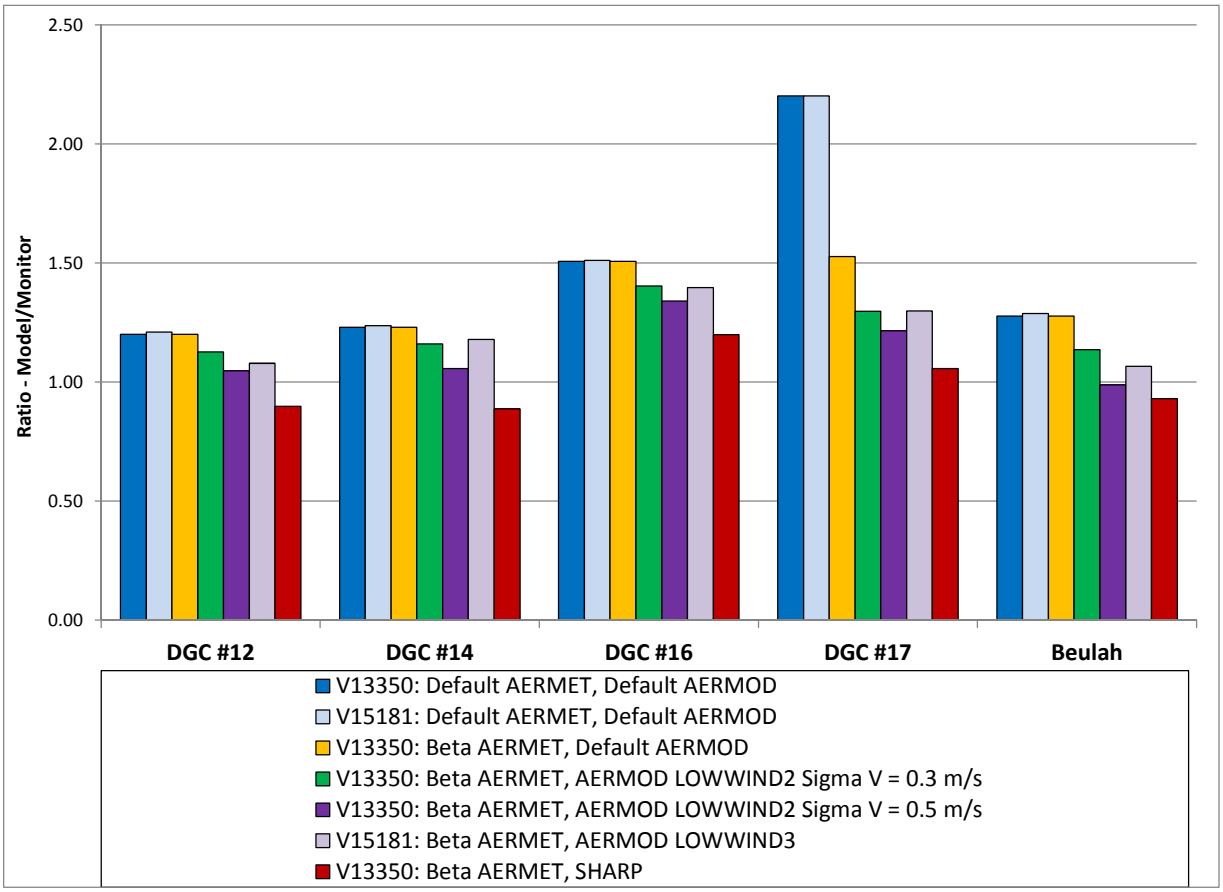
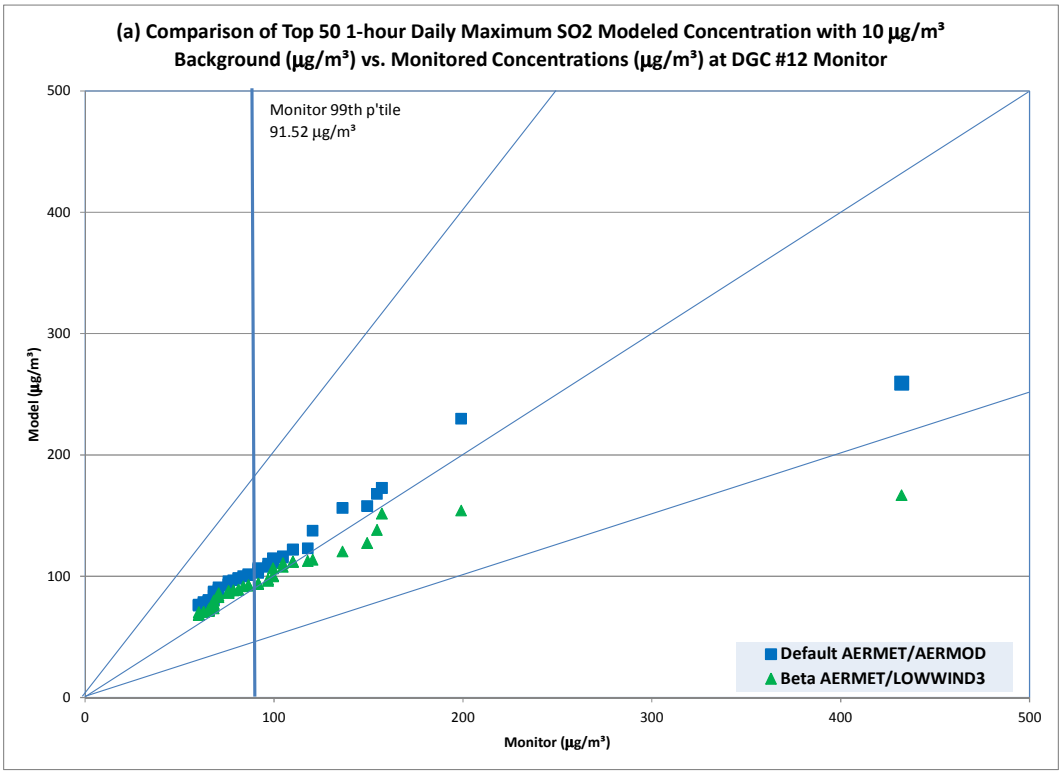
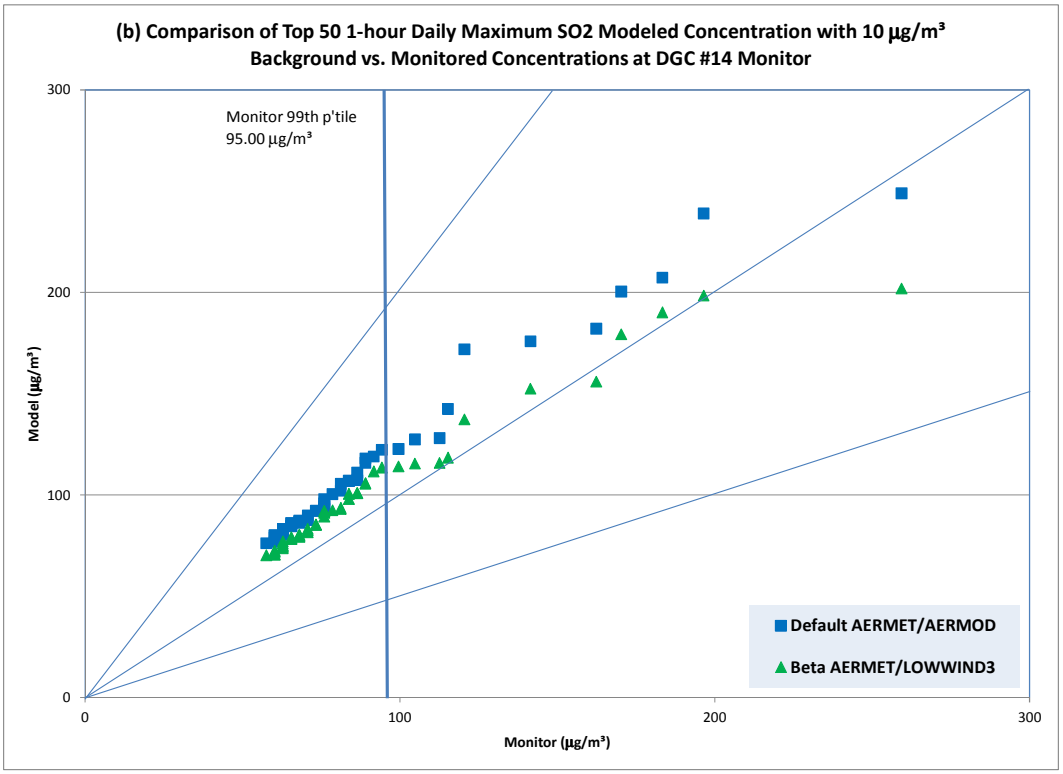
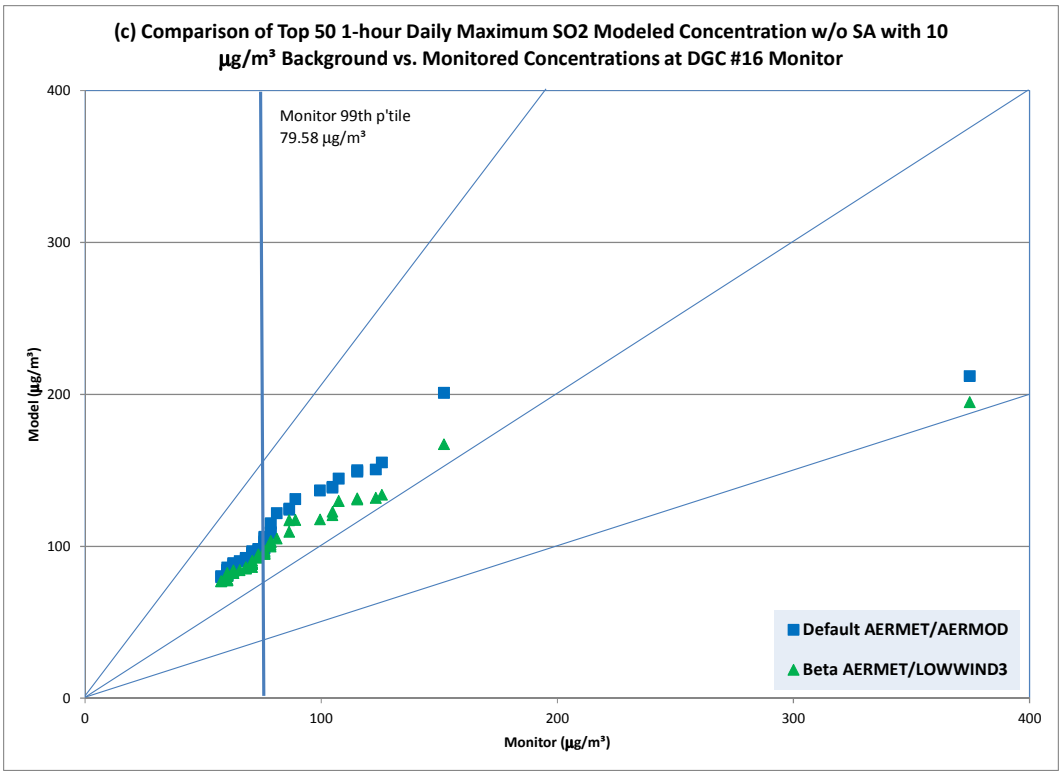
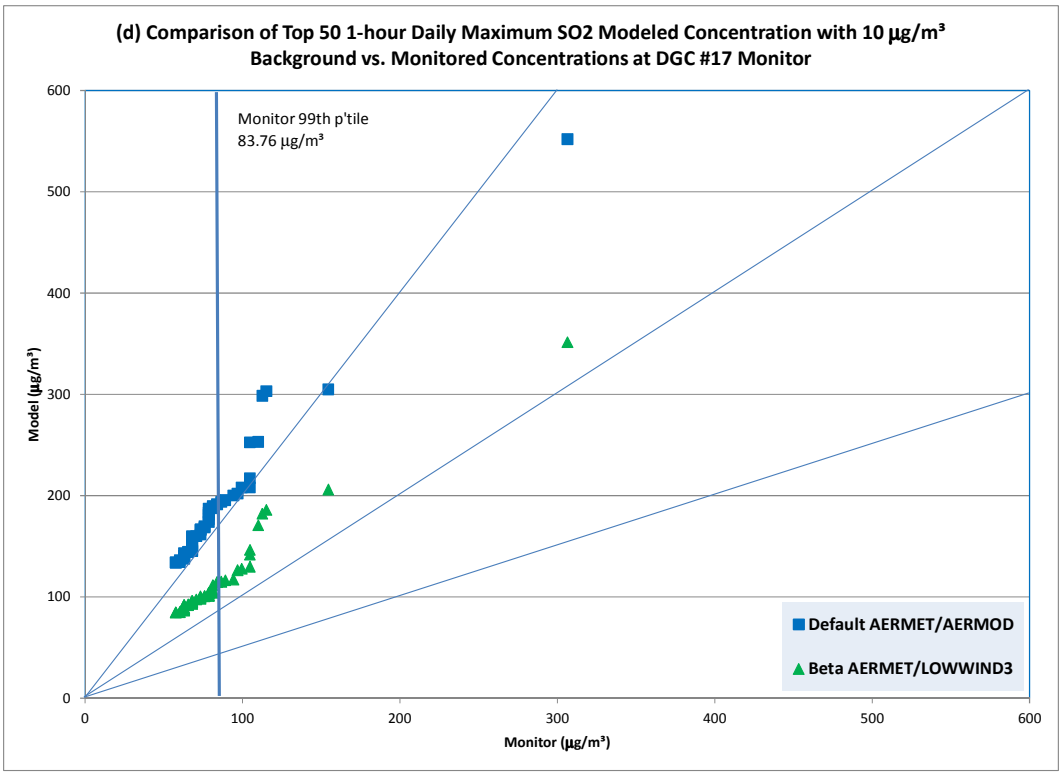


Figure 2: North Dakota Q-Q Plots: Top 50 Daily Maximum 1-hour SO_2 Concentrations. (a) DGC #12 Monitor. (b) DGC#14 Monitor. (c) DGC#16 Monitor. (d) DGC#17 Monitor. (e) Beulah Monitor






(c) Comparison of Top 50 1-hour Daily Maximum SO2 Modeled Concentration w/o SA with 10 µg/m³ Background vs. Monitored Concentrations at DGC #16 Monitor
Monitor 99th p'tile
79.58 µg/m³
Model (µg/m³)
Monitor (µg/m³)
0
100
200
300
400
Default AERMET/AERMOD
Beta AERMET/LOWWIND3


(d) Comparison of Top 50 1-hour Daily Maximum SO2 Modeled Concentration with 10 µg/m³ Background vs. Monitored Concentrations at DGC #17 Monitor
Monitor 99th p'tile
83.76 µg/m³
Model (µg/m³)
Monitor (µg/m³)
0
100
200
300
400
500
600
Default AERMET/AERMOD
Beta AERMET/LOWWIND3

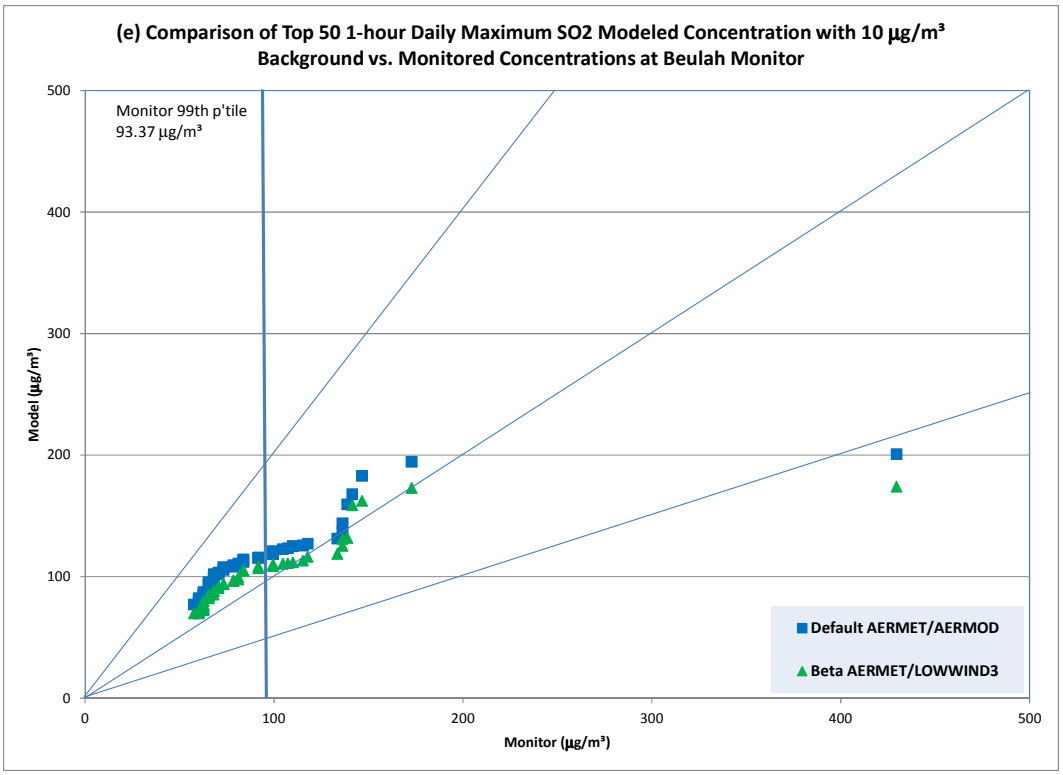

(e) Comparison of Top 50 1-hour Daily Maximum SO2 Modeled Concentration with 10 µg/m³ Background vs. Monitored Concentrations at Beulah Monitor
Monitor 99th p'tile
93.37 µg/m³
Model (µg/m³)
Monitor (µg/m³)
0
100
200
300
400
500
Default AERMET/AERMOD
Beta AERMET/LOWWIND3

Table 2: Gibson Ratio of Monitored to Modeled Design Concentrations*

Model Version	Test Case	Monitor	Observed	Predicted	Ratio
13350 (previously reported results)	Default AERMET, Default AERMOD	Mt. Carmel	197.25	278.45	1.41
		East Mt.	206.89	230.74	1.12
		Shrodt	148.16	189.63	1.28
		Gibson Tower	127.12	193.71	1.52
15181	Default AERMET, Default AERMOD	Mt. Carmel	197.25	278.45	1.41
		East Mt.	206.89	230.74	1.12
		Shrodt	148.16	189.63	1.28
		Gibson Tower	127.12	193.71	1.52
13350 (previously reported results)	Beta AERMET, Default AERMOD	Mt. Carmel	197.25	287.16	1.46
		East Mt.	206.89	229.22	1.11
		Shrodt	148.16	189.63	1.28
		Gibson Tower	127.12	193.71	1.52
13350 (previously reported results)	Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.3 m/sec	Mt. Carmel	197.25	280.32	1.42
		East Mt.	206.89	224.65	1.09
		Shrodt	148.16	184.82	1.25
		Gibson Tower	127.12	192.22	1.51
13350 (previously reported results)	Beta AERMET, AERMOD with LOWWIND2 σ_v = 0.5 m/sec	Mt. Carmel	197.25	277.57	1.41
		East Mt.	206.89	224.65	1.09
		Shrodt	148.16	176.81	1.19
		Gibson Tower	127.12	192.22	1.51
15181	Beta AERMET, AERMOD with LOWWIND3	Mt. Carmel	197.25	276.12	1.40
		East Mt.	206.89	217.05	1.05
		Shrodt	148.16	175.42	1.18
		Gibson Tower	127.12	175.92	1.38
13350 (previously reported results)	SHARP	Mt. Carmel	197.25	225.05	1.14
		East Mt.	206.89	202.82	0.98
		Shrodt	148.16	136.41	0.92
		Gibson Tower	127.12	148.64	1.17

*Design Concentration: 99th percentile peak daily 1-hour maximum, averaged over the years modeled and monitored.

Figure 3: Gibson Ratio of Monitored to Modeled Design Concentration Values

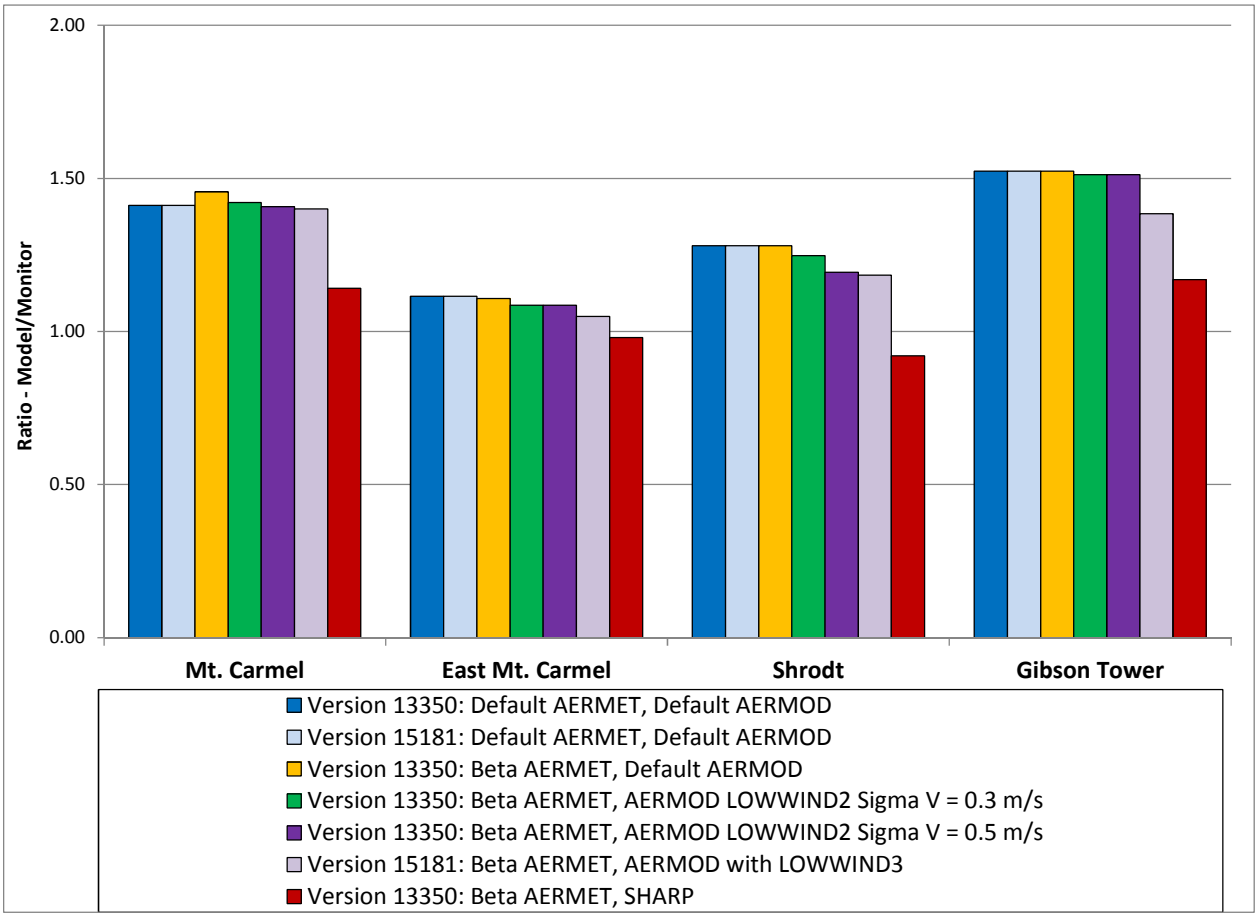
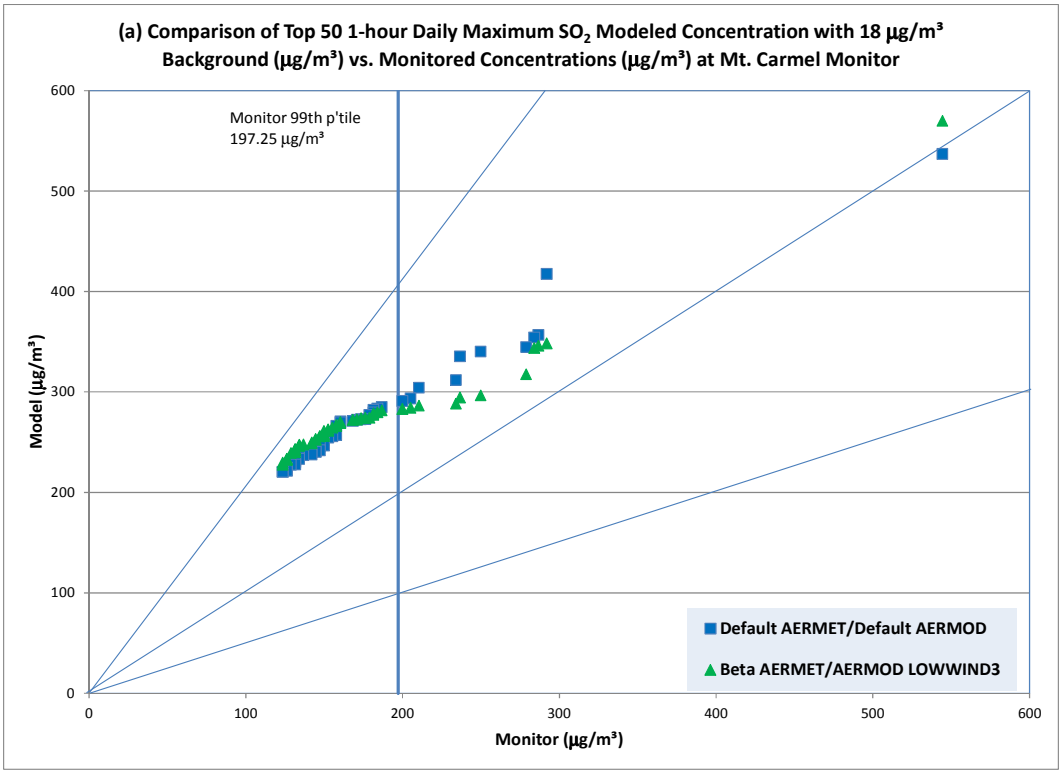
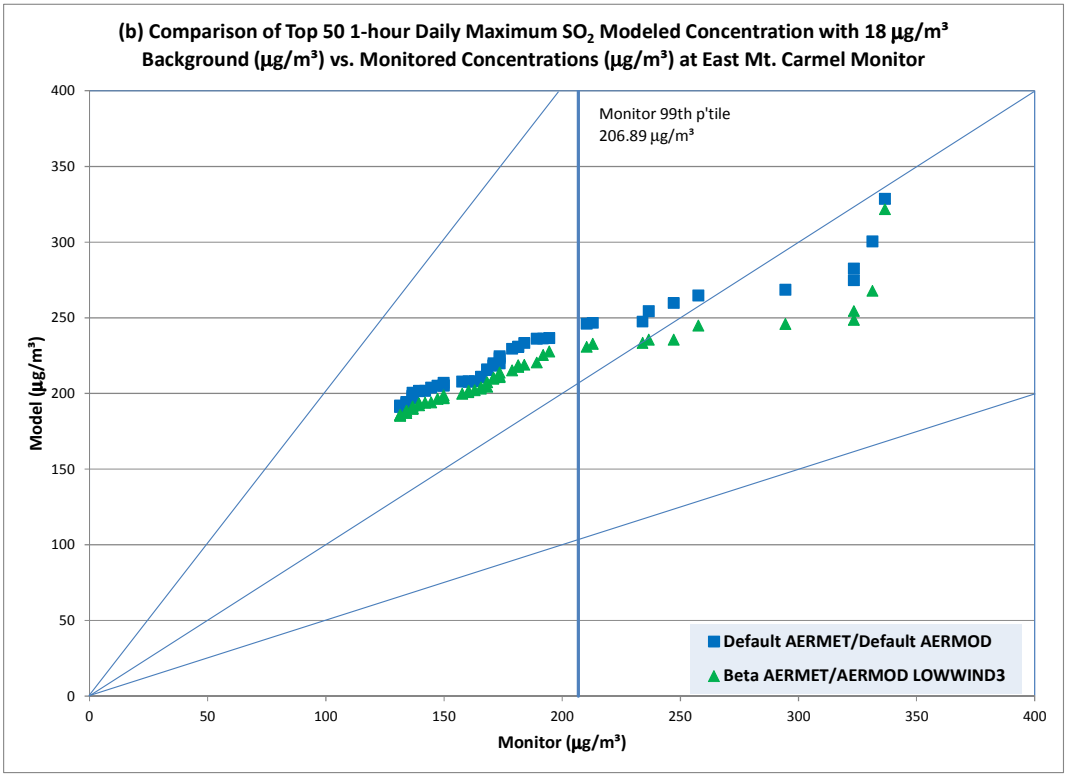
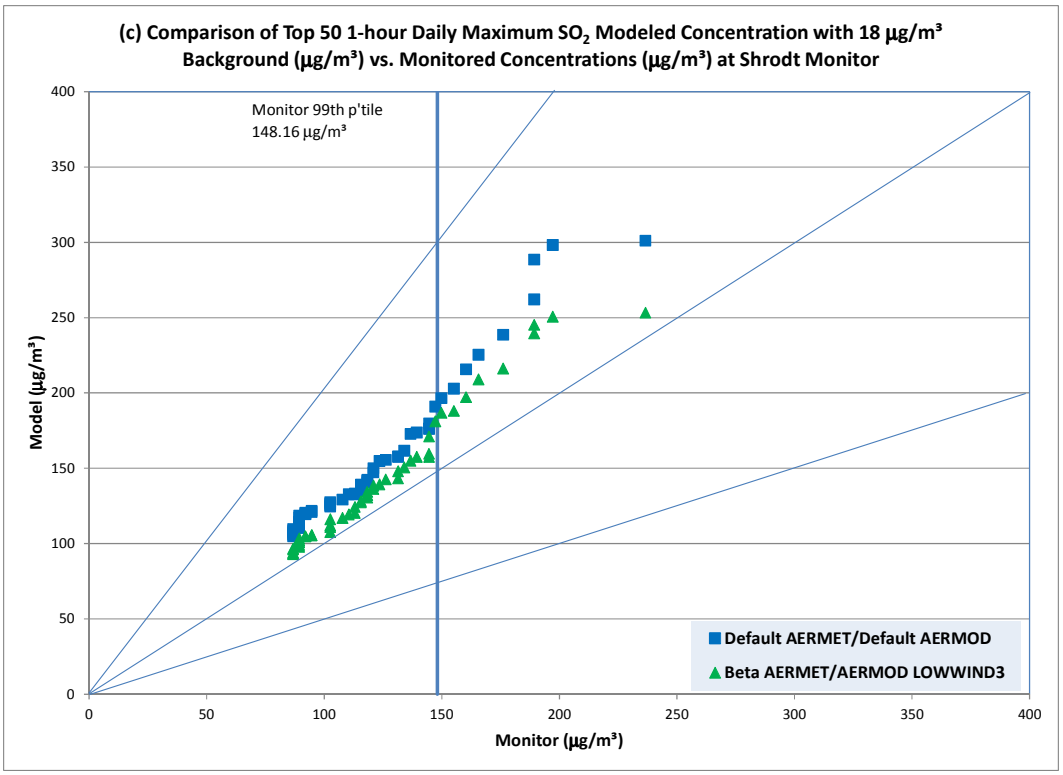
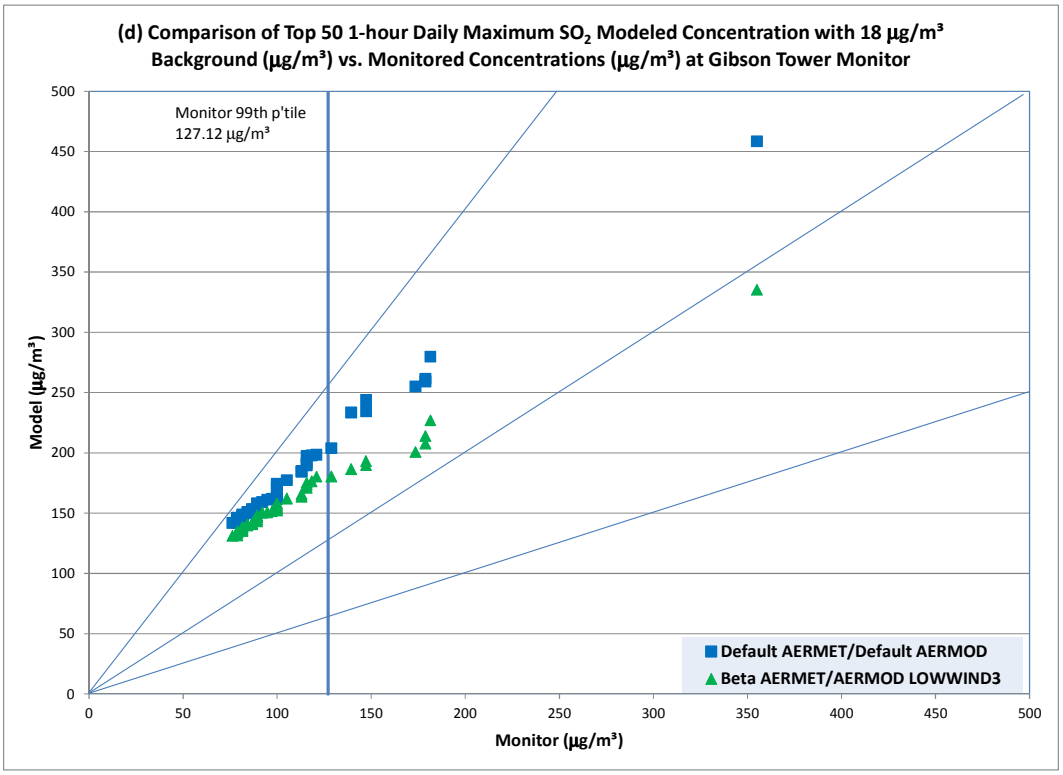


Figure 4: Gibson Q-Q Plots: Top 50 Daily Maximum 1-hour SO_2 Concentrations.
(a) Mt. Carmel Monitor. (b) East Mt. Carmel Monitor. (c) Shrodt Monitor. (d) Gibson Tower Monitor






(c) Comparison of Top 50 1-hour Daily Maximum SO_2 Modeled Concentration with 18 µg/m³ Background (µg/m³) vs. Monitored Concentrations (µg/m³) at Shrodt Monitor
Monitor 99th p'tile
148.16 µg/m³
Model (µg/m³)
Monitor (µg/m³)
Default AERMET/Default AERMOD
Beta AERMET/AERMOD LOWWIND3
0
50
100
150
200
250
300
350
400

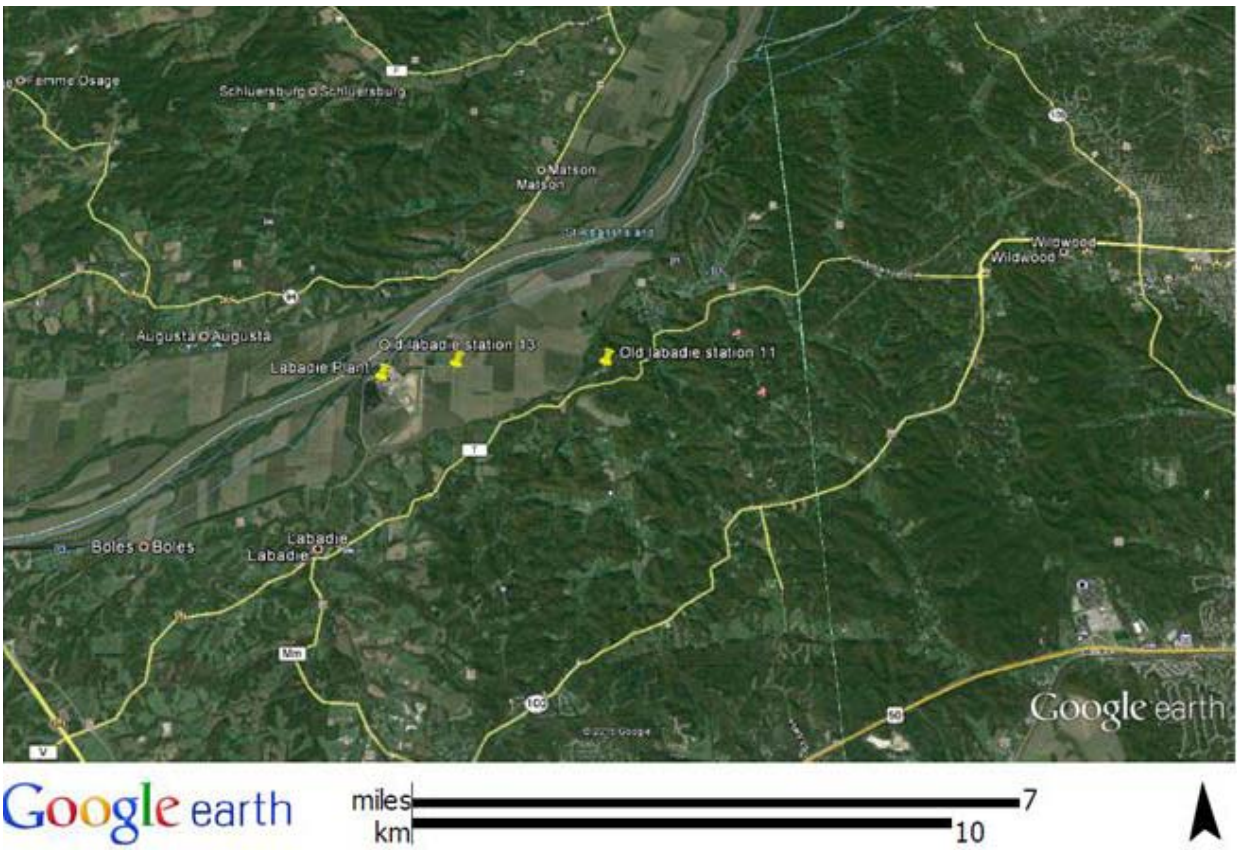

(d) Comparison of Top 50 1-hour Daily Maximum SO_2 Modeled Concentration with 18 µg/m³ Background (µg/m³) vs. Monitored Concentrations (µg/m³) at Gibson Tower Monitor
Monitor 99th p'tile
127.12 µg/m³
Model (µg/m³)
Monitor (µg/m³)
Default AERMET/Default AERMOD
Beta AERMET/AERMOD LOWWIND3
0
50
100
150
200
250
300
350
400
450
500

Appendix D

Comparison of Wind Roses from Jefferson City and Spirit of St. Louis Airports to Historical Tall-Tower Labadie Meteorological Data

Ameren has found in archived records that during the calendar year 1984, on-site meteorological data were taken at a 10-m tower ("Station 13") as well as from the 50-m and 85-m levels on a tall-tower ("Station 17") more reflective of stack-top conditions (213 meters) at the sites shown in Figure 1.

Figure 1: Meteorological Monitoring Sites from 1984 Data Collection Near Labadie



These stations were operated by Ameren (then Union Electric) experienced field personnel according to the applicable quality assurance guidance at that time.

Unfortunately, the hourly data gathered from this meteorological network was stored on 9-track reel tapes that no longer exist. However, hard copies of wind rose plots of the data are available for the various meteorological levels, as shown in Figure 2 for the on-site 10-m level, Figure 3 for the on-site 50-m level, and Figure 4 for the on-site 85-m level. These can be compared to the wind roses available for the KJEF and KSUS airports, available in Figures 5 and 6, respectively.

Figure 2: 1984 Wind Rose for 10-m On-site Meteorological Data Near the Labadie Energy Center

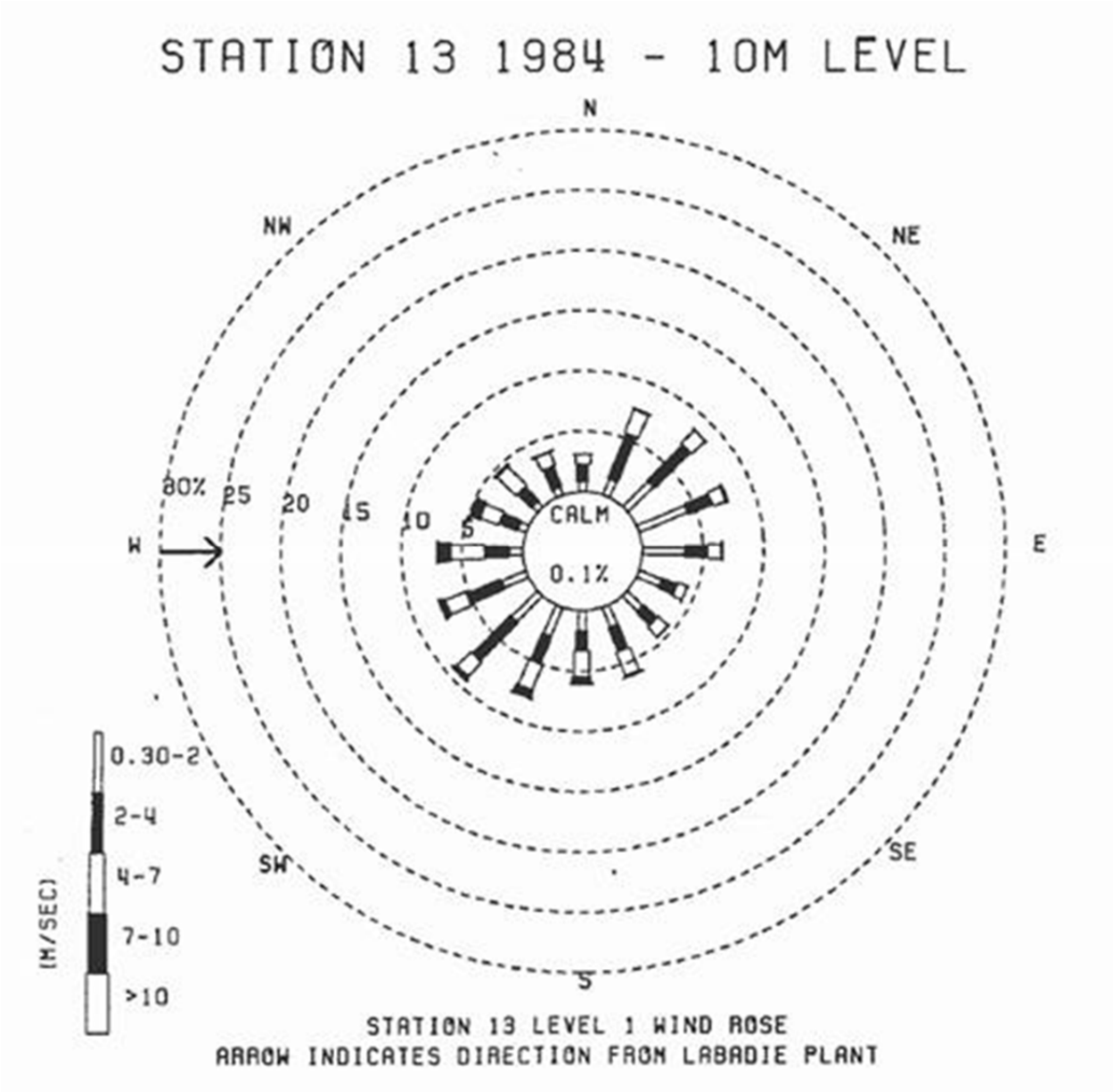


Figure 3: 1984 Wind rose for 50-m On-site Meteorological Data

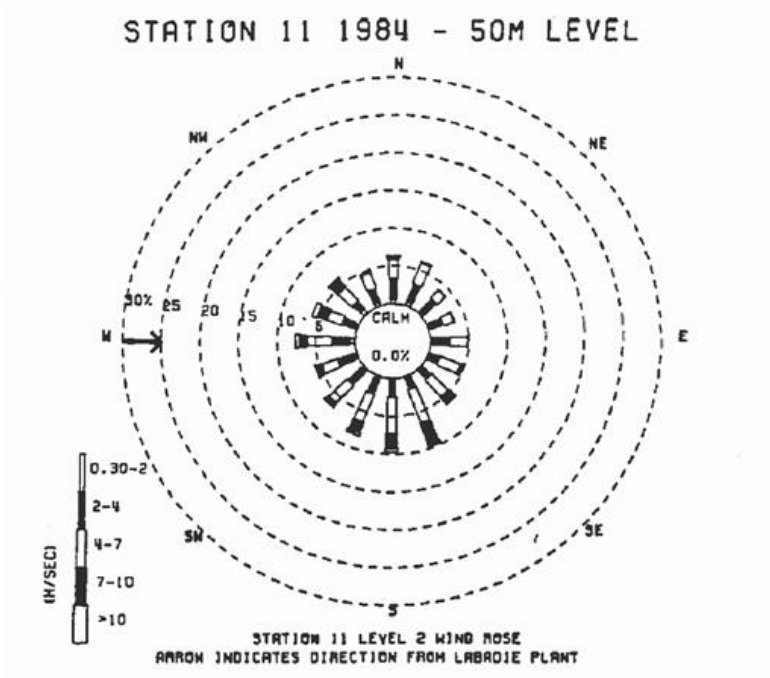


Figure 4: 1984 Wind rose for 85-m On-site Meteorological Data

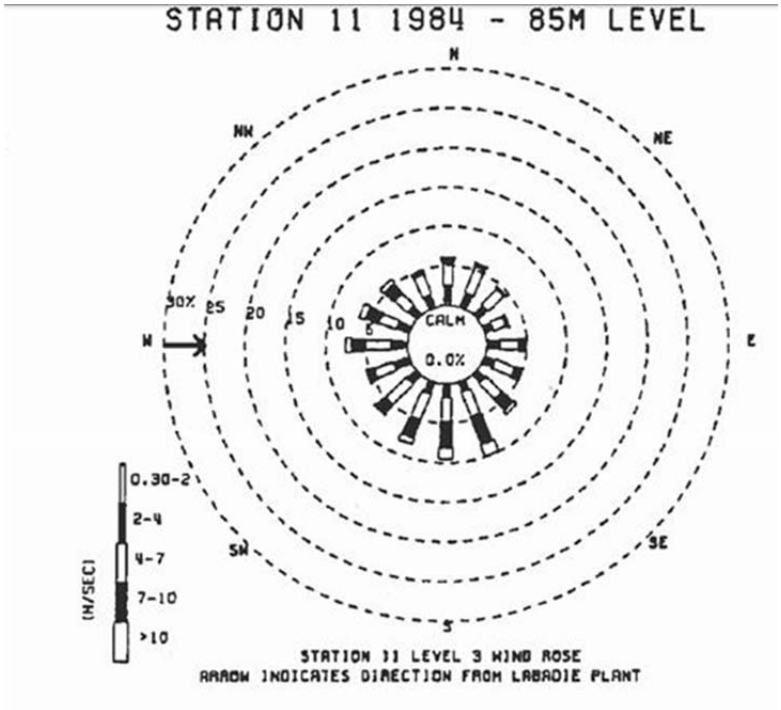


Figure 5: KJEF (Jefferson City Airport) Wind Rose (2012-2014)

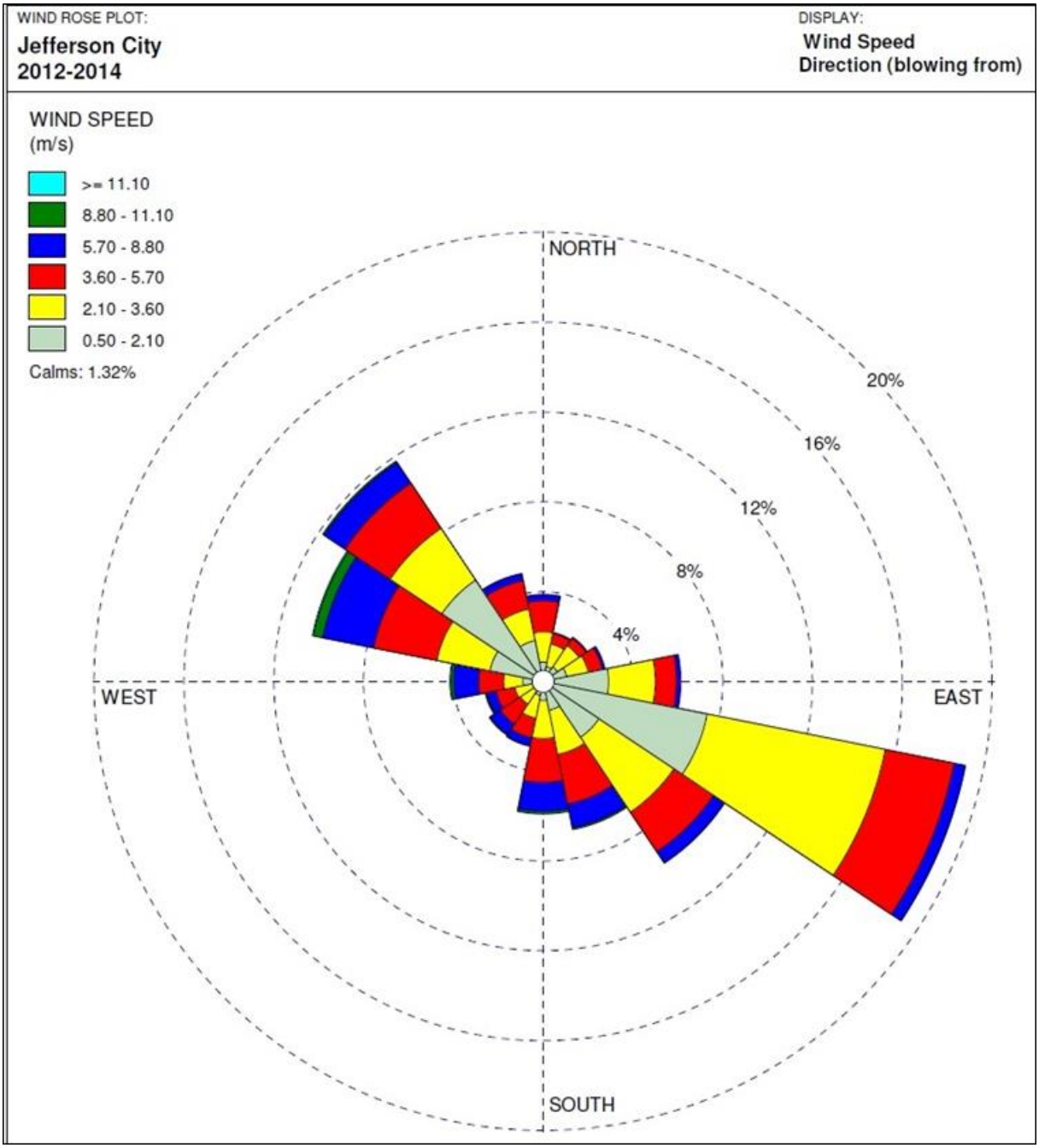
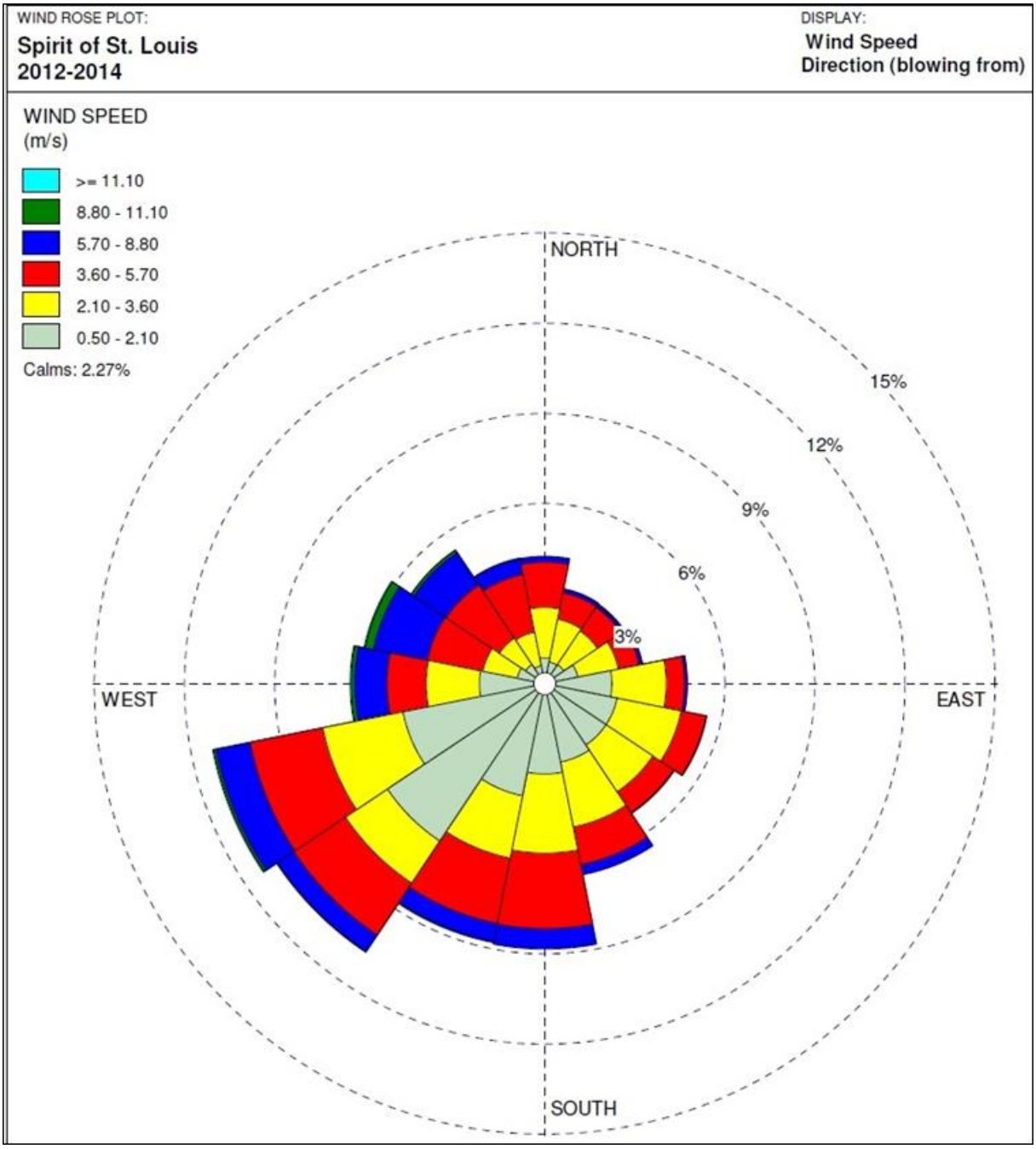


Figure 6: KSUS (Spirit of St. Louis Airport) Wind Rose (2012-2014)



It is evident from the comparison of the 10-m vs. 50-m and 85-m wind roses (Figures 2, 3, and 4, respectively), that there is a substantial difference in the wind pattern at the Labadie stack top versus the valley. While the KSUS wind pattern is more similar to the valley flow near Labadie, the KJEF wind pattern is a better match to the on-site tall tower measurements in the following respects:

- The strong alignment of the 10-m data along the Missouri River valley orientation is not at all present in the higher-level winds. Therefore, the use and reliance on the KSUS data for modeling tall stack releases from Labadie is not recommended.

- The preference for winds from the SSE and WNW from the tall tower levels is more consistent with the KJEF wind pattern. Therefore, placement of the Labadie monitors at their current locations is more in line with the upper level wind pattern seen in Figures 3 and 4.

As a result of this review of historical on-site wind data, it can be concluded that the KJEF winds are reasonably representative of upper-level flow affecting the Labadie stack-top winds.

Ameren

Ameren Services

RECEIVED

2015 AUG 25 AM 9:32

AIR POLLUTION CONTROL PGM

August 24, 2015

Ms. Kyra Moore
Permit Section Chief
Air Pollution Control Program
P.O. Box 176
Jefferson City, MO 65101

Dear Kyra:

We write regarding the Missouri Department of Natural Resources' ("MDNR") Proposed Options for Area Boundary Recommendations ("Proposed Recommendation") for the 2010 1-Hour Sulfur Dioxide National Ambient Air Quality Standard (the "1-hour SO_2 NAAQS"). In MDNR's Proposed Recommendation, MDNR proposes to rely on air dispersion modeling to recommend a designation of nonattainment of the 1-hour SO_2 NAAQS for the Ameren Missouri Labadie Energy Center ("Labadie"), located in Franklin County. While Ameren Missouri does not believe that modeling is appropriate for use in the NAAQS designation process, Ameren Missouri has retained AECOM to conduct a modeling analysis of the Labadie area. This analysis, enclosed herewith, demonstrates that Labadie is in *attainment* of the 1-hour SO_2 NAAQS.

This analysis uses the latest AERMOD air dispersion modeling software (version 15181) to model SO_2 ambient air quality around Labadie. This revised AERMOD software corrects many of issues which were present in the prior version that MDNR relied upon in preparing its Proposed Recommendation, most notably, the over-prediction of SO_2 emissions in low wind speed hours. AECOM's modeling (using AERMOD LOWWIND3 / ustar modeling options) predicts that the 1-hour peak SO_2 concentrations around Labadie are under the 75 ppb 1-hour SO_2 NAAQS standard. Further when considering the over prediction caused by the current AERMOD implementation of the condition referred to as a "penetrated plume," if corrected AECOM's modeling would show ambient air concentrations are even further below the 1-hour SO_2 NAAQS standard.

Ameren Missouri requests that MDNR consider the enclosed modeling as this implementation of AERMOD is being proposed by EPA as a regulatory option as part of the triennial review of the EPA Modeling Guideline (a.k.a. 40 CFR 51 Appendix W). As noted above, while Ameren Missouri does not believe that modeling is appropriate to base a NAAQS designation recommendation, the AECOM modeling demonstrates that the modeling relied upon by MDNR substantially over-predicts ambient air quality and, accordingly, provides an unrealistic indication of ambient air quality in the Labadie area and alone should not be the basis upon which to premise a nonattainment designation for the Labadie area under the 1-hour SO_2 NAAQS.

Sincerely,

Steven C. Whitworth
Senior Director, Environmental Policy & Analysis

File: AQ-2.4

1901 Chouteau Avenue
PO Box 66149, MC 602
St. Louis, MO 63166-6149
Ameren.com

KEY TO FILES

1-hour SO_2 Modeling for Labadie Power Plant
Dispersion Modeling Files
August 2015

The following document summarizes the content of the AERMET and AERMOD Version 15181 modeling archive. The GEP, background source, and receptor inputs were imported from MDNR modeling files. The contents of these folders are described below.

AECOM conducted modeling with the following differences from the recent MDNR modeling.

- We used AERMOD version 15181, which was not available to MDNR when it did its modeling. Version 15181 does correct some "bugs" discovered in version 14134, so we believe that it is prudent to conduct modeling with this version.

- We merged the two adjacent flues for Labadie Units 3 and 4 in the modeling. This is allowed by EPA precedent (Clearinghouse Record CH-91-II-01).

- We modeled with both Jefferson City and Spirit of St. Louis meteorological data, but since Jefferson City had slightly higher results, we will present those results at the public hearing on August 27, 2015.

- We used background concentrations from Nilwood, IL as a more representative rural site vs. East St. Louis that is more applicable to Jefferson County modeling. We input an hour-of-day, seasonal table of background concentrations as discussed in EPA's March 1, 2011 Clearinghouse memo. We note that MDNR modeled many other adjacent SO_2 sources (which we also included), thus likely resulting in a double-counting of background impacts.

KSUS 2012-2014

Meteorological Processing (AERMET v15181)

Contains files used to process three years of Spirit of St. Louis surface data and three years of Lincoln, IL upper air data needed for AERMOD using AERMOD's meteorological pre-processor, AERMET.

- 724345-03966-*year*.ish : Spirit of St. Louis Airport surface data in ISH format for years 2012-2014.
- raob_04833-*year*.txt : Lincoln, IL filled upper air sounding file in FSL format.

- *.inp : AERMET input files for Stage 1, 2 and 3

- *.txt : AERMET message file for Stage 1, 2 and 3
- *.rpt : AERMET report file for Stage 1, 2 and 3
- *.DSK : AERMET upper air sounding and surface observation extraction files
- *QA.DSK : AERMET upper air sounding and surface observation quality assessment files
- Discarded_ISHD_Records.dat : AERMET file listing the ISH records discarded by AERMET during processing
- KSUSILX-MIN-*year*.DSK: AERMET Stage 2 merged file
- KSUSILX-MIN-*year*.PFL: AERMET profile output file (input to AERMOD)
- KSUSILX-MIN-*year*.SFC: AERMET surface output file (input to AERMOD)
- KSUSILX-MIN-2012-14.PFL: AERMET profile output file (input to AERMOD) for the time period modeled; created from the 2012-2014 AERMET-produced profile files.
- KSUSILX-MIN-2012-14.SFC: AERMET surface output file (input to AERMOD) for the time period modeled; created from the 2012-2014 AERMET-produced profile files.
- KSUSILX-MIN-USTAR-*year*.PFL: AERMET profile output file using BETA U* (input to AERMOD)
- KSUSILX-MIN-USTAR -*year*.SFC: AERMET surface output file using BETA U* (input to AERMOD)
- KSUSILX-MIN-USTAR -2012-14.PFL: AERMET profile output file using BETA U* (input to AERMOD) for the time period modeled; created from the 2012-2014 AERMET-produced profile files.
- KSUSILX-MIN-USTAR -2012-14.SFC: AERMET surface output file using BETA U* (input to AERMOD) for the time period modeled; created from the 2012-2014 AERMET-produced profile files.

AERMOD v15181 – contains input (*.inp) and output (*.out) AERMOD files for the 3 years modeled (2012-2014).

- *.inp : AERMOD input file for DEFAULT or BETA with LOWWIND3.
- LabadieUnit1-34_2012-2014.txt : Hourly emissions file in AERMOD-ready format
- *.out : AERMOD output file for DEFAULT or BETA with LOWWIND3.
- *.plt : AERMOD plotfile for DEFAULT or BETA with LOWWIND3.

KJEF 2012-2014

Meteorological Processing (AERMET v15181)

Contains files used to process three years of Jefferson City surface data (2012-2014) and three years of Lincoln, IL upper air data needed for AERMOD using AERMOD's meteorological pre-processor, AERMET. Example year is 2012.

- 724458-03963-2012.ish : Jefferson City Airport surface data in ISH format .
- raob_04833-2012.txt : Lincoln, IL filled upper air sounding file in FSL format.

- *.inp : AERMET input files for Stage 1, 2 and 3
- *.txt : AERMET message file for Stage 1, 2 and 3
- *.rpt : AERMET report file for Stage 1, 2 and 3
- *.DSK : AERMET upper air sounding and surface observation extraction files
- *QA.DSK : AERMET upper air sounding and surface observation quality assessment files
- KJEFILX-MIN-2012.DSK: AERMET Stage 2 merged file
- KJEFILX-MIN-2012.PFL: AERMET profile output file (input to AERMOD)
- KJEFILX-MIN-2012.SFC: AERMET surface output file (input to AERMOD)
- KJEFILX-MIN-2012-14.PFL: AERMET profile output file (input to AERMOD) for the time period modeled (2012-2014).
- KJEFILX-MIN-2012-14.SFC: AERMET surface output file (input to AERMOD) for the time period modeled (2012-2014).
- KJEFILX-MIN-USTAR-*year*.PFL: AERMET profile output file using BETA U* (input to AERMOD)
- KJEFILX-MIN-USTAR -*year*.SFC: AERMET surface output file using BETA U* (input to AERMOD)
- KJEFILX-MIN-USTAR -2012-14.PFL: AERMET profile output file using BETA U* (input to AERMOD) for the time period modeled; created from the 2012-2014 AERMET-produced profile files.
- KJEFILX-MIN-USTAR -2012-14.SFC: AERMET surface output file using BETA U* (input to AERMOD) for the time period modeled; created from the 2012-2014 AERMET-produced profile files.

AERMOD v15181 – contains input (*.inp) and output (*.out) AERMOD files for the 3 years modeled (2012-2014).

- *.inp : AERMOD input file for DEFAULT or BETA with LOWWIND3.
- LabadieUnit1-34_2012-2014.txt : Hourly emissions file in AERMOD-ready format
- *.out : AERMOD output file for DEFAULT or BETA with LOWWIND3.
- *.plt : AERMOD plotfile for DEFAULT or BETA with LOWWIND3.

EMISSIONS – contains spreadsheet and text file of AERMOD input file with the actual hourly emissions data for 2012-2014 per the 1-hour SO_2 Technical Assistance Document.
Units 3 and 4 were merged per Modeling Clearinghouse Memo:
http://cfpub.epa.gov/oarweb/MCHISRS/index.cfm?fuseaction=main.resultdetails&recnum=91-II%20%20-01

MONITOR DATA

MDNR chose a constant background value of 9 ppb based on a sector approach at the East St. Louis monitor. This monitor is located near a number of SO_2 sources in an urban area that is not representative of Labadie's more rural location. The nearest rural monitors to Labadie are Mark Twain State Park MTSP), in Stoutville, MO and Illinois EPA in Nilwood, IL. Both are approximately 125 km from Labadie. The MTSP monitor did not record SO_2 data between October 2010 and June 2012, making it incomplete for the last three years. The Nilwood monitor has data for all three years with 98% data capture. The maximum concentration for each hour by season for each of the three years were averaged and input into AERMOD.

All of AECOM/Ameren's submitted files can be obtained digitally from the Air Program. Only AECOM's presented scenario input and excerpted output files are included here for brevity.

AECOM/Ameren's Full AERMOD Input file for Labadie (Jefferson City Met Data and Beta/Low Wind Options)

```
CO STARTING
CO TITLEONE Labadie Actual emissions, temps and flows 3-4 combined 2012-14
CO TITLETWO NAD83 Z15 SO2
CO MODELOPT CONC BETA LOWWIND3
CO AVERTIME 1
CO POLLUTID SO2
CO RUNORNOT RUN
CO FINISHED

SO STARTING
SO ELEVUNIT METERS
** Background data from 2012-2014 Nilwood
**        Winter 0    1    2    3    4    5    6    7    8    9    10   11
**             12   13   14   15   16   17   18   19   20   21   22   23
SO BACKGRND  SEASHR 3.67  3.37  3.33  3.23  4.00  4.67  5.00  3.07  3.27  6.33  7.00 10.00
SO BACKGRND  SEASHR 8.00  7.67  8.00  7.00  6.67  5.33  4.00  5.33  4.33  4.00  3.67  3.00
**    Spring
SO BACKGRND  SEASHR 2.33  2.00  2.00  2.67  2.00  2.33  2.33  3.33  4.33  7.67  5.33  6.33
SO BACKGRND  SEASHR 5.67  4.00  3.00  5.67  4.67  3.00  2.67  2.33  2.33  2.00  2.33  3.00
**    Summer
SO BACKGRND  SEASHR 2.00  3.00  2.33  2.67  3.00  2.67  3.00  7.67  5.33  7.00  7.33  5.33
SO BACKGRND  SEASHR 4.00  3.67  4.00  4.00  4.00  3.00  2.67  2.33  2.33  2.33  1.67  2.00
**    Fall
SO BACKGRND  SEASHR 2.33  2.33  2.67  2.00  2.33  2.67  3.00  2.33  4.00  4.00  8.00  7.00
SO BACKGRND  SEASHR 6.00  6.33  5.33  4.00  4.00  4.00  2.67  2.67  3.00  3.00  2.67  2.67
SO BACKUNIT  PPB
**
**All Four Base Load Stacks Were Constructed Prior to December 31, 1970
**Based Upon 52.21(h) GEP Stack Height = Actual Stack Height
**Equivalent Stack Diameters for Boiler #3 and Boiler #4 Updated to Reflect Facility Data
**See Ameren Email to MDNR Dated February 23, 2012
**Original Assumptions
**Generators Not Included, Intermittent Source
**Actual data 2012-14
**Boiler 1
SO LOCATION Labadie1 Point 688352.17  4270445.59  149.66
SO HOUREMIS LabadieUnit1-34_2012-2014.txt LABADIE1

**Boiler 2
SO LOCATION Labadie2 Point 688387.01  4270400.40  149.66
SO HOUREMIS labadieUnit1-34_2012-2014.txt LABADIE2

**Boiler 34
SO LOCATION Lab34 Point 688435.47  4270332.33  149.66
SO HOUREMIS labadieUnit1-34_2012-2014.txt Lab34

**Boiler 4
**SO LOCATION Labadie4 Point 688439.28  4270327.43  149.66
**SO HOUREMIS ./labadieUnit1-4_2012-2014.txt LABADIE4
```

```
SO SRCPARAM Labadie1 1.0    213.36     443.06    34.72   6.25
SO SRCPARAM Labadie2 1.0    213.36     442.49    35.56   6.25
**SO SRCPARAM Labadie3 1.0    213.36     443.20    34.52   6.25
SO SRCPARAM Lab34 1.0    213.36     441.71    34.95   8.84

**Purina Animal Nutrition Center
**Corrected UTM from aerial photo
**100 HP Boiler
**Reported as Stack but no release parameters given, assume volume paramters for boiler.
SO LOCATION EU_10 VOLUME 689107.65 4262863.7 172
SO SRCPARAM EU_10 0.0409 5 1.1628 4.651
**To avoid double counting found in 2014 reported emissions, using 2013 emissions in this modeling analysis
**N.B. West Contracting CO INC
**Drag Slat Conveyer
**No information regarding this source so assume volume source parameters for boiler w/o parameters.
SO LOCATION EP17 Volume 695196.752 4262475.068 159
SO SRCPARAM EP17 0.07385 5 1.1628 4.651
**Aggregate Dryer w/Burner and rotary mixer
**Corrected UTMs from aerial
SO LOCATION EP5 Point 695174.86 4262540.03 159
SO SRCPARAM EP5 0.0116 7.62 376.15 5.526 0.9144
**AC Heater/Burner
**Corrected UTMs from aerial
**No exit temp or emission velocity provided. Assumed Temp=298.15K Emission Velocity=0.001 m/s
SO LOCATION S2 Point 695174.86 4262540.03 159
SO SRCPARAM S2 0.01759 2.7432 298.15 0.001 0.24384

**BPIP Outputs Dated January 11, 2012
SO BUILDHGT Labadie1       78.44   78.44   78.44   78.44   78.44   78.44
SO BUILDHGT Labadie1       78.44   78.44   78.44   78.44   78.44   78.44
SO BUILDHGT Labadie1       78.44   25.37   27.71   78.44   78.44   78.44
SO BUILDHGT Labadie1       78.44   78.44   78.44   78.44   78.44   78.44
SO BUILDHGT Labadie1       78.44   78.44   78.44   78.44   78.44   78.44
SO BUILDHGT Labadie1       78.44   25.37   27.71   78.44   78.44   78.44
SO BUILDWID Labadie1      195.26  212.09  222.49  226.12  222.88  222.69
SO BUILDWID Labadie1      220.81  212.22  197.19  176.16  149.79  118.86
SO BUILDWID Labadie1       84.32   43.39   61.83  112.08  144.48  172.49
SO BUILDWID Labadie1      195.26  212.09  222.49  226.12  222.88  222.69
SO BUILDWID Labadie1      220.81  212.22  197.19  176.16  149.79  118.86
SO BUILDWID Labadie1       84.32   43.39   61.83  112.08  144.48  172.49
SO BUILDLEN Labadie1      176.16  149.79  118.86   84.32   47.21   76.28
SO BUILDLEN Labadie1      112.08  144.48  172.49  195.26  212.09  222.49
SO BUILDLEN Labadie1      226.12  220.00  229.51  220.81  212.22  197.19
SO BUILDLEN Labadie1      176.16  149.79  118.86   84.32   47.21   76.28
SO BUILDLEN Labadie1      112.08  144.48  172.49  195.26  212.09  222.49
SO BUILDLEN Labadie1      226.12  220.00  229.51  220.81  212.22  197.19
SO XBADJ    Labadie1      -88.14  -56.63  -23.40   10.55   44.17   41.54
SO XBADJ    Labadie1       34.41   26.23   17.26    7.76   -1.97  -11.65
SO XBADJ    Labadie1      -20.97  -30.23  -28.68  -57.59  -69.96  -80.21
SO XBADJ    Labadie1      -88.02  -93.15  -95.46  -94.86  -91.38 -117.82
SO XBADJ    Labadie1     -146.49 -170.71 -189.75 -203.02 -210.12 -210.84
SO XBADJ    Labadie1     -205.15 -189.77 -200.83 -163.22 -142.26 -116.98
SO YBADJ    Labadie1     -105.39 -104.07  -99.60  -92.09  -81.79  -67.87
SO YBADJ    Labadie1      -52.81  -36.15  -18.38   -0.06   18.26   36.03
SO YBADJ    Labadie1       52.71   25.71  -16.96   90.45   98.47  103.50
SO YBADJ    Labadie1      105.39  104.07   99.60   92.09   81.79   67.87
SO YBADJ    Labadie1       52.81   36.15   18.38    0.06  -18.26  -36.03
SO YBADJ    Labadie1      -52.71  -25.71   16.96  -90.45  -98.47 -103.51


SO BUILDHGT Labadie2       78.44   78.44   78.44   78.44   78.44   78.44
SO BUILDHGT Labadie2       78.44   78.44   78.44   78.44   78.44   78.44
SO BUILDHGT Labadie2       78.44   25.37   78.44   78.44   78.44   78.44
SO BUILDHGT Labadie2       78.44   78.44   78.44   78.44   78.44   78.44
SO BUILDHGT Labadie2       78.44   78.44   78.44   78.44   78.44   78.44
```

```
SO BUILDHGT Labadie2      78.44   25.37   78.44   78.44   78.44   78.44
SO BUILDWID Labadie2     195.26  212.09  222.49  226.12  222.88  222.69
SO BUILDWID Labadie2     220.81  212.22  197.19  176.16  149.79  118.86
SO BUILDWID Labadie2      84.32   43.39   76.28  112.08  144.48  172.49
SO BUILDWID Labadie2     195.26  212.09  222.49  226.12  222.88  222.69
SO BUILDWID Labadie2     220.81  212.22  197.19  176.16  149.79  118.86
SO BUILDWID Labadie2      84.32   43.39   76.28  112.08  144.48  172.49
SO BUILDLEN Labadie2     176.16  149.79  118.86   84.32   47.21   76.28
SO BUILDLEN Labadie2     112.08  144.48  172.49  195.26  212.09  222.49
SO BUILDLEN Labadie2     226.12  220.00  222.69  220.81  212.22  197.19
SO BUILDLEN Labadie2     176.16  149.79  118.86   84.32   47.21   76.28
SO BUILDLEN Labadie2     112.08  144.48  172.49  195.26  212.09  222.49
SO BUILDLEN Labadie2     226.12  220.00  222.69  220.81  212.22  197.19
SO XBADJ    Labadie2     -49.69  -26.08   -1.68   22.77   46.53   33.97
SO XBADJ    Labadie2      17.13   -0.23  -17.58  -34.40  -50.17  -64.41
SO XBADJ    Labadie2     -76.70  -87.24 -100.02 -111.97 -120.52 -125.40
SO XBADJ    Labadie2    -126.47 -123.70 -117.17 -107.09  -93.74 -110.24
SO XBADJ    Labadie2    -129.21 -144.25 -154.91 -160.86 -161.93 -158.07
SO XBADJ    Labadie2    -149.41 -132.76 -122.66 -108.84  -91.71  -71.79
SO YBADJ    Labadie2     -63.23  -55.88  -46.83  -36.35  -24.78  -11.32
SO YBADJ    Labadie2       1.57   14.40   26.81   38.39   48.81   57.75
SO YBADJ    Labadie2      64.93   28.07   72.10   73.17   72.01   68.66
SO YBADJ    Labadie2      63.23   55.88   46.83   36.35   24.78   11.32
SO YBADJ    Labadie2      -1.57  -14.40  -26.81  -38.39  -48.81  -57.75
SO YBADJ    Labadie2     -64.93  -28.07  -72.10  -73.17  -72.01  -68.66


**SO BUILDHGT Labadie3      78.44   78.44   78.44   78.44   78.44   78.44
**SO BUILDHGT Labadie3      78.44   78.44   78.44   78.44   78.44   78.44
**SO BUILDHGT Labadie3      27.71   27.71   78.44   78.44   78.44   78.44
**SO BUILDHGT Labadie3      78.44   78.44   78.44   78.44   78.44   78.44
**SO BUILDHGT Labadie3      78.44   78.44   78.44   78.44   78.44   78.44
**SO BUILDHGT Labadie3      27.71   27.71   78.44   78.44   78.44   78.44
**SO BUILDWID Labadie3     195.26  212.09  222.49  226.12  222.88  222.69
**SO BUILDWID Labadie3     220.81  212.22  197.19  176.16  149.79  118.86
**SO BUILDWID Labadie3      69.54   30.46   76.28  112.08  144.48  172.49
**SO BUILDWID Labadie3     195.26  212.09  222.49  226.12  222.88  222.69
**SO BUILDWID Labadie3     220.81  212.22  197.19  176.16  149.79  118.86
**SO BUILDWID Labadie3      69.54   30.46   76.28  112.08  144.48  172.49
**SO BUILDLEN Labadie3     176.16  149.79  118.86   84.32   47.21   76.28
**SO BUILDLEN Labadie3     112.08  144.48  172.49  195.26  212.09  222.49
**SO BUILDLEN Labadie3     230.71  230.36  222.69  220.81  212.22  197.19
**SO BUILDLEN Labadie3     176.16  149.79  118.86   84.32   47.21   76.28
**SO BUILDLEN Labadie3     112.08  144.48  172.49  195.26  212.09  222.49
**SO BUILDLEN Labadie3     230.71  230.36  222.69  220.81  212.22  197.19
**SO XBADJ    Labadie3       8.93   21.31   33.04   43.77   53.16   26.03
**SO XBADJ    Labadie3      -5.13  -36.13  -66.04  -93.94 -118.99 -140.42
**SO XBADJ    Labadie3    -177.41 -174.21 -183.20 -192.51 -195.97 -193.47
**SO XBADJ    Labadie3    -185.09 -171.09 -151.89 -128.08 -100.38 -102.31
**SO XBADJ    Labadie3    -106.95 -108.35 -106.45 -101.32  -93.11  -82.07
**SO XBADJ    Labadie3     -53.30  -56.15  -39.48  -28.30  -16.26   -3.72
**SO YBADJ    Labadie3      -3.69   12.94   29.17   44.52   58.52   71.86
**SO YBADJ    Labadie3      82.11   89.86   94.88   97.01   96.20   92.47
**SO YBADJ    Labadie3     -13.38  -23.94   64.17   50.91   36.11   20.20
**SO YBADJ    Labadie3       3.69  -12.94  -29.17  -44.52  -58.52  -71.86
**SO YBADJ    Labadie3     -82.11  -89.86  -94.88  -97.01  -96.20  -92.47
**SO YBADJ    Labadie3      13.38   23.94  -64.17  -50.91  -36.11  -20.20


SO BUILDHGT Lab34      78.44   78.44   78.44   78.44   78.44   78.44
SO BUILDHGT Lab34      78.44   78.44   78.44   78.44   78.44   78.44
SO BUILDHGT Lab34      27.71   27.71   78.44   78.44   78.44   78.44
SO BUILDHGT Lab34      78.44   78.44   78.44   78.44   78.44   78.44
SO BUILDHGT Lab34      78.44   78.44   78.44   78.44   78.44   78.44
SO BUILDHGT Lab34      27.71   27.71   78.44   78.44   78.44   78.44
SO BUILDWID Lab34     195.26  212.09  222.49  226.12  222.88  222.69
```

```
SO BUILDWID Lab34      220.81  212.22  197.19  176.16  149.79  118.86
SO BUILDWID Lab34       69.54   30.46   76.28  112.08  144.48  172.49
SO BUILDWID Lab34      195.26  212.09  222.49  226.12  222.88  222.69
SO BUILDWID Lab34      220.81  212.22  197.19  176.16  149.79  118.86
SO BUILDWID Lab34       69.54   30.46   76.28  112.08  144.48  172.49
SO BUILDLEN Lab34      176.16  149.79  118.86   84.32   47.21   76.28
SO BUILDLEN Lab34      112.08  144.48  172.49  195.26  212.09  222.49
SO BUILDLEN Lab34      230.71  230.36  222.69  220.81  212.22  197.19
SO BUILDLEN Lab34      176.16  149.79  118.86   84.32   47.21   76.28
SO BUILDLEN Lab34      112.08  144.48  172.49  195.26  212.09  222.49
SO BUILDLEN Lab34      230.71  230.36  222.69  220.81  212.22  197.19
SO XBADJ    Lab34       13.09   24.61   35.38   45.07   53.39   25.18
SO XBADJ    Lab34       -7.03  -39.03  -69.85  -98.54 -124.24 -146.17
SO XBADJ    Lab34     -183.47 -180.41 -189.35 -198.42 -201.45 -198.37
SO XBADJ    Lab34     -189.26 -174.40 -154.23 -129.39 -100.61 -101.46
SO XBADJ    Lab34     -105.05 -105.45 -102.64  -96.72  -87.85  -76.32
SO XBADJ    Lab34      -47.23  -49.95  -33.33  -22.39  -10.77    1.18
SO YBADJ    Lab34        0.91   18.20   34.92   50.59   64.72   78.01
SO YBADJ    Lab34       88.01   95.34   99.78  101.18   99.50   94.81
SO YBADJ    Lab34      -12.08  -23.71   63.32   49.01   33.21   16.39
SO YBADJ    Lab34       -0.91  -18.20  -34.92  -50.59  -64.72  -78.01
SO YBADJ    Lab34      -88.01  -95.34  -99.78 -101.18  -99.50  -94.81
SO YBADJ    Lab34       12.08   23.71  -63.32  -49.01  -33.21  -16.39


SO SRCGROUP Labadie1 Labadie1
SO SRCGROUP Labadie2 Labadie2
**SO SRCGROUP Labadie3 Labadie3
SO SRCGROUP Lab34 Lab34
SO SRCGROUP ALL BACKGRND

SO FINISHED

RE STARTING
**AERMAP Outputs Dated January 11, 2012
** AERMAP - VERSION 11103                                01/11/12
**                                          06:36:24
**  Ameren Missouri Labadie Plant ELEVATION EXTRACTION
**  MDNR January 10, 2012
** A total of      19  NED files were used
** A total of   16783  receptors were processed
** DOMAINXY 634731 4213961 15 750639 4327012 15
** ANCHORXY 689985 4270485 689985 4270485 15 4
** Terrain heights were extracted by default

RE ELEVUNIT METERS
  DISCCART    687704.11   4267671.62    168.08    178.39
  DISCCART    687691.33   4267698.42    167.28    178.39
  DISCCART    687678.19   4267725.96    168.78    177.01
  DISCCART    687656.17   4267770.85    170.65    170.65
  DISCCART    687635.15   4267816.21    170.64    170.64
  DISCCART    687613.62   4267861.34    167.04    172.42
  DISCCART    687592.10   4267906.47    165.22    170.93
  DISCCART    687570.57   4267951.60    163.92    170.93
  DISCCART    687547.84   4267996.13    149.83    173.79
  DISCCART    687526.38   4268041.29    147.11    172.83
  DISCCART    687506.24   4268087.06    144.93    170.93
  DISCCART    687484.49   4268132.08    146.86    147.43
  DISCCART    687462.96   4268177.21    143.46    144.94
  DISCCART    687489.77   4268201.25    140.77    147.43
  DISCCART    687522.46   4268199.80    144.33    144.95
  DISCCART    687553.73   4268221.25    144.59    144.59
  DISCCART    687579.80   4268254.77    143.02    144.66
  DISCCART    687589.73   4268260.66    140.60    146.03
  DISCCART    687598.33   4268261.35    140.30    146.03
  DISCCART    687611.69   4268254.66    140.60    146.03
```

DISCCART	687631.59	4268228.66	140.16	145.78
DISCCART	687655.64	4268207.50	141.08	145.78
DISCCART	687666.75	4268202.61	141.13	145.78
DISCCART	687680.69	4268200.08	140.36	159.54
DISCCART	687701.53	4268184.48	141.04	159.54
DISCCART	687718.76	4268173.19	141.69	159.54
DISCCART	687730.27	4268170.30	141.00	159.54
DISCCART	687759.96	4268160.57	142.92	175.71
DISCCART	687775.12	4268164.12	144.10	144.37
DISCCART	687783.34	4268169.73	143.37	176.60
DISCCART	687793.39	4268179.02	143.26	176.60
DISCCART	687829.60	4268213.50	141.49	177.19
DISCCART	687841.15	4268214.72	142.44	176.70
DISCCART	687872.04	4268234.02	140.89	177.27
DISCCART	687911.76	4268264.39	141.88	155.12
DISCCART	687916.97	4268276.88	142.28	154.86
DISCCART	687916.35	4268285.64	142.04	154.63
DISCCART	687896.43	4268320.33	140.54	146.76
DISCCART	687887.82	4268338.60	140.37	145.39
DISCCART	687887.37	4268354.77	140.51	145.53
DISCCART	687892.86	4268369.99	140.59	145.53
DISCCART	687906.76	4268384.64	140.47	145.74
DISCCART	687919.70	4268392.91	140.23	145.74
DISCCART	687961.46	4268420.40	140.75	145.74
DISCCART	687984.80	4268448.47	140.87	146.51
DISCCART	687992.29	4268464.50	142.35	143.74
DISCCART	687988.70	4268479.28	141.47	146.13
DISCCART	687974.92	4268491.08	140.31	146.13
DISCCART	687963.68	4268505.07	139.93	145.94
DISCCART	687959.12	4268524.14	140.16	145.52
DISCCART	687953.27	4268573.80	140.65	145.52
DISCCART	687949.04	4268623.62	139.98	145.75
DISCCART	687955.24	4268654.13	139.93	145.75
DISCCART	687979.25	4268696.66	140.38	145.75
DISCCART	688005.57	4268739.17	139.97	143.29
DISCCART	688017.87	4268757.71	141.41	143.23
DISCCART	688018.93	4268770.51	141.45	145.66
DISCCART	688009.84	4268790.82	140.71	143.19
DISCCART	688004.82	4268807.46	140.29	145.77
DISCCART	688007.72	4268824.76	140.59	145.73
DISCCART	688023.36	4268855.02	141.50	146.14
DISCCART	688045.41	4268899.90	142.51	146.62
DISCCART	688071.00	4268942.85	143.43	146.95
DISCCART	688040.29	4268966.06	140.60	146.95
DISCCART	688000.49	4268996.33	142.83	142.83
DISCCART	687960.70	4269026.60	139.96	145.54
DISCCART	687920.90	4269056.87	141.22	143.40
DISCCART	687881.11	4269087.14	141.01	143.29
DISCCART	687841.31	4269117.42	139.46	145.64
DISCCART	687801.52	4269147.69	141.39	142.79
DISCCART	687800.72	4269162.95	139.13	145.61
DISCCART	687799.70	4269212.94	141.80	141.80
DISCCART	687796.87	4269262.86	139.52	143.39
DISCCART	687796.93	4269312.86	142.88	142.88
DISCCART	687795.54	4269362.84	142.21	142.21
DISCCART	687794.92	4269412.83	142.54	146.02
DISCCART	687792.36	4269462.77	142.85	142.85
DISCCART	687790.51	4269512.73	142.77	142.77
DISCCART	687788.65	4269562.70	142.64	142.64
DISCCART	687786.80	4269612.67	142.29	142.29
DISCCART	687783.76	4269662.57	142.40	142.40
DISCCART	687783.10	4269712.57	142.52	142.52
DISCCART	687781.25	4269762.53	142.60	142.60
DISCCART	687779.39	4269812.50	142.36	146.20
DISCCART	687777.54	4269862.47	141.79	145.72
DISCCART	687774.72	4269912.39	142.09	146.01

DISCCART	687773.84	4269962.38	144.45	146.09
DISCCART	687771.98	4270012.34	143.50	146.09
DISCCART	687770.13	4270062.31	142.45	146.22
DISCCART	687768.28	4270112.27	142.86	142.86
DISCCART	687766.43	4270162.24	143.49	143.49
DISCCART	687764.57	4270212.21	143.94	143.94
DISCCART	687762.72	4270262.17	142.70	142.70
DISCCART	687760.87	4270312.14	143.98	143.98
DISCCART	687757.04	4270361.99	143.71	143.71
DISCCART	687757.17	4270411.99	141.59	144.12
DISCCART	687780.60	4270430.29	140.52	144.47
DISCCART	687819.32	4270460.75	139.63	144.47
DISCCART	687858.67	4270491.61	138.74	144.63
DISCCART	687898.01	4270522.46	138.62	144.80
DISCCART	687937.35	4270553.32	138.65	144.80
DISCCART	687976.69	4270584.18	138.77	144.42
DISCCART	688016.29	4270614.70	138.65	144.35
DISCCART	688055.37	4270645.90	138.69	144.41
DISCCART	688094.71	4270676.76	138.68	144.01
DISCCART	688134.05	4270707.61	138.68	143.99
DISCCART	688173.39	4270738.47	138.68	144.26
DISCCART	688212.90	4270769.12	138.68	144.31
DISCCART	688251.52	4270800.87	138.67	144.32
DISCCART	688289.96	4270832.85	138.88	144.25
DISCCART	688328.39	4270864.84	138.68	145.74
DISCCART	688366.82	4270896.82	138.68	146.20
DISCCART	688405.26	4270928.80	138.68	146.35
DISCCART	688443.69	4270960.78	138.68	146.35
DISCCART	688482.12	4270992.77	138.68	146.35
DISCCART	688520.56	4271024.75	138.69	145.84
DISCCART	688558.99	4271056.73	138.75	145.84
DISCCART	688595.32	4271091.09	138.79	145.35
DISCCART	688630.73	4271126.39	138.81	144.23
DISCCART	688666.15	4271161.68	138.68	144.63
DISCCART	688701.56	4271196.98	138.68	147.59
DISCCART	688736.97	4271232.27	138.68	147.70
DISCCART	688772.39	4271267.57	138.66	147.70
DISCCART	688807.80	4271302.87	138.68	144.76
DISCCART	688843.22	4271338.16	138.69	144.26
DISCCART	688878.63	4271373.46	138.74	144.09
DISCCART	688914.05	4271408.75	138.71	144.07
DISCCART	688949.46	4271444.05	138.95	144.14
DISCCART	688983.72	4271480.47	138.82	141.42
DISCCART	689016.44	4271518.28	138.68	138.68
DISCCART	689049.17	4271556.08	138.66	138.66
DISCCART	689081.89	4271593.88	138.63	138.63
DISCCART	689114.62	4271631.68	138.60	138.60
DISCCART	689147.34	4271669.49	138.57	138.57
DISCCART	689180.07	4271707.29	138.54	138.54
DISCCART	689212.48	4271745.36	138.54	221.29
DISCCART	689245.51	4271782.89	138.54	221.29
DISCCART	689278.24	4271820.70	138.54	221.29
DISCCART	689310.96	4271858.50	138.54	221.29
DISCCART	689343.70	4271896.30	138.55	221.29
DISCCART	689341.70	4271842.33	138.54	221.29
DISCCART	689340.10	4271792.36	138.54	221.29
DISCCART	689338.02	4271742.40	138.54	138.54
DISCCART	689336.17	4271692.44	140.20	143.95
DISCCART	689334.33	4271642.47	143.25	143.25
DISCCART	689333.59	4271592.48	143.03	143.03
DISCCART	689330.83	4271542.55	143.49	143.49
DISCCART	689375.77	4271532.76	143.67	143.67
DISCCART	689424.62	4271522.11	143.29	143.29
DISCCART	689473.48	4271511.46	143.23	143.23
DISCCART	689522.33	4271500.81	143.27	143.27
DISCCART	689571.21	4271490.31	143.22	143.22

DISCCART	689618.21	4271490.71	143.19	143.19
DISCCART	689668.21	4271491.35	142.98	142.98
DISCCART	689718.20	4271492.01	142.69	142.69
DISCCART	689768.20	4271492.77	142.24	142.24
DISCCART	689818.19	4271493.54	142.44	146.91
DISCCART	689868.19	4271494.31	143.64	146.84
DISCCART	689918.18	4271495.07	143.02	143.02
DISCCART	689968.17	4271495.84	142.88	142.88
DISCCART	690018.14	4271497.68	142.90	142.90
DISCCART	690068.14	4271497.37	142.67	142.67
DISCCART	690118.13	4271498.14	142.68	142.68
DISCCART	690168.13	4271498.91	142.68	142.68
DISCCART	690218.12	4271499.68	142.32	142.32
DISCCART	690268.12	4271500.44	142.80	142.80
DISCCART	690318.11	4271501.21	143.13	143.13
DISCCART	690318.09	4271525.79	142.94	142.94
DISCCART	690318.06	4271550.37	142.78	142.78
DISCCART	690327.25	4271551.50	142.76	142.76
DISCCART	690376.88	4271557.61	142.74	142.74
DISCCART	690426.50	4271563.72	142.90	142.90
DISCCART	690476.13	4271569.83	142.75	142.75
DISCCART	690525.75	4271575.94	142.74	142.74
DISCCART	690575.38	4271582.05	142.78	142.78
DISCCART	690625.00	4271588.16	142.75	142.75
DISCCART	690674.63	4271594.27	142.87	142.87
DISCCART	690724.25	4271600.38	142.83	142.83
DISCCART	690773.88	4271606.49	142.61	142.61
DISCCART	690823.50	4271612.60	142.32	142.32
DISCCART	690873.13	4271618.71	142.16	142.16
DISCCART	690922.75	4271624.82	142.22	142.22
DISCCART	690972.38	4271630.93	142.28	142.28
DISCCART	691022.01	4271637.04	142.57	142.57
DISCCART	691071.63	4271643.15	142.81	142.81
DISCCART	691121.26	4271649.26	142.60	142.60
DISCCART	691170.88	4271655.37	142.50	142.50
DISCCART	691220.51	4271661.48	142.63	142.63
DISCCART	691270.13	4271667.59	142.67	142.67
DISCCART	691316.32	4271649.69	142.72	142.72
DISCCART	691362.94	4271631.62	142.52	142.52
DISCCART	691409.56	4271613.55	142.26	142.26
DISCCART	691455.93	4271594.85	141.73	141.73
DISCCART	691502.79	4271577.42	141.93	141.93
DISCCART	691549.56	4271559.73	142.02	142.02
DISCCART	691549.22	4271505.73	142.18	142.18
DISCCART	691549.57	4271455.73	142.31	142.31
DISCCART	691549.91	4271405.74	142.03	142.03
DISCCART	691550.26	4271355.74	142.32	142.32
DISCCART	691550.60	4271305.74	142.03	142.03
DISCCART	691550.95	4271255.74	141.80	141.80
DISCCART	691551.29	4271205.74	142.29	142.29
DISCCART	691551.64	4271155.74	141.92	141.92
DISCCART	691551.99	4271105.74	141.77	141.77
DISCCART	691552.33	4271055.74	141.51	141.51
DISCCART	691552.68	4271005.75	142.11	142.11
DISCCART	691553.02	4270955.75	141.94	141.94
DISCCART	691553.37	4270905.75	141.76	141.76
DISCCART	691554.31	4270855.76	141.60	141.60
DISCCART	691554.06	4270805.76	141.48	141.48
DISCCART	691554.40	4270755.76	141.37	141.37
DISCCART	691554.75	4270705.76	141.33	141.33
DISCCART	691555.09	4270655.76	141.30	141.30
DISCCART	691555.44	4270605.76	141.26	141.26
DISCCART	691555.78	4270555.76	141.08	141.08
DISCCART	691556.13	4270505.76	140.96	140.96
DISCCART	691556.47	4270455.77	140.99	140.99
DISCCART	691556.82	4270405.77	141.07	141.07

DISCCART	691558.91	4270355.81	141.20	141.20
DISCCART	691557.51	4270305.83	141.26	141.26
DISCCART	691557.85	4270255.83	141.53	141.53
DISCCART	691558.20	4270205.83	141.72	141.72
DISCCART	691558.55	4270155.83	141.66	141.66
DISCCART	691558.89	4270105.83	141.61	198.97
DISCCART	691559.24	4270055.84	141.52	198.97
DISCCART	691560.53	4270005.85	141.38	203.29
DISCCART	691559.93	4269955.86	141.37	203.31
DISCCART	691560.27	4269905.86	141.37	203.31
DISCCART	691560.62	4269855.86	141.38	212.71
DISCCART	691560.96	4269805.86	142.81	214.42
DISCCART	691517.86	4269783.96	143.01	214.42
DISCCART	691473.28	4269761.31	143.00	234.40
DISCCART	691428.71	4269738.67	142.89	234.40
DISCCART	691384.13	4269716.02	142.99	234.40
DISCCART	691338.11	4269696.47	143.54	234.40
DISCCART	691290.83	4269680.20	143.05	234.40
DISCCART	691242.97	4269665.73	142.85	234.40
DISCCART	691195.33	4269650.55	143.44	234.40
DISCCART	691149.00	4269631.74	143.47	234.40
DISCCART	691104.75	4269608.46	143.62	234.40
DISCCART	691061.86	4269582.77	143.79	234.40
DISCCART	691018.41	4269558.03	143.88	234.40
DISCCART	690972.84	4269537.44	143.94	234.40
DISCCART	690925.17	4269522.35	144.81	234.40
DISCCART	690876.27	4269511.95	144.42	234.40
DISCCART	690827.09	4269502.90	144.15	234.40
DISCCART	690777.92	4269493.86	144.07	234.40
DISCCART	690728.77	4269484.67	144.25	234.40
DISCCART	690679.66	4269475.26	144.07	234.40
DISCCART	690630.39	4269466.74	144.13	234.40
DISCCART	690581.00	4269458.98	144.33	234.40
DISCCART	690531.27	4269453.78	144.29	234.40
DISCCART	690481.47	4269449.35	144.43	234.40
DISCCART	690431.78	4269443.75	144.11	234.40
DISCCART	690382.80	4269433.72	144.50	234.29
DISCCART	690335.14	4269418.60	145.16	172.56
DISCCART	690288.84	4269399.73	144.74	172.56
DISCCART	690245.60	4269374.62	145.42	172.56
DISCCART	690202.40	4269349.44	145.51	172.56
DISCCART	690158.76	4269325.04	143.90	172.56
DISCCART	690113.33	4269304.15	143.83	145.58
DISCCART	690066.25	4269287.32	144.15	144.15
DISCCART	690017.88	4269274.67	143.89	146.05
DISCCART	689968.73	4269265.51	143.80	177.82
DISCCART	689918.80	4269262.77	145.28	178.50
DISCCART	689868.82	4269264.13	144.68	179.87
DISCCART	689818.90	4269267.00	145.14	179.87
DISCCART	689769.09	4269271.39	145.03	179.87
DISCCART	689719.17	4269274.06	144.81	179.87
DISCCART	689669.38	4269269.39	145.00	179.87
DISCCART	689620.78	4269257.65	145.26	179.87
DISCCART	689574.82	4269237.96	144.66	179.87
DISCCART	689564.36	4269238.14	143.57	179.87
DISCCART	689554.03	4269225.58	144.46	179.87
DISCCART	689520.11	4269200.82	144.36	179.87
DISCCART	689479.72	4269171.35	144.59	179.87
DISCCART	689439.33	4269141.87	144.52	179.59
DISCCART	689398.94	4269112.40	144.39	179.59
DISCCART	689358.55	4269082.93	144.24	179.59
DISCCART	689318.72	4269052.69	144.56	179.59
DISCCART	689278.77	4269022.63	145.27	179.59
DISCCART	689235.18	4268998.14	145.38	179.59
DISCCART	689189.52	4268977.75	145.31	177.55
DISCCART	689144.03	4268957.01	145.19	145.46

DISCCART	689098.68	4268935.96	145.24	145.42
DISCCART	689053.68	4268914.17	145.46	146.09
DISCCART	689008.69	4268892.34	145.82	146.05
DISCCART	688963.64	4268870.66	145.98	145.98
DISCCART	688918.58	4268848.99	146.04	146.04
DISCCART	688873.52	4268827.31	146.28	146.28
DISCCART	688828.47	4268805.63	146.22	146.22
DISCCART	688783.41	4268783.95	146.36	146.36
DISCCART	688738.35	4268762.28	146.67	146.67
DISCCART	688693.30	4268740.60	146.52	175.23
DISCCART	688648.02	4268719.39	144.48	175.70
DISCCART	688602.72	4268698.21	144.01	175.70
DISCCART	688557.45	4268676.99	144.12	175.70
DISCCART	688512.29	4268655.54	146.07	175.70
DISCCART	688468.13	4268632.09	143.23	175.70
DISCCART	688425.98	4268605.18	143.15	175.70
DISCCART	688385.94	4268575.25	143.92	175.70
DISCCART	688350.19	4268540.28	143.69	175.70
DISCCART	688319.22	4268501.03	143.67	175.70
DISCCART	688293.31	4268458.27	143.77	175.70
DISCCART	688270.40	4268413.83	144.11	175.70
DISCCART	688245.40	4268370.52	144.64	175.70
DISCCART	688216.93	4268329.42	144.34	174.26
DISCCART	688185.18	4268290.80	144.80	157.98
DISCCART	688150.00	4268255.26	145.25	157.98
DISCCART	688112.02	4268222.75	145.02	152.89
DISCCART	688071.48	4268193.48	148.08	153.54
DISCCART	688028.68	4268167.63	149.99	177.19
DISCCART	687985.47	4268142.48	154.21	154.21
DISCCART	687943.50	4268115.29	155.12	176.70
DISCCART	687903.74	4268084.98	153.41	178.50
DISCCART	687867.80	4268050.22	151.66	178.50
DISCCART	687834.63	4268012.81	152.93	178.50
DISCCART	687804.42	4267972.97	152.77	178.50
DISCCART	687777.55	4267930.80	153.52	178.50
DISCCART	687755.58	4267885.88	155.63	172.85
DISCCART	687737.12	4267839.42	157.94	174.57
DISCCART	687722.27	4267791.67	161.02	176.37
DISCCART	687711.59	4267742.83	162.97	178.39
DISCCART	687708.99	4267721.38	163.68	178.39
DISCCART	687704.11	4267671.62	168.08	178.39
DISCCART	687384.49	4268032.08	144.07	170.93
DISCCART	687384.49	4267932.08	142.87	175.67
DISCCART	687384.49	4267832.08	152.80	157.97
DISCCART	687384.49	4267732.08	161.50	165.22
DISCCART	687384.49	4267632.08	160.46	170.48
DISCCART	687384.49	4267532.08	146.18	178.39
DISCCART	687384.49	4267432.08	147.50	178.12
DISCCART	687384.49	4267332.08	147.42	147.42
DISCCART	687384.49	4267232.08	146.98	172.91
DISCCART	687384.49	4267132.08	157.21	172.91
DISCCART	687384.49	4267032.08	169.08	169.08
DISCCART	687384.49	4266932.08	167.57	172.12
DISCCART	687384.49	4266832.08	162.68	162.68
DISCCART	687384.49	4266732.08	160.10	160.10
DISCCART	687384.49	4266632.08	152.22	160.19
DISCCART	687384.49	4268132.08	142.26	146.22
DISCCART	687384.49	4268232.08	143.59	143.59
DISCCART	687384.49	4268332.08	143.40	143.40
DISCCART	687384.49	4268432.08	143.10	143.10
DISCCART	687384.49	4268532.08	143.39	143.39
DISCCART	687384.49	4268632.08	143.41	143.41
DISCCART	687384.49	4268732.08	143.68	143.68
DISCCART	687384.49	4268832.08	142.81	142.81
DISCCART	687384.49	4268932.08	143.33	143.33
DISCCART	687384.49	4269032.08	143.59	143.59

DISCCART	687384.49	4269132.08	143.74	143.74
DISCCART	687384.49	4269232.08	144.06	144.06
DISCCART	687384.49	4269332.08	143.39	143.39
DISCCART	687384.49	4269432.08	143.54	143.54
DISCCART	687384.49	4269532.08	143.55	143.55
DISCCART	687384.49	4269632.08	143.43	143.43
DISCCART	687384.49	4269732.08	143.47	143.47
DISCCART	687384.49	4269832.08	143.71	146.40
DISCCART	687384.49	4269932.08	143.91	143.91
DISCCART	687384.49	4270032.08	142.81	142.81
DISCCART	687384.49	4270132.08	143.52	143.52
DISCCART	687384.49	4270232.08	138.68	138.68
DISCCART	687384.49	4270332.08	138.67	138.67
DISCCART	687384.49	4270432.08	138.67	138.67
DISCCART	687384.49	4270532.08	138.75	138.75
DISCCART	687384.49	4270632.08	143.75	143.75
DISCCART	687384.49	4270732.08	144.55	144.55
DISCCART	687384.49	4270832.08	143.44	143.44
DISCCART	687384.49	4270932.08	142.91	142.91
DISCCART	687384.49	4271032.08	143.29	143.29
DISCCART	687384.49	4271132.08	143.30	143.30
DISCCART	687384.49	4271232.08	145.32	146.22
DISCCART	687384.49	4271332.08	142.56	142.56
DISCCART	687384.49	4271432.08	142.38	142.38
DISCCART	687384.49	4271532.08	142.29	142.29
DISCCART	687384.49	4271632.08	141.94	141.94
DISCCART	687384.49	4271732.08	141.78	141.78
DISCCART	687384.49	4271832.08	141.23	231.74
DISCCART	687384.49	4271932.08	141.41	232.10
DISCCART	687384.49	4272032.08	165.32	165.32
DISCCART	687384.49	4272132.08	162.26	232.10
DISCCART	687384.49	4272232.08	154.71	258.39
DISCCART	687384.49	4272332.08	164.43	258.29
DISCCART	687384.49	4272432.08	164.92	259.59
DISCCART	687384.49	4272532.08	173.31	259.11
DISCCART	687384.49	4272632.08	199.63	232.10
DISCCART	687384.49	4272732.08	197.36	232.10
DISCCART	687384.49	4272832.08	183.10	259.59
DISCCART	687384.49	4272932.08	175.78	266.46
DISCCART	687284.49	4268032.08	143.99	143.99
DISCCART	687284.49	4267932.08	146.48	146.48
DISCCART	687284.49	4267832.08	146.13	170.38
DISCCART	687284.49	4267732.08	145.49	170.48
DISCCART	687284.49	4267632.08	145.83	177.66
DISCCART	687284.49	4267532.08	147.57	170.48
DISCCART	687284.49	4267432.08	148.62	148.62
DISCCART	687284.49	4267332.08	149.12	177.83
DISCCART	687284.49	4267232.08	150.57	177.83
DISCCART	687284.49	4267132.08	151.22	187.14
DISCCART	687284.49	4267032.08	164.60	184.47
DISCCART	687284.49	4266932.08	173.45	175.77
DISCCART	687284.49	4266832.08	165.92	184.83
DISCCART	687284.49	4266732.08	159.00	185.86
DISCCART	687284.49	4266632.08	152.94	184.44
DISCCART	687284.49	4268132.08	143.82	143.82
DISCCART	687284.49	4268232.08	143.47	143.47
DISCCART	687284.49	4268332.08	143.26	143.26
DISCCART	687284.49	4268432.08	143.06	143.06
DISCCART	687284.49	4268532.08	143.54	143.54
DISCCART	687284.49	4268632.08	143.61	143.61
DISCCART	687284.49	4268732.08	143.93	143.93
DISCCART	687284.49	4268832.08	143.90	143.90
DISCCART	687284.49	4268932.08	142.98	142.98
DISCCART	687284.49	4269032.08	143.74	143.74
DISCCART	687284.49	4269132.08	143.62	143.62
DISCCART	687284.49	4269232.08	144.00	144.00

DISCCART	687284.49	4269332.08	144.36	144.36
DISCCART	687284.49	4269432.08	143.47	143.47
DISCCART	687284.49	4269532.08	143.39	143.39
DISCCART	687284.49	4269632.08	143.69	143.69
DISCCART	687284.49	4269732.08	145.41	146.37
DISCCART	687284.49	4269832.08	143.77	143.77
DISCCART	687284.49	4269932.08	141.91	141.91
DISCCART	687284.49	4270032.08	143.59	143.59
DISCCART	687284.49	4270132.08	138.65	143.88
DISCCART	687284.49	4270232.08	138.66	138.66
DISCCART	687284.49	4270332.08	138.65	138.65
DISCCART	687284.49	4270432.08	138.77	138.77
DISCCART	687284.49	4270532.08	140.54	144.85
DISCCART	687284.49	4270632.08	142.76	142.76
DISCCART	687284.49	4270732.08	144.45	144.45
DISCCART	687284.49	4270832.08	143.41	143.41
DISCCART	687284.49	4270932.08	143.19	143.19
DISCCART	687284.49	4271032.08	143.52	143.52
DISCCART	687284.49	4271132.08	143.64	144.46
DISCCART	687284.49	4271232.08	142.75	142.75
DISCCART	687284.49	4271332.08	142.45	142.45
DISCCART	687284.49	4271432.08	142.15	142.15
DISCCART	687284.49	4271532.08	142.18	142.18
DISCCART	687284.49	4271632.08	141.74	141.74
DISCCART	687284.49	4271732.08	141.76	141.76
DISCCART	687284.49	4271832.08	142.15	231.96
DISCCART	687284.49	4271932.08	142.66	232.10
DISCCART	687284.49	4272032.08	155.30	232.10
DISCCART	687284.49	4272132.08	155.58	257.49
DISCCART	687284.49	4272232.08	156.61	259.59
DISCCART	687284.49	4272332.08	158.83	259.59
DISCCART	687284.49	4272432.08	172.17	259.59
DISCCART	687284.49	4272532.08	185.96	257.84
DISCCART	687284.49	4272632.08	212.12	232.10
DISCCART	687284.49	4272732.08	221.31	232.10
DISCCART	687284.49	4272832.08	193.98	259.59
DISCCART	687284.49	4272932.08	176.30	266.77
DISCCART	687184.49	4268032.08	143.49	143.49
DISCCART	687184.49	4267932.08	146.44	146.44
DISCCART	687184.49	4267832.08	146.42	146.42
DISCCART	687184.49	4267732.08	147.49	147.49
DISCCART	687184.49	4267632.08	146.27	146.27
DISCCART	687184.49	4267532.08	146.21	146.21
DISCCART	687184.49	4267432.08	148.95	180.67
DISCCART	687184.49	4267332.08	151.66	183.97
DISCCART	687184.49	4267232.08	160.34	177.83
DISCCART	687184.49	4267132.08	151.68	191.40
DISCCART	687184.49	4267032.08	165.09	187.14
DISCCART	687184.49	4266932.08	181.39	181.39
DISCCART	687184.49	4266832.08	172.66	186.13
DISCCART	687184.49	4266732.08	162.44	191.22
DISCCART	687184.49	4266632.08	153.11	198.18
DISCCART	687184.49	4268132.08	144.33	144.33
DISCCART	687184.49	4268232.08	143.54	143.54
DISCCART	687184.49	4268332.08	143.01	143.01
DISCCART	687184.49	4268432.08	143.33	143.33
DISCCART	687184.49	4268532.08	143.32	143.32
DISCCART	687184.49	4268632.08	143.99	143.99
DISCCART	687184.49	4268732.08	143.84	143.84
DISCCART	687184.49	4268832.08	143.96	143.96
DISCCART	687184.49	4268932.08	144.16	144.16
DISCCART	687184.49	4269032.08	143.23	143.23
DISCCART	687184.49	4269132.08	144.16	144.16
DISCCART	687184.49	4269232.08	143.74	143.74
DISCCART	687184.49	4269332.08	144.13	144.13
DISCCART	687184.49	4269432.08	143.87	143.87

DISCCART	687184.49	4269532.08	143.42	143.42
DISCCART	687184.49	4269632.08	143.41	146.84
DISCCART	687184.49	4269732.08	144.05	144.05
DISCCART	687184.49	4269832.08	141.97	141.97
DISCCART	687184.49	4269932.08	143.60	143.60
DISCCART	687184.49	4270032.08	138.65	144.34
DISCCART	687184.49	4270132.08	138.65	138.65
DISCCART	687184.49	4270232.08	138.65	138.65
DISCCART	687184.49	4270332.08	138.66	138.66
DISCCART	687184.49	4270432.08	138.79	144.99
DISCCART	687184.49	4270532.08	143.80	143.80
DISCCART	687184.49	4270632.08	144.45	144.45
DISCCART	687184.49	4270732.08	144.52	144.52
DISCCART	687184.49	4270832.08	144.09	144.09
DISCCART	687184.49	4270932.08	143.04	143.04
DISCCART	687184.49	4271032.08	140.94	144.19
DISCCART	687184.49	4271132.08	144.64	146.06
DISCCART	687184.49	4271232.08	142.89	142.89
DISCCART	687184.49	4271332.08	142.27	142.27
DISCCART	687184.49	4271432.08	141.98	141.98
DISCCART	687184.49	4271532.08	141.45	141.45
DISCCART	687184.49	4271632.08	141.76	141.76
DISCCART	687184.49	4271732.08	141.79	141.79
DISCCART	687184.49	4271832.08	142.38	231.96
DISCCART	687184.49	4271932.08	145.33	232.10
DISCCART	687184.49	4272032.08	151.12	258.29
DISCCART	687184.49	4272132.08	161.54	232.10
DISCCART	687184.49	4272232.08	160.91	259.59
DISCCART	687184.49	4272332.08	161.25	259.59
DISCCART	687184.49	4272432.08	170.34	259.59
DISCCART	687184.49	4272532.08	186.10	259.59
DISCCART	687184.49	4272632.08	202.45	232.10
DISCCART	687184.49	4272732.08	226.29	232.10
DISCCART	687184.49	4272832.08	215.70	232.10
DISCCART	687184.49	4272932.08	181.24	266.77
DISCCART	687084.49	4268032.08	146.26	147.12
DISCCART	687084.49	4267932.08	149.22	149.22
DISCCART	687084.49	4267832.08	149.79	149.79
DISCCART	687084.49	4267732.08	149.70	149.70
DISCCART	687084.49	4267632.08	149.67	149.67
DISCCART	687084.49	4267532.08	148.88	178.24
DISCCART	687084.49	4267432.08	148.71	185.05
DISCCART	687084.49	4267332.08	161.57	183.60
DISCCART	687084.49	4267232.08	170.12	177.83
DISCCART	687084.49	4267132.08	153.94	196.84
DISCCART	687084.49	4267032.08	168.64	187.14
DISCCART	687084.49	4266932.08	184.08	184.08
DISCCART	687084.49	4266832.08	174.88	191.05
DISCCART	687084.49	4266732.08	164.26	196.91
DISCCART	687084.49	4266632.08	157.61	198.54
DISCCART	687084.49	4268132.08	144.09	144.09
DISCCART	687084.49	4268232.08	143.62	143.62
DISCCART	687084.49	4268332.08	143.30	143.30
DISCCART	687084.49	4268432.08	143.46	143.46
DISCCART	687084.49	4268532.08	143.12	143.12
DISCCART	687084.49	4268632.08	143.88	143.88
DISCCART	687084.49	4268732.08	144.26	144.26
DISCCART	687084.49	4268832.08	144.01	144.01
DISCCART	687084.49	4268932.08	143.74	143.74
DISCCART	687084.49	4269032.08	144.60	144.60
DISCCART	687084.49	4269132.08	143.29	143.29
DISCCART	687084.49	4269232.08	143.69	143.69
DISCCART	687084.49	4269332.08	143.53	145.97
DISCCART	687084.49	4269432.08	143.45	146.43
DISCCART	687084.49	4269532.08	143.76	143.76
DISCCART	687084.49	4269632.08	143.97	143.97

DISCCART	687084.49	4269732.08	141.73	141.73
DISCCART	687084.49	4269832.08	143.08	143.08
DISCCART	687084.49	4269932.08	143.62	143.62
DISCCART	687084.49	4270032.08	138.65	138.65
DISCCART	687084.49	4270132.08	138.65	138.65
DISCCART	687084.49	4270232.08	138.64	138.64
DISCCART	687084.49	4270332.08	138.87	138.87
DISCCART	687084.49	4270432.08	143.31	145.46
DISCCART	687084.49	4270532.08	144.74	144.74
DISCCART	687084.49	4270632.08	144.60	144.60
DISCCART	687084.49	4270732.08	143.25	143.25
DISCCART	687084.49	4270832.08	141.25	144.71
DISCCART	687084.49	4270932.08	143.35	146.05
DISCCART	687084.49	4271032.08	142.38	145.95
DISCCART	687084.49	4271132.08	142.53	142.53
DISCCART	687084.49	4271232.08	142.67	142.67
DISCCART	687084.49	4271332.08	142.08	142.08
DISCCART	687084.49	4271432.08	142.51	142.51
DISCCART	687084.49	4271532.08	141.80	141.80
DISCCART	687084.49	4271632.08	141.62	141.62
DISCCART	687084.49	4271732.08	142.38	162.81
DISCCART	687084.49	4271832.08	142.55	163.91
DISCCART	687084.49	4271932.08	145.49	258.29
DISCCART	687084.49	4272032.08	159.05	232.10
DISCCART	687084.49	4272132.08	162.80	258.29
DISCCART	687084.49	4272232.08	166.00	259.59
DISCCART	687084.49	4272332.08	170.59	259.59
DISCCART	687084.49	4272432.08	173.06	259.59
DISCCART	687084.49	4272532.08	176.81	259.59
DISCCART	687084.49	4272632.08	184.56	259.59
DISCCART	687084.49	4272732.08	200.79	259.59
DISCCART	687084.49	4272832.08	217.43	258.39
DISCCART	687084.49	4272932.08	195.76	266.77
DISCCART	686984.49	4268032.08	152.34	165.98
DISCCART	686984.49	4267932.08	151.25	180.33
DISCCART	686984.49	4267832.08	153.57	179.45
DISCCART	686984.49	4267732.08	152.42	177.34
DISCCART	686984.49	4267632.08	157.85	158.26
DISCCART	686984.49	4267532.08	158.34	158.34
DISCCART	686984.49	4267432.08	151.36	185.82
DISCCART	686984.49	4267332.08	171.18	177.75
DISCCART	686984.49	4267232.08	178.30	178.30
DISCCART	686984.49	4267132.08	164.18	186.48
DISCCART	686984.49	4267032.08	158.14	196.91
DISCCART	686984.49	4266932.08	177.27	196.43
DISCCART	686984.49	4266832.08	186.13	188.03
DISCCART	686984.49	4266732.08	171.70	198.18
DISCCART	686984.49	4266632.08	164.10	198.54
DISCCART	686984.49	4268132.08	143.91	179.58
DISCCART	686984.49	4268232.08	143.92	143.92
DISCCART	686984.49	4268332.08	143.73	143.73
DISCCART	686984.49	4268432.08	143.72	143.72
DISCCART	686984.49	4268532.08	143.65	143.65
DISCCART	686984.49	4268632.08	143.69	143.69
DISCCART	686984.49	4268732.08	144.17	144.17
DISCCART	686984.49	4268832.08	144.17	144.17
DISCCART	686984.49	4268932.08	144.28	144.28
DISCCART	686984.49	4269032.08	144.36	144.36
DISCCART	686984.49	4269132.08	144.83	144.83
DISCCART	686984.49	4269232.08	143.76	146.01
DISCCART	686984.49	4269332.08	144.06	144.06
DISCCART	686984.49	4269432.08	141.69	144.62
DISCCART	686984.49	4269532.08	143.37	143.37
DISCCART	686984.49	4269632.08	143.01	143.01
DISCCART	686984.49	4269732.08	142.81	142.81
DISCCART	686984.49	4269832.08	143.67	143.67

DISCCART	686984.49	4269932.08	139.37	144.20
DISCCART	686984.49	4270032.08	138.65	138.65
DISCCART	686984.49	4270132.08	138.65	138.65
DISCCART	686984.49	4270232.08	138.65	138.65
DISCCART	686984.49	4270332.08	139.29	144.58
DISCCART	686984.49	4270432.08	144.80	144.80
DISCCART	686984.49	4270532.08	143.74	143.74
DISCCART	686984.49	4270632.08	142.70	142.70
DISCCART	686984.49	4270732.08	145.27	146.07
DISCCART	686984.49	4270832.08	141.79	146.06
DISCCART	686984.49	4270932.08	142.25	142.25
DISCCART	686984.49	4271032.08	142.61	142.61
DISCCART	686984.49	4271132.08	142.29	142.29
DISCCART	686984.49	4271232.08	142.01	142.01
DISCCART	686984.49	4271332.08	142.23	142.23
DISCCART	686984.49	4271432.08	141.98	141.98
DISCCART	686984.49	4271532.08	141.23	141.23
DISCCART	686984.49	4271632.08	141.63	141.63
DISCCART	686984.49	4271732.08	141.52	164.62
DISCCART	686984.49	4271832.08	145.26	167.00
DISCCART	686984.49	4271932.08	146.25	258.39
DISCCART	686984.49	4272032.08	154.36	258.39
DISCCART	686984.49	4272132.08	158.39	259.59
DISCCART	686984.49	4272232.08	159.48	259.59
DISCCART	686984.49	4272332.08	160.50	259.59
DISCCART	686984.49	4272432.08	162.49	259.59
DISCCART	686984.49	4272532.08	168.43	259.59
DISCCART	686984.49	4272632.08	175.79	265.67
DISCCART	686984.49	4272732.08	179.29	266.77
DISCCART	686984.49	4272832.08	201.91	259.59
DISCCART	686984.49	4272932.08	219.62	259.59
DISCCART	686884.49	4268032.08	159.89	165.98
DISCCART	686884.49	4267932.08	158.55	181.38
DISCCART	686884.49	4267832.08	164.62	176.93
DISCCART	686884.49	4267732.08	164.44	170.68
DISCCART	686884.49	4267632.08	162.18	162.18
DISCCART	686884.49	4267532.08	158.66	158.66
DISCCART	686884.49	4267432.08	148.69	185.82
DISCCART	686884.49	4267332.08	169.84	184.50
DISCCART	686884.49	4267232.08	183.13	183.64
DISCCART	686884.49	4267132.08	181.17	184.58
DISCCART	686884.49	4267032.08	176.73	190.02
DISCCART	686884.49	4266932.08	178.17	196.91
DISCCART	686884.49	4266832.08	192.86	192.86
DISCCART	686884.49	4266732.08	185.96	196.91
DISCCART	686884.49	4266632.08	172.39	198.54
DISCCART	686884.49	4268132.08	143.62	181.38
DISCCART	686884.49	4268232.08	143.51	179.13
DISCCART	686884.49	4268332.08	143.49	143.49
DISCCART	686884.49	4268432.08	143.61	143.61
DISCCART	686884.49	4268532.08	143.27	143.27
DISCCART	686884.49	4268632.08	143.29	143.29
DISCCART	686884.49	4268732.08	143.57	143.57
DISCCART	686884.49	4268832.08	143.88	143.88
DISCCART	686884.49	4268932.08	144.19	144.19
DISCCART	686884.49	4269032.08	144.18	144.18
DISCCART	686884.49	4269132.08	144.47	146.72
DISCCART	686884.49	4269232.08	143.70	143.70
DISCCART	686884.49	4269332.08	142.95	142.95
DISCCART	686884.49	4269432.08	143.71	143.71
DISCCART	686884.49	4269532.08	143.24	143.24
DISCCART	686884.49	4269632.08	143.11	143.11
DISCCART	686884.49	4269732.08	143.46	143.46
DISCCART	686884.49	4269832.08	144.03	144.03
DISCCART	686884.49	4269932.08	138.65	144.40
DISCCART	686884.49	4270032.08	138.65	138.65

DISCCART	686884.49	4270132.08	138.65	138.65
DISCCART	686884.49	4270232.08	138.66	138.66
DISCCART	686884.49	4270332.08	139.66	144.01
DISCCART	686884.49	4270432.08	144.10	144.10
DISCCART	686884.49	4270532.08	143.00	143.00
DISCCART	686884.49	4270632.08	143.00	145.99
DISCCART	686884.49	4270732.08	142.47	142.47
DISCCART	686884.49	4270832.08	142.45	142.45
DISCCART	686884.49	4270932.08	143.11	143.11
DISCCART	686884.49	4271032.08	142.63	142.63
DISCCART	686884.49	4271132.08	142.44	142.44
DISCCART	686884.49	4271232.08	141.96	141.96
DISCCART	686884.49	4271332.08	141.81	141.81
DISCCART	686884.49	4271432.08	141.77	141.77
DISCCART	686884.49	4271532.08	141.51	141.51
DISCCART	686884.49	4271632.08	141.28	170.44
DISCCART	686884.49	4271732.08	143.30	167.00
DISCCART	686884.49	4271832.08	157.60	164.00
DISCCART	686884.49	4271932.08	163.39	163.39
DISCCART	686884.49	4272032.08	154.55	259.19
DISCCART	686884.49	4272132.08	150.41	259.59
DISCCART	686884.49	4272232.08	151.42	259.59
DISCCART	686884.49	4272332.08	154.77	259.59
DISCCART	686884.49	4272432.08	159.45	265.63
DISCCART	686884.49	4272532.08	163.97	266.77
DISCCART	686884.49	4272632.08	168.28	266.77
DISCCART	686884.49	4272732.08	176.77	266.77
DISCCART	686884.49	4272832.08	193.30	266.77
DISCCART	686884.49	4272932.08	229.11	259.59
DISCCART	686784.49	4268032.08	144.81	181.38
DISCCART	686784.49	4267932.08	169.83	180.33
DISCCART	686784.49	4267832.08	173.65	177.16
DISCCART	686784.49	4267732.08	171.35	175.51
DISCCART	686784.49	4267632.08	165.20	165.20
DISCCART	686784.49	4267532.08	158.82	158.82
DISCCART	686784.49	4267432.08	150.50	185.82
DISCCART	686784.49	4267332.08	158.94	185.82
DISCCART	686784.49	4267232.08	176.80	185.53
DISCCART	686784.49	4267132.08	184.49	184.49
DISCCART	686784.49	4267032.08	183.45	183.45
DISCCART	686784.49	4266932.08	186.61	189.82
DISCCART	686784.49	4266832.08	192.67	196.84
DISCCART	686784.49	4266732.08	195.90	195.90
DISCCART	686784.49	4266632.08	192.96	198.18
DISCCART	686784.49	4268132.08	143.59	181.38
DISCCART	686784.49	4268232.08	143.47	181.13
DISCCART	686784.49	4268332.08	143.61	143.61
DISCCART	686784.49	4268432.08	143.76	143.76
DISCCART	686784.49	4268532.08	143.42	143.42
DISCCART	686784.49	4268632.08	143.78	143.78
DISCCART	686784.49	4268732.08	143.45	143.45
DISCCART	686784.49	4268832.08	143.62	143.62
DISCCART	686784.49	4268932.08	144.01	144.01
DISCCART	686784.49	4269032.08	144.40	144.40
DISCCART	686784.49	4269132.08	143.16	143.16
DISCCART	686784.49	4269232.08	143.57	143.57
DISCCART	686784.49	4269332.08	143.54	143.54
DISCCART	686784.49	4269432.08	143.50	143.50
DISCCART	686784.49	4269532.08	143.73	143.73
DISCCART	686784.49	4269632.08	143.14	143.14
DISCCART	686784.49	4269732.08	143.84	143.84
DISCCART	686784.49	4269832.08	143.64	144.76
DISCCART	686784.49	4269932.08	138.68	138.68
DISCCART	686784.49	4270032.08	138.65	138.65
DISCCART	686784.49	4270132.08	138.65	138.65
DISCCART	686784.49	4270232.08	138.73	138.73

DISCCART	686784.49	4270332.08	139.38	144.76
DISCCART	686784.49	4270432.08	144.64	144.64
DISCCART	686784.49	4270532.08	145.10	145.79
DISCCART	686784.49	4270632.08	142.75	142.75
DISCCART	686784.49	4270732.08	142.88	142.88
DISCCART	686784.49	4270832.08	143.03	143.03
DISCCART	686784.49	4270932.08	142.71	142.71
DISCCART	686784.49	4271032.08	142.42	142.42
DISCCART	686784.49	4271132.08	142.32	142.32
DISCCART	686784.49	4271232.08	142.01	142.01
DISCCART	686784.49	4271332.08	142.01	142.01
DISCCART	686784.49	4271432.08	141.59	141.59
DISCCART	686784.49	4271532.08	141.34	174.38
DISCCART	686784.49	4271632.08	141.10	175.95
DISCCART	686784.49	4271732.08	142.04	177.40
DISCCART	686784.49	4271832.08	152.67	167.00
DISCCART	686784.49	4271932.08	164.68	164.68
DISCCART	686784.49	4272032.08	165.11	165.11
DISCCART	686784.49	4272132.08	161.91	259.59
DISCCART	686784.49	4272232.08	158.36	259.59
DISCCART	686784.49	4272332.08	162.06	259.59
DISCCART	686784.49	4272432.08	160.03	266.19
DISCCART	686784.49	4272532.08	161.85	266.77
DISCCART	686784.49	4272632.08	172.83	266.77
DISCCART	686784.49	4272732.08	181.46	266.77
DISCCART	686784.49	4272832.08	200.14	265.67
DISCCART	686784.49	4272932.08	236.49	259.59
DISCCART	686684.49	4268032.08	144.74	181.38
DISCCART	686684.49	4267932.08	178.59	178.59
DISCCART	686684.49	4267832.08	179.91	179.91
DISCCART	686684.49	4267732.08	172.49	172.49
DISCCART	686684.49	4267632.08	163.46	170.55
DISCCART	686684.49	4267532.08	158.32	158.32
DISCCART	686684.49	4267432.08	158.02	158.02
DISCCART	686684.49	4267332.08	156.10	185.82
DISCCART	686684.49	4267232.08	170.86	185.53
DISCCART	686684.49	4267132.08	173.01	185.53
DISCCART	686684.49	4267032.08	171.12	196.84
DISCCART	686684.49	4266932.08	169.66	198.54
DISCCART	686684.49	4266832.08	172.30	198.54
DISCCART	686684.49	4266732.08	193.85	197.88
DISCCART	686684.49	4266632.08	197.03	197.03
DISCCART	686684.49	4268132.08	143.05	181.38
DISCCART	686684.49	4268232.08	143.26	181.38
DISCCART	686684.49	4268332.08	143.36	143.36
DISCCART	686684.49	4268432.08	143.65	143.65
DISCCART	686684.49	4268532.08	143.89	143.89
DISCCART	686684.49	4268632.08	143.85	143.85
DISCCART	686684.49	4268732.08	144.01	144.01
DISCCART	686684.49	4268832.08	143.84	143.84
DISCCART	686684.49	4268932.08	143.79	143.79
DISCCART	686684.49	4269032.08	143.33	143.33
DISCCART	686684.49	4269132.08	144.07	144.07
DISCCART	686684.49	4269232.08	143.68	143.68
DISCCART	686684.49	4269332.08	143.98	143.98
DISCCART	686684.49	4269432.08	144.06	144.06
DISCCART	686684.49	4269532.08	144.12	144.12
DISCCART	686684.49	4269632.08	143.15	143.15
DISCCART	686684.49	4269732.08	144.38	144.38
DISCCART	686684.49	4269832.08	138.65	138.65
DISCCART	686684.49	4269932.08	138.70	138.70
DISCCART	686684.49	4270032.08	138.75	138.75
DISCCART	686684.49	4270132.08	138.72	138.72
DISCCART	686684.49	4270232.08	138.88	145.13
DISCCART	686684.49	4270332.08	144.30	144.30
DISCCART	686684.49	4270432.08	141.61	141.61

DISCCART	686684.49	4270532.08	143.10	143.10
DISCCART	686684.49	4270632.08	142.56	142.56
DISCCART	686684.49	4270732.08	143.17	143.17
DISCCART	686684.49	4270832.08	142.69	142.69
DISCCART	686684.49	4270932.08	142.76	142.76
DISCCART	686684.49	4271032.08	142.17	142.17
DISCCART	686684.49	4271132.08	142.28	142.28
DISCCART	686684.49	4271232.08	141.92	141.92
DISCCART	686684.49	4271332.08	141.56	141.56
DISCCART	686684.49	4271432.08	141.25	174.21
DISCCART	686684.49	4271532.08	141.62	175.77
DISCCART	686684.49	4271632.08	144.14	177.40
DISCCART	686684.49	4271732.08	160.29	173.86
DISCCART	686684.49	4271832.08	153.10	177.40
DISCCART	686684.49	4271932.08	156.49	176.74
DISCCART	686684.49	4272032.08	168.19	172.06
DISCCART	686684.49	4272132.08	169.96	258.29
DISCCART	686684.49	4272232.08	161.49	259.59
DISCCART	686684.49	4272332.08	170.03	259.59
DISCCART	686684.49	4272432.08	170.93	259.59
DISCCART	686684.49	4272532.08	171.55	264.94
DISCCART	686684.49	4272632.08	174.49	266.77
DISCCART	686684.49	4272732.08	192.68	259.59
DISCCART	686684.49	4272832.08	229.65	259.59
DISCCART	686684.49	4272932.08	238.93	259.59
DISCCART	686584.49	4268032.08	143.87	181.96
DISCCART	686584.49	4267932.08	163.62	181.38
DISCCART	686584.49	4267832.08	178.34	178.34
DISCCART	686584.49	4267732.08	168.73	179.71
DISCCART	686584.49	4267632.08	165.63	177.99
DISCCART	686584.49	4267532.08	164.01	164.01
DISCCART	686584.49	4267432.08	158.98	158.98
DISCCART	686584.49	4267332.08	152.15	185.82
DISCCART	686584.49	4267232.08	152.24	187.40
DISCCART	686584.49	4267132.08	156.82	196.84
DISCCART	686584.49	4267032.08	157.63	198.54
DISCCART	686584.49	4266932.08	164.94	198.54
DISCCART	686584.49	4266832.08	180.25	197.60
DISCCART	686584.49	4266732.08	184.59	198.31
DISCCART	686584.49	4266632.08	184.34	198.54
DISCCART	686584.49	4268132.08	143.42	181.38
DISCCART	686584.49	4268232.08	143.32	181.38
DISCCART	686584.49	4268332.08	143.16	143.16
DISCCART	686584.49	4268432.08	144.13	144.13
DISCCART	686584.49	4268532.08	144.08	144.08
DISCCART	686584.49	4268632.08	143.98	143.98
DISCCART	686584.49	4268732.08	144.08	144.08
DISCCART	686584.49	4268832.08	144.30	144.30
DISCCART	686584.49	4268932.08	143.40	144.50
DISCCART	686584.49	4269032.08	143.53	143.53
DISCCART	686584.49	4269132.08	143.52	143.52
DISCCART	686584.49	4269232.08	143.91	143.91
DISCCART	686584.49	4269332.08	143.85	143.85
DISCCART	686584.49	4269432.08	144.22	144.22
DISCCART	686584.49	4269532.08	144.08	144.08
DISCCART	686584.49	4269632.08	143.80	143.80
DISCCART	686584.49	4269732.08	141.69	144.45
DISCCART	686584.49	4269832.08	138.68	138.68
DISCCART	686584.49	4269932.08	138.71	138.71
DISCCART	686584.49	4270032.08	138.76	138.76
DISCCART	686584.49	4270132.08	138.81	138.81
DISCCART	686584.49	4270232.08	138.70	145.04
DISCCART	686584.49	4270332.08	144.11	144.11
DISCCART	686584.49	4270432.08	144.76	145.84
DISCCART	686584.49	4270532.08	143.20	143.20
DISCCART	686584.49	4270632.08	143.51	143.51

DISCCART	686584.49	4270732.08	143.13	143.13
DISCCART	686584.49	4270832.08	143.29	143.29
DISCCART	686584.49	4270932.08	143.13	143.13
DISCCART	686584.49	4271032.08	142.50	142.50
DISCCART	686584.49	4271132.08	142.39	142.39
DISCCART	686584.49	4271232.08	141.82	141.82
DISCCART	686584.49	4271332.08	141.46	141.46
DISCCART	686584.49	4271432.08	141.26	174.89
DISCCART	686584.49	4271532.08	142.05	177.40
DISCCART	686584.49	4271632.08	142.01	177.40
DISCCART	686584.49	4271732.08	170.65	173.86
DISCCART	686584.49	4271832.08	166.94	176.65
DISCCART	686584.49	4271932.08	168.07	171.70
DISCCART	686584.49	4272032.08	167.35	176.79
DISCCART	686584.49	4272132.08	176.72	176.72
DISCCART	686584.49	4272232.08	171.94	259.59
DISCCART	686584.49	4272332.08	171.28	259.59
DISCCART	686584.49	4272432.08	177.42	259.59
DISCCART	686584.49	4272532.08	181.35	259.59
DISCCART	686584.49	4272632.08	187.52	259.59
DISCCART	686584.49	4272732.08	199.24	259.59
DISCCART	686584.49	4272832.08	209.59	259.59
DISCCART	686584.49	4272932.08	207.79	266.77
DISCCART	686484.49	4268032.08	143.77	181.96
DISCCART	686484.49	4267932.08	148.58	181.96
DISCCART	686484.49	4267832.08	176.61	179.29
DISCCART	686484.49	4267732.08	175.53	181.67
DISCCART	686484.49	4267632.08	174.81	174.81
DISCCART	686484.49	4267532.08	165.43	174.40
DISCCART	686484.49	4267432.08	157.66	157.97
DISCCART	686484.49	4267332.08	161.18	167.58
DISCCART	686484.49	4267232.08	165.82	183.23
DISCCART	686484.49	4267132.08	168.60	185.18
DISCCART	686484.49	4267032.08	168.28	185.64
DISCCART	686484.49	4266932.08	160.52	198.54
DISCCART	686484.49	4266832.08	158.07	198.54
DISCCART	686484.49	4266732.08	167.25	198.54
DISCCART	686484.49	4266632.08	171.18	198.61
DISCCART	686484.49	4268132.08	143.56	181.84
DISCCART	686484.49	4268232.08	143.67	179.17
DISCCART	686484.49	4268332.08	143.35	143.35
DISCCART	686484.49	4268432.08	143.48	143.48
DISCCART	686484.49	4268532.08	143.73	143.73
DISCCART	686484.49	4268632.08	143.96	143.96
DISCCART	686484.49	4268732.08	143.63	143.63
DISCCART	686484.49	4268832.08	144.84	144.84
DISCCART	686484.49	4268932.08	143.00	143.00
DISCCART	686484.49	4269032.08	143.72	143.72
DISCCART	686484.49	4269132.08	144.01	144.01
DISCCART	686484.49	4269232.08	143.97	143.97
DISCCART	686484.49	4269332.08	143.83	143.83
DISCCART	686484.49	4269432.08	143.78	143.78
DISCCART	686484.49	4269532.08	144.18	144.18
DISCCART	686484.49	4269632.08	144.62	144.62
DISCCART	686484.49	4269732.08	138.66	144.04
DISCCART	686484.49	4269832.08	138.71	138.71
DISCCART	686484.49	4269932.08	138.75	138.75
DISCCART	686484.49	4270032.08	138.78	138.78
DISCCART	686484.49	4270132.08	138.98	138.98
DISCCART	686484.49	4270232.08	144.42	144.42
DISCCART	686484.49	4270332.08	143.15	143.15
DISCCART	686484.49	4270432.08	144.27	144.27
DISCCART	686484.49	4270532.08	143.27	143.27
DISCCART	686484.49	4270632.08	142.68	142.68
DISCCART	686484.49	4270732.08	143.15	143.15
DISCCART	686484.49	4270832.08	143.19	143.19

DISCCART	686484.49	4270932.08	142.17	142.17
DISCCART	686484.49	4271032.08	143.02	143.02
DISCCART	686484.49	4271132.08	142.50	142.50
DISCCART	686484.49	4271232.08	141.89	141.89
DISCCART	686484.49	4271332.08	141.51	141.51
DISCCART	686484.49	4271432.08	141.54	175.07
DISCCART	686484.49	4271532.08	141.21	177.40
DISCCART	686484.49	4271632.08	147.45	177.40
DISCCART	686484.49	4271732.08	171.72	171.72
DISCCART	686484.49	4271832.08	175.97	176.68
DISCCART	686484.49	4271932.08	175.08	175.08
DISCCART	686484.49	4272032.08	170.67	170.67
DISCCART	686484.49	4272132.08	168.62	170.68
DISCCART	686484.49	4272232.08	162.09	259.59
DISCCART	686484.49	4272332.08	167.36	259.59
DISCCART	686484.49	4272432.08	172.09	259.59
DISCCART	686484.49	4272532.08	179.63	259.59
DISCCART	686484.49	4272632.08	186.27	259.59
DISCCART	686484.49	4272732.08	181.92	266.77
DISCCART	686484.49	4272832.08	180.84	266.77
DISCCART	686484.49	4272932.08	189.73	266.77
DISCCART	687484.49	4268032.08	145.11	173.55
DISCCART	687484.49	4267932.08	158.22	170.93
DISCCART	687484.49	4267832.08	155.64	177.47
DISCCART	687484.49	4267732.08	156.97	178.39
DISCCART	687484.49	4267632.08	151.14	178.39
DISCCART	687484.49	4267532.08	152.98	178.39
DISCCART	687484.49	4267432.08	145.82	178.39
DISCCART	687484.49	4267332.08	146.50	146.50
DISCCART	687484.49	4267232.08	146.33	171.34
DISCCART	687484.49	4267132.08	146.35	178.38
DISCCART	687484.49	4267032.08	162.68	162.68
DISCCART	687484.49	4266932.08	160.53	160.53
DISCCART	687484.49	4266832.08	158.53	158.53
DISCCART	687484.49	4266732.08	159.18	159.18
DISCCART	687484.49	4266632.08	158.05	158.05
DISCCART	687484.49	4268132.08	146.86	147.43
DISCCART	687484.49	4268232.08	144.68	146.43
DISCCART	687484.49	4268332.08	143.45	143.45
DISCCART	687484.49	4268432.08	143.50	143.50
DISCCART	687484.49	4268532.08	143.47	143.47
DISCCART	687484.49	4268632.08	143.15	143.15
DISCCART	687484.49	4268732.08	143.36	143.36
DISCCART	687484.49	4268832.08	142.86	142.86
DISCCART	687484.49	4268932.08	143.37	143.37
DISCCART	687484.49	4269032.08	143.63	143.63
DISCCART	687484.49	4269132.08	144.05	144.05
DISCCART	687484.49	4269232.08	143.61	143.61
DISCCART	687484.49	4269332.08	143.44	143.44
DISCCART	687484.49	4269432.08	143.51	143.51
DISCCART	687484.49	4269532.08	143.67	143.67
DISCCART	687484.49	4269632.08	143.87	143.87
DISCCART	687484.49	4269732.08	144.02	144.02
DISCCART	687484.49	4269832.08	143.11	143.11
DISCCART	687484.49	4269932.08	144.04	144.04
DISCCART	687484.49	4270032.08	144.16	144.16
DISCCART	687484.49	4270132.08	142.95	142.95
DISCCART	687484.49	4270232.08	138.83	144.09
DISCCART	687484.49	4270332.08	138.76	138.76
DISCCART	687484.49	4270432.08	138.66	138.66
DISCCART	687484.49	4270532.08	138.69	138.69
DISCCART	687484.49	4270632.08	138.62	144.18
DISCCART	687484.49	4270732.08	143.15	143.15
DISCCART	687484.49	4270832.08	142.87	142.87
DISCCART	687484.49	4270932.08	143.04	143.04
DISCCART	687484.49	4271032.08	143.26	143.26

DISCCART	687484.49	4271132.08	143.66	143.66
DISCCART	687484.49	4271232.08	143.58	143.58
DISCCART	687484.49	4271332.08	142.66	142.66
DISCCART	687484.49	4271432.08	142.37	142.37
DISCCART	687484.49	4271532.08	142.50	142.50
DISCCART	687484.49	4271632.08	142.04	142.04
DISCCART	687484.49	4271732.08	141.84	201.50
DISCCART	687484.49	4271832.08	141.64	208.66
DISCCART	687484.49	4271932.08	141.06	232.10
DISCCART	687484.49	4272032.08	161.73	208.66
DISCCART	687484.49	4272132.08	168.59	229.82
DISCCART	687484.49	4272232.08	164.40	232.10
DISCCART	687484.49	4272332.08	159.35	232.10
DISCCART	687484.49	4272432.08	165.49	232.10
DISCCART	687484.49	4272532.08	181.68	232.10
DISCCART	687484.49	4272632.08	204.02	231.74
DISCCART	687484.49	4272732.08	199.82	232.10
DISCCART	687484.49	4272832.08	172.12	262.51
DISCCART	687484.49	4272932.08	176.82	265.15
DISCCART	687584.49	4267832.08	168.95	172.83
DISCCART	687584.49	4267732.08	173.94	173.94
DISCCART	687584.49	4267632.08	175.39	178.11
DISCCART	687584.49	4267532.08	158.53	178.39
DISCCART	687584.49	4267432.08	149.55	195.97
DISCCART	687584.49	4267332.08	145.82	195.97
DISCCART	687584.49	4267232.08	146.23	195.97
DISCCART	687584.49	4267132.08	146.55	171.55
DISCCART	687584.49	4267032.08	150.05	171.64
DISCCART	687584.49	4266932.08	150.31	170.33
DISCCART	687584.49	4266832.08	162.10	162.10
DISCCART	687584.49	4266732.08	152.35	159.95
DISCCART	687584.49	4266632.08	149.09	184.36
DISCCART	687584.49	4268332.08	143.41	143.41
DISCCART	687584.49	4268432.08	143.51	143.51
DISCCART	687584.49	4268532.08	143.49	143.49
DISCCART	687584.49	4268632.08	143.24	143.24
DISCCART	687584.49	4268732.08	142.70	142.70
DISCCART	687584.49	4268832.08	142.95	142.95
DISCCART	687584.49	4268932.08	143.27	143.27
DISCCART	687584.49	4269032.08	143.74	143.74
DISCCART	687584.49	4269132.08	143.89	143.89
DISCCART	687584.49	4269232.08	143.55	143.55
DISCCART	687584.49	4269332.08	144.18	144.18
DISCCART	687584.49	4269432.08	143.19	143.19
DISCCART	687584.49	4269532.08	143.14	143.14
DISCCART	687584.49	4269632.08	143.77	143.77
DISCCART	687584.49	4269732.08	143.77	143.77
DISCCART	687584.49	4269832.08	143.73	143.73
DISCCART	687584.49	4269932.08	143.32	143.32
DISCCART	687584.49	4270032.08	143.54	147.04
DISCCART	687584.49	4270132.08	144.06	144.18
DISCCART	687584.49	4270232.08	143.70	144.76
DISCCART	687584.49	4270332.08	138.76	143.11
DISCCART	687584.49	4270432.08	138.71	138.71
DISCCART	687584.49	4270532.08	138.65	138.65
DISCCART	687584.49	4270632.08	138.65	138.65
DISCCART	687584.49	4270732.08	138.65	144.76
DISCCART	687584.49	4270832.08	144.29	144.29
DISCCART	687584.49	4270932.08	143.05	143.05
DISCCART	687584.49	4271032.08	142.73	142.73
DISCCART	687584.49	4271132.08	142.65	142.65
DISCCART	687584.49	4271232.08	140.48	143.46
DISCCART	687584.49	4271332.08	145.10	146.51
DISCCART	687584.49	4271432.08	142.80	142.80
DISCCART	687584.49	4271532.08	142.34	142.34
DISCCART	687584.49	4271632.08	142.42	142.42

DISCCART	687584.49	4271732.08	141.90	201.92
DISCCART	687584.49	4271832.08	141.66	208.66
DISCCART	687584.49	4271932.08	143.04	231.96
DISCCART	687584.49	4272032.08	147.03	232.10
DISCCART	687584.49	4272132.08	165.00	228.11
DISCCART	687584.49	4272232.08	171.97	229.82
DISCCART	687584.49	4272332.08	173.91	232.10
DISCCART	687584.49	4272432.08	202.91	208.23
DISCCART	687584.49	4272532.08	181.60	232.10
DISCCART	687584.49	4272632.08	198.39	223.47
DISCCART	687584.49	4272732.08	198.93	223.47
DISCCART	687584.49	4272832.08	169.04	259.11
DISCCART	687584.49	4272932.08	175.77	262.53
DISCCART	687684.49	4267632.08	173.92	177.47
DISCCART	687684.49	4267532.08	164.01	178.39
DISCCART	687684.49	4267432.08	151.13	195.97
DISCCART	687684.49	4267332.08	148.38	195.97
DISCCART	687684.49	4267232.08	146.84	195.97
DISCCART	687684.49	4267132.08	145.82	195.97
DISCCART	687684.49	4267032.08	145.90	195.43
DISCCART	687684.49	4266932.08	145.83	163.43
DISCCART	687684.49	4266832.08	147.55	163.43
DISCCART	687684.49	4266732.08	145.90	179.50
DISCCART	687684.49	4266632.08	150.54	184.71
DISCCART	687684.49	4268232.08	145.47	145.73
DISCCART	687684.49	4268332.08	143.22	143.22
DISCCART	687684.49	4268432.08	143.52	143.52
DISCCART	687684.49	4268532.08	143.31	143.31
DISCCART	687684.49	4268632.08	143.30	143.30
DISCCART	687684.49	4268732.08	142.83	142.83
DISCCART	687684.49	4268832.08	142.82	142.82
DISCCART	687684.49	4268932.08	143.29	143.29
DISCCART	687684.49	4269032.08	143.38	143.38
DISCCART	687684.49	4269132.08	142.98	142.98
DISCCART	687684.49	4269232.08	143.36	145.97
DISCCART	687684.49	4269332.08	143.74	146.21
DISCCART	687684.49	4269432.08	143.03	143.03
DISCCART	687684.49	4269532.08	143.38	143.38
DISCCART	687684.49	4269632.08	143.63	143.63
DISCCART	687684.49	4269732.08	142.99	142.99
DISCCART	687684.49	4269832.08	143.33	143.33
DISCCART	687684.49	4269932.08	143.29	143.29
DISCCART	687684.49	4270032.08	143.58	143.58
DISCCART	687684.49	4270132.08	143.37	143.37
DISCCART	687684.49	4270232.08	143.58	143.58
DISCCART	687684.49	4270332.08	143.35	143.35
DISCCART	687684.49	4270432.08	138.78	138.78
DISCCART	687684.49	4270532.08	138.64	138.64
DISCCART	687684.49	4270632.08	138.65	138.65
DISCCART	687684.49	4270732.08	138.65	138.65
DISCCART	687684.49	4270832.08	138.65	138.65
DISCCART	687684.49	4270932.08	139.48	145.03
DISCCART	687684.49	4271032.08	144.10	144.10
DISCCART	687684.49	4271132.08	143.28	143.28
DISCCART	687684.49	4271232.08	138.98	144.76
DISCCART	687684.49	4271332.08	141.57	144.44
DISCCART	687684.49	4271432.08	142.48	142.48
DISCCART	687684.49	4271532.08	142.53	142.53
DISCCART	687684.49	4271632.08	141.95	141.95
DISCCART	687684.49	4271732.08	142.37	204.01
DISCCART	687684.49	4271832.08	141.92	208.66
DISCCART	687684.49	4271932.08	141.50	229.82
DISCCART	687684.49	4272032.08	142.19	232.10
DISCCART	687684.49	4272132.08	179.84	208.66
DISCCART	687684.49	4272232.08	183.77	208.66
DISCCART	687684.49	4272332.08	188.81	208.66

DISCCART	687684.49	4272432.08	206.21	206.21
DISCCART	687684.49	4272532.08	190.47	223.47
DISCCART	687684.49	4272632.08	202.77	223.47
DISCCART	687684.49	4272732.08	199.74	223.47
DISCCART	687684.49	4272832.08	172.69	250.96
DISCCART	687684.49	4272932.08	168.91	265.32
DISCCART	687784.49	4267832.08	155.87	192.09
DISCCART	687784.49	4267732.08	158.29	192.31
DISCCART	687784.49	4267632.08	162.71	192.44
DISCCART	687784.49	4267532.08	168.23	192.31
DISCCART	687784.49	4267432.08	155.15	195.97
DISCCART	687784.49	4267332.08	151.81	195.97
DISCCART	687784.49	4267232.08	155.77	195.97
DISCCART	687784.49	4267132.08	152.63	195.97
DISCCART	687784.49	4267032.08	151.37	195.97
DISCCART	687784.49	4266932.08	150.48	160.73
DISCCART	687784.49	4266832.08	148.00	160.73
DISCCART	687784.49	4266732.08	146.82	179.11
DISCCART	687784.49	4266632.08	151.88	184.71
DISCCART	687784.49	4268232.08	144.67	145.32
DISCCART	687784.49	4268332.08	143.23	143.23
DISCCART	687784.49	4268432.08	142.96	142.96
DISCCART	687784.49	4268532.08	143.07	143.07
DISCCART	687784.49	4268632.08	143.02	143.02
DISCCART	687784.49	4268732.08	142.81	142.81
DISCCART	687784.49	4268832.08	143.03	143.03
DISCCART	687784.49	4268932.08	142.76	142.76
DISCCART	687784.49	4269032.08	143.11	143.11
DISCCART	687784.49	4270532.08	138.68	138.68
DISCCART	687784.49	4270632.08	138.65	138.65
DISCCART	687784.49	4270732.08	138.65	138.65
DISCCART	687784.49	4270832.08	138.65	138.65
DISCCART	687784.49	4270932.08	138.72	138.72
DISCCART	687784.49	4271032.08	139.46	139.46
DISCCART	687784.49	4271132.08	144.78	144.78
DISCCART	687784.49	4271232.08	144.14	144.14
DISCCART	687784.49	4271332.08	142.65	144.64
DISCCART	687784.49	4271432.08	144.52	146.01
DISCCART	687784.49	4271532.08	142.34	142.34
DISCCART	687784.49	4271632.08	141.74	141.74
DISCCART	687784.49	4271732.08	142.44	204.40
DISCCART	687784.49	4271832.08	142.14	208.66
DISCCART	687784.49	4271932.08	141.66	223.47
DISCCART	687784.49	4272032.08	140.33	232.10
DISCCART	687784.49	4272132.08	171.02	208.66
DISCCART	687784.49	4272232.08	197.75	201.46
DISCCART	687784.49	4272332.08	202.73	202.73
DISCCART	687784.49	4272432.08	177.73	223.47
DISCCART	687784.49	4272532.08	182.80	223.47
DISCCART	687784.49	4272632.08	201.53	217.44
DISCCART	687784.49	4272732.08	184.48	223.47
DISCCART	687784.49	4272832.08	170.59	250.96
DISCCART	687784.49	4272932.08	166.33	263.03
DISCCART	687884.49	4268032.08	154.67	178.50
DISCCART	687884.49	4267932.08	162.19	178.50
DISCCART	687884.49	4267832.08	163.87	190.52
DISCCART	687884.49	4267732.08	171.26	191.51
DISCCART	687884.49	4267632.08	173.89	192.31
DISCCART	687884.49	4267532.08	169.11	195.97
DISCCART	687884.49	4267432.08	162.82	195.97
DISCCART	687884.49	4267332.08	164.67	195.97
DISCCART	687884.49	4267232.08	163.80	195.97
DISCCART	687884.49	4267132.08	162.41	195.97
DISCCART	687884.49	4267032.08	159.21	195.43
DISCCART	687884.49	4266932.08	151.91	195.43
DISCCART	687884.49	4266832.08	150.95	161.44

DISCCART	687884.49	4266732.08	149.97	149.97
DISCCART	687884.49	4266632.08	147.72	184.71
DISCCART	687884.49	4268432.08	143.43	145.45
DISCCART	687884.49	4268532.08	143.42	143.42
DISCCART	687884.49	4268632.08	142.83	142.83
DISCCART	687884.49	4268732.08	143.30	143.30
DISCCART	687884.49	4268832.08	142.97	142.97
DISCCART	687884.49	4268932.08	143.13	143.13
DISCCART	687884.49	4269032.08	143.01	145.45
DISCCART	687884.49	4270632.08	138.66	138.66
DISCCART	687884.49	4270732.08	138.65	138.65
DISCCART	687884.49	4270832.08	138.66	138.66
DISCCART	687884.49	4270932.08	138.65	138.65
DISCCART	687884.49	4271032.08	139.20	145.14
DISCCART	687884.49	4271132.08	144.77	144.77
DISCCART	687884.49	4271232.08	144.33	144.33
DISCCART	687884.49	4271332.08	143.73	143.73
DISCCART	687884.49	4271432.08	138.65	145.99
DISCCART	687884.49	4271532.08	141.78	145.93
DISCCART	687884.49	4271632.08	142.06	142.06
DISCCART	687884.49	4271732.08	142.25	204.01
DISCCART	687884.49	4271832.08	142.09	208.66
DISCCART	687884.49	4271932.08	141.79	208.66
DISCCART	687884.49	4272032.08	142.73	223.47
DISCCART	687884.49	4272132.08	161.46	208.66
DISCCART	687884.49	4272232.08	182.49	207.22
DISCCART	687884.49	4272332.08	178.27	214.44
DISCCART	687884.49	4272432.08	179.42	223.47
DISCCART	687884.49	4272532.08	180.33	223.47
DISCCART	687884.49	4272632.08	179.38	223.47
DISCCART	687884.49	4272732.08	188.84	218.01
DISCCART	687884.49	4272832.08	166.73	250.96
DISCCART	687884.49	4272932.08	166.33	250.96
DISCCART	687984.49	4268032.08	161.34	178.34
DISCCART	687984.49	4267932.08	174.57	175.86
DISCCART	687984.49	4267832.08	177.48	177.48
DISCCART	687984.49	4267732.08	180.88	180.88
DISCCART	687984.49	4267632.08	184.91	191.51
DISCCART	687984.49	4267532.08	188.27	192.31
DISCCART	687984.49	4267432.08	186.86	195.97
DISCCART	687984.49	4267332.08	181.04	195.97
DISCCART	687984.49	4267232.08	178.45	195.97
DISCCART	687984.49	4267132.08	173.43	195.43
DISCCART	687984.49	4267032.08	158.14	195.97
DISCCART	687984.49	4266932.08	158.98	195.09
DISCCART	687984.49	4266832.08	159.38	159.38
DISCCART	687984.49	4266732.08	157.32	159.08
DISCCART	687984.49	4266632.08	154.18	159.83
DISCCART	687984.49	4268732.08	142.37	143.29
DISCCART	687984.49	4268832.08	143.71	145.26
DISCCART	687984.49	4268932.08	143.56	145.79
DISCCART	687984.49	4270632.08	138.66	138.66
DISCCART	687984.49	4270732.08	138.67	138.67
DISCCART	687984.49	4270832.08	138.66	138.66
DISCCART	687984.49	4270932.08	138.66	138.66
DISCCART	687984.49	4271032.08	138.65	138.65
DISCCART	687984.49	4271132.08	138.91	144.95
DISCCART	687984.49	4271232.08	144.15	144.15
DISCCART	687984.49	4271332.08	144.44	144.44
DISCCART	687984.49	4271432.08	143.71	143.71
DISCCART	687984.49	4271532.08	141.95	143.69
DISCCART	687984.49	4271632.08	141.32	141.32
DISCCART	687984.49	4271732.08	138.65	204.40
DISCCART	687984.49	4271832.08	140.64	208.66
DISCCART	687984.49	4271932.08	139.97	208.66
DISCCART	687984.49	4272032.08	140.67	223.47

DISCCART	687984.49	4272132.08	148.54	223.47
DISCCART	687984.49	4272232.08	173.57	207.22
DISCCART	687984.49	4272332.08	176.37	207.22
DISCCART	687984.49	4272432.08	178.82	214.44
DISCCART	687984.49	4272532.08	181.53	216.87
DISCCART	687984.49	4272632.08	188.12	214.44
DISCCART	687984.49	4272732.08	179.90	244.22
DISCCART	687984.49	4272832.08	166.33	250.96
DISCCART	687984.49	4272932.08	166.33	250.96
DISCCART	688084.49	4268032.08	159.14	178.50
DISCCART	688084.49	4267932.08	167.39	178.50
DISCCART	688084.49	4267832.08	168.56	182.18
DISCCART	688084.49	4267732.08	171.97	192.31
DISCCART	688084.49	4267632.08	180.66	192.31
DISCCART	688084.49	4267532.08	185.87	192.06
DISCCART	688084.49	4267432.08	187.87	195.97
DISCCART	688084.49	4267332.08	189.08	195.43
DISCCART	688084.49	4267232.08	190.04	195.09
DISCCART	688084.49	4267132.08	170.77	195.43
DISCCART	688084.49	4267032.08	159.85	195.43
DISCCART	688084.49	4266932.08	165.48	179.14
DISCCART	688084.49	4266832.08	163.06	179.87
DISCCART	688084.49	4266732.08	163.53	163.53
DISCCART	688084.49	4266632.08	157.38	158.40
DISCCART	688084.49	4268132.08	154.08	154.46
DISCCART	688084.49	4270732.08	138.67	138.67
DISCCART	688084.49	4270832.08	138.67	138.67
DISCCART	688084.49	4270932.08	138.66	138.66
DISCCART	688084.49	4271032.08	138.66	138.66
DISCCART	688084.49	4271132.08	138.65	138.65
DISCCART	688084.49	4271232.08	139.00	144.97
DISCCART	688084.49	4271332.08	144.00	144.00
DISCCART	688084.49	4271432.08	143.45	143.45
DISCCART	688084.49	4271532.08	138.65	144.70
DISCCART	688084.49	4271632.08	142.92	142.92
DISCCART	688084.49	4271732.08	138.65	201.50
DISCCART	688084.49	4271832.08	138.65	207.22
DISCCART	688084.49	4271932.08	141.12	208.66
DISCCART	688084.49	4272032.08	140.88	214.44
DISCCART	688084.49	4272132.08	147.05	217.44
DISCCART	688084.49	4272232.08	171.95	178.62
DISCCART	688084.49	4272332.08	178.10	178.10
DISCCART	688084.49	4272432.08	174.46	214.44
DISCCART	688084.49	4272532.08	170.65	217.29
DISCCART	688084.49	4272632.08	172.16	238.32
DISCCART	688084.49	4272732.08	165.60	250.96
DISCCART	688084.49	4272832.08	160.22	250.96
DISCCART	688084.49	4272932.08	166.33	250.96
DISCCART	688184.49	4268032.08	159.13	159.13
DISCCART	688184.49	4267932.08	157.27	178.50
DISCCART	688184.49	4267832.08	160.91	190.67
DISCCART	688184.49	4267732.08	162.54	192.31
DISCCART	688184.49	4267632.08	165.30	195.97
DISCCART	688184.49	4267532.08	171.16	195.97
DISCCART	688184.49	4267432.08	170.44	195.97
DISCCART	688184.49	4267332.08	179.54	195.97
DISCCART	688184.49	4267232.08	182.31	195.43
DISCCART	688184.49	4267132.08	166.55	195.43
DISCCART	688184.49	4267032.08	162.17	195.43
DISCCART	688184.49	4266932.08	175.17	178.95
DISCCART	688184.49	4266832.08	175.71	175.71
DISCCART	688184.49	4266732.08	170.31	170.31
DISCCART	688184.49	4266632.08	162.75	162.75
DISCCART	688184.49	4268132.08	153.00	158.97
DISCCART	688184.49	4268232.08	149.17	151.76
DISCCART	688184.49	4270832.08	138.67	138.67

DISCCART	688184.49	4270932.08	138.67	138.67
DISCCART	688184.49	4271032.08	138.66	138.66
DISCCART	688184.49	4271132.08	138.66	138.66
DISCCART	688184.49	4271232.08	138.65	138.65
DISCCART	688184.49	4271332.08	140.88	144.96
DISCCART	688184.49	4271432.08	143.80	143.80
DISCCART	688184.49	4271532.08	143.57	143.57
DISCCART	688184.49	4271632.08	139.38	144.06
DISCCART	688184.49	4271732.08	138.65	138.65
DISCCART	688184.49	4271832.08	138.65	203.03
DISCCART	688184.49	4271932.08	141.72	205.67
DISCCART	688184.49	4272032.08	141.15	208.66
DISCCART	688184.49	4272132.08	142.28	214.44
DISCCART	688184.49	4272232.08	167.90	169.06
DISCCART	688184.49	4272332.08	171.74	181.54
DISCCART	688184.49	4272432.08	173.27	197.39
DISCCART	688184.49	4272532.08	169.85	214.44
DISCCART	688184.49	4272632.08	163.74	244.56
DISCCART	688184.49	4272732.08	156.08	250.96
DISCCART	688184.49	4272832.08	162.17	250.96
DISCCART	688184.49	4272932.08	170.37	250.96
DISCCART	688284.49	4268032.08	148.75	159.21
DISCCART	688284.49	4267932.08	151.97	166.01
DISCCART	688284.49	4267832.08	151.62	192.31
DISCCART	688284.49	4267732.08	155.33	193.83
DISCCART	688284.49	4267632.08	156.04	195.97
DISCCART	688284.49	4267532.08	158.34	195.97
DISCCART	688284.49	4267432.08	171.27	190.68
DISCCART	688284.49	4267332.08	184.55	184.55
DISCCART	688284.49	4267232.08	174.88	191.35
DISCCART	688284.49	4267132.08	163.72	195.43
DISCCART	688284.49	4267032.08	177.52	190.35
DISCCART	688284.49	4266932.08	182.22	182.22
DISCCART	688284.49	4266832.08	171.42	184.15
DISCCART	688284.49	4266732.08	168.55	177.17
DISCCART	688284.49	4266632.08	164.65	164.65
DISCCART	688284.49	4268132.08	150.19	157.90
DISCCART	688284.49	4268232.08	157.05	157.05
DISCCART	688284.49	4268332.08	153.63	157.95
DISCCART	688284.49	4270932.08	138.67	138.67
DISCCART	688284.49	4271032.08	138.67	138.67
DISCCART	688284.49	4271132.08	138.66	138.66
DISCCART	688284.49	4271232.08	138.66	138.66
DISCCART	688284.49	4271332.08	138.68	138.68
DISCCART	688284.49	4271432.08	144.66	144.66
DISCCART	688284.49	4271532.08	144.07	144.07
DISCCART	688284.49	4271632.08	138.69	144.52
DISCCART	688284.49	4271732.08	138.65	142.23
DISCCART	688284.49	4271832.08	138.65	188.88
DISCCART	688284.49	4271932.08	141.89	188.88
DISCCART	688284.49	4272032.08	142.10	204.40
DISCCART	688284.49	4272132.08	144.52	205.53
DISCCART	688284.49	4272232.08	162.02	197.39
DISCCART	688284.49	4272332.08	169.80	197.39
DISCCART	688284.49	4272432.08	169.50	203.69
DISCCART	688284.49	4272532.08	168.71	203.69
DISCCART	688284.49	4272632.08	176.08	203.69
DISCCART	688284.49	4272732.08	154.56	250.96
DISCCART	688284.49	4272832.08	158.43	250.96
DISCCART	688284.49	4272932.08	167.74	250.96
DISCCART	688384.49	4268032.08	156.68	158.36
DISCCART	688384.49	4267932.08	151.25	170.37
DISCCART	688384.49	4267832.08	164.80	165.51
DISCCART	688384.49	4267732.08	168.79	170.44
DISCCART	688384.49	4267632.08	166.18	174.63
DISCCART	688384.49	4267532.08	159.63	191.63

DISCCART	688384.49	4267432.08	174.06	190.68
DISCCART	688384.49	4267332.08	184.77	190.46
DISCCART	688384.49	4267232.08	187.81	190.19
DISCCART	688384.49	4267132.08	181.78	192.83
DISCCART	688384.49	4267032.08	188.54	188.54
DISCCART	688384.49	4266932.08	181.86	183.36
DISCCART	688384.49	4266832.08	170.32	185.84
DISCCART	688384.49	4266732.08	159.46	186.95
DISCCART	688384.49	4266632.08	157.88	157.88
DISCCART	688384.49	4268132.08	158.35	158.35
DISCCART	688384.49	4268232.08	159.79	159.79
DISCCART	688384.49	4268332.08	159.22	172.50
DISCCART	688384.49	4268432.08	161.82	175.12
DISCCART	688384.49	4268532.08	144.97	175.70
DISCCART	688384.49	4271032.08	138.67	138.67
DISCCART	688384.49	4271132.08	138.67	138.67
DISCCART	688384.49	4271232.08	138.68	138.68
DISCCART	688384.49	4271332.08	138.68	138.68
DISCCART	688384.49	4271432.08	138.68	144.99
DISCCART	688384.49	4271532.08	144.55	144.55
DISCCART	688384.49	4271632.08	143.92	143.92
DISCCART	688384.49	4271732.08	138.68	144.00
DISCCART	688384.49	4271832.08	138.68	188.88
DISCCART	688384.49	4271932.08	143.41	188.88
DISCCART	688384.49	4272032.08	143.36	220.72
DISCCART	688384.49	4272132.08	140.66	221.29
DISCCART	688384.49	4272232.08	147.51	221.29
DISCCART	688384.49	4272332.08	170.53	203.69
DISCCART	688384.49	4272432.08	185.55	197.39
DISCCART	688384.49	4272532.08	195.97	197.39
DISCCART	688384.49	4272632.08	187.92	203.69
DISCCART	688384.49	4272732.08	157.93	244.56
DISCCART	688384.49	4272832.08	159.81	250.96
DISCCART	688384.49	4272932.08	167.76	244.56
DISCCART	688484.49	4268032.08	161.52	161.52
DISCCART	688484.49	4267932.08	155.21	174.31
DISCCART	688484.49	4267832.08	151.93	179.28
DISCCART	688484.49	4267732.08	167.22	175.26
DISCCART	688484.49	4267632.08	175.70	175.70
DISCCART	688484.49	4267532.08	171.28	178.59
DISCCART	688484.49	4267432.08	163.75	192.90
DISCCART	688484.49	4267332.08	178.38	192.88
DISCCART	688484.49	4267232.08	191.40	191.40
DISCCART	688484.49	4267132.08	189.40	192.69
DISCCART	688484.49	4267032.08	179.44	192.69
DISCCART	688484.49	4266932.08	171.19	190.35
DISCCART	688484.49	4266832.08	165.47	190.35
DISCCART	688484.49	4266732.08	162.61	162.61
DISCCART	688484.49	4266632.08	155.50	173.43
DISCCART	688484.49	4268132.08	162.89	162.89
DISCCART	688484.49	4268232.08	163.95	163.95
DISCCART	688484.49	4268332.08	168.22	173.63
DISCCART	688484.49	4268432.08	167.61	175.24
DISCCART	688484.49	4268532.08	175.51	175.51
DISCCART	688484.49	4271032.08	138.68	145.84
DISCCART	688484.49	4271132.08	138.68	138.68
DISCCART	688484.49	4271232.08	138.68	138.68
DISCCART	688484.49	4271332.08	138.68	138.68
DISCCART	688484.49	4271432.08	138.68	138.68
DISCCART	688484.49	4271532.08	138.68	138.68
DISCCART	688484.49	4271632.08	144.22	144.22
DISCCART	688484.49	4271732.08	138.70	144.75
DISCCART	688484.49	4271832.08	138.68	188.88
DISCCART	688484.49	4271932.08	144.40	188.88
DISCCART	688484.49	4272032.08	143.46	221.29
DISCCART	688484.49	4272132.08	143.13	221.29

DISCCART	688484.49	4272232.08	143.29	221.29
DISCCART	688484.49	4272332.08	168.28	203.69
DISCCART	688484.49	4272432.08	174.14	203.69
DISCCART	688484.49	4272532.08	182.40	203.69
DISCCART	688484.49	4272632.08	200.63	202.19
DISCCART	688484.49	4272732.08	174.12	238.32
DISCCART	688484.49	4272832.08	153.17	250.89
DISCCART	688484.49	4272932.08	164.95	244.56
DISCCART	688584.49	4268032.08	170.47	170.47
DISCCART	688584.49	4267932.08	158.02	182.88
DISCCART	688584.49	4267832.08	160.95	160.95
DISCCART	688584.49	4267732.08	156.76	183.23
DISCCART	688584.49	4267632.08	169.76	183.23
DISCCART	688584.49	4267532.08	180.51	181.51
DISCCART	688584.49	4267432.08	177.32	180.72
DISCCART	688584.49	4267332.08	183.33	183.33
DISCCART	688584.49	4267232.08	190.79	190.79
DISCCART	688584.49	4267132.08	183.70	192.90
DISCCART	688584.49	4267032.08	171.77	192.90
DISCCART	688584.49	4266932.08	169.77	190.90
DISCCART	688584.49	4266832.08	162.88	190.76
DISCCART	688584.49	4266732.08	159.33	177.78
DISCCART	688584.49	4266632.08	166.67	172.73
DISCCART	688584.49	4268132.08	171.64	171.64
DISCCART	688584.49	4268232.08	170.70	170.70
DISCCART	688584.49	4268332.08	173.01	173.01
DISCCART	688584.49	4268432.08	171.53	173.97
DISCCART	688584.49	4268532.08	168.84	175.06
DISCCART	688584.49	4268632.08	156.05	175.70
DISCCART	688584.49	4271132.08	138.68	138.68
DISCCART	688584.49	4271232.08	138.68	138.68
DISCCART	688584.49	4271332.08	138.68	138.68
DISCCART	688584.49	4271432.08	138.68	138.68
DISCCART	688584.49	4271532.08	138.68	138.68
DISCCART	688584.49	4271632.08	138.68	138.68
DISCCART	688584.49	4271732.08	144.60	145.27
DISCCART	688584.49	4271832.08	138.68	221.29
DISCCART	688584.49	4271932.08	143.76	221.29
DISCCART	688584.49	4272032.08	143.47	221.29
DISCCART	688584.49	4272132.08	143.37	221.29
DISCCART	688584.49	4272232.08	143.84	221.29
DISCCART	688584.49	4272332.08	145.21	221.29
DISCCART	688584.49	4272432.08	164.53	221.29
DISCCART	688584.49	4272532.08	164.75	221.29
DISCCART	688584.49	4272632.08	196.48	202.62
DISCCART	688584.49	4272732.08	164.64	238.32
DISCCART	688584.49	4272832.08	152.97	244.56
DISCCART	688584.49	4272932.08	161.93	244.56
DISCCART	688684.49	4268032.08	175.53	175.53
DISCCART	688684.49	4267932.08	166.54	178.62
DISCCART	688684.49	4267832.08	165.31	165.31
DISCCART	688684.49	4267732.08	164.54	177.47
DISCCART	688684.49	4267632.08	158.13	189.05
DISCCART	688684.49	4267532.08	169.88	183.23
DISCCART	688684.49	4267432.08	177.43	177.43
DISCCART	688684.49	4267332.08	181.72	190.55
DISCCART	688684.49	4267232.08	190.54	190.54
DISCCART	688684.49	4267132.08	191.40	191.40
DISCCART	688684.49	4267032.08	187.33	190.16
DISCCART	688684.49	4266932.08	177.45	190.16
DISCCART	688684.49	4266832.08	166.65	190.42
DISCCART	688684.49	4266732.08	157.80	190.16
DISCCART	688684.49	4266632.08	174.68	174.68
DISCCART	688684.49	4268132.08	180.17	180.17
DISCCART	688684.49	4268232.08	173.49	175.23
DISCCART	688684.49	4268332.08	167.23	171.17

DISCCART	688684.49	4268432.08	160.57	174.33
DISCCART	688684.49	4268532.08	154.87	175.70
DISCCART	688684.49	4268632.08	149.27	175.70
DISCCART	688684.49	4271232.08	138.68	138.68
DISCCART	688684.49	4271332.08	138.68	138.68
DISCCART	688684.49	4271432.08	138.68	138.68
DISCCART	688684.49	4271532.08	138.68	138.68
DISCCART	688684.49	4271632.08	138.68	138.68
DISCCART	688684.49	4271732.08	138.68	138.68
DISCCART	688684.49	4271832.08	138.68	221.29
DISCCART	688684.49	4271932.08	139.26	221.29
DISCCART	688684.49	4272032.08	143.79	221.29
DISCCART	688684.49	4272132.08	142.91	221.29
DISCCART	688684.49	4272232.08	144.23	221.29
DISCCART	688684.49	4272332.08	143.54	221.29
DISCCART	688684.49	4272432.08	158.82	221.29
DISCCART	688684.49	4272532.08	175.97	221.29
DISCCART	688684.49	4272632.08	165.63	221.29
DISCCART	688684.49	4272732.08	156.51	238.32
DISCCART	688684.49	4272832.08	151.71	244.56
DISCCART	688684.49	4272932.08	157.83	244.56
DISCCART	688784.49	4268032.08	178.70	178.70
DISCCART	688784.49	4267932.08	167.42	180.88
DISCCART	688784.49	4267832.08	170.94	184.21
DISCCART	688784.49	4267732.08	173.85	182.25
DISCCART	688784.49	4267632.08	169.33	186.17
DISCCART	688784.49	4267532.08	164.65	229.70
DISCCART	688784.49	4267432.08	169.75	192.41
DISCCART	688784.49	4267332.08	182.55	192.41
DISCCART	688784.49	4267232.08	191.14	191.14
DISCCART	688784.49	4267132.08	184.84	189.99
DISCCART	688784.49	4267032.08	182.80	189.27
DISCCART	688784.49	4266932.08	173.13	190.89
DISCCART	688784.49	4266832.08	162.37	190.90
DISCCART	688784.49	4266732.08	171.85	181.24
DISCCART	688784.49	4266632.08	176.19	176.19
DISCCART	688784.49	4268132.08	180.15	182.75
DISCCART	688784.49	4268232.08	164.93	182.88
DISCCART	688784.49	4268332.08	157.89	182.88
DISCCART	688784.49	4268432.08	151.26	175.23
DISCCART	688784.49	4268532.08	150.95	172.65
DISCCART	688784.49	4268632.08	146.25	175.06
DISCCART	688784.49	4268732.08	145.57	145.57
DISCCART	688784.49	4271332.08	138.68	138.68
DISCCART	688784.49	4271432.08	138.68	138.68
DISCCART	688784.49	4271532.08	138.68	138.68
DISCCART	688784.49	4271632.08	138.68	138.68
DISCCART	688784.49	4271732.08	138.68	220.72
DISCCART	688784.49	4271832.08	138.68	221.29
DISCCART	688784.49	4271932.08	138.59	221.29
DISCCART	688784.49	4272032.08	138.91	221.29
DISCCART	688784.49	4272132.08	142.81	221.29
DISCCART	688784.49	4272232.08	143.82	221.29
DISCCART	688784.49	4272332.08	142.42	221.29
DISCCART	688784.49	4272432.08	177.76	221.29
DISCCART	688784.49	4272532.08	161.61	221.29
DISCCART	688784.49	4272632.08	167.75	221.29
DISCCART	688784.49	4272732.08	157.03	238.32
DISCCART	688784.49	4272832.08	149.79	239.99
DISCCART	688784.49	4272932.08	160.47	238.32
DISCCART	688884.49	4268032.08	177.24	177.24
DISCCART	688884.49	4267932.08	178.95	178.95
DISCCART	688884.49	4267832.08	179.39	183.53
DISCCART	688884.49	4267732.08	183.48	183.48
DISCCART	688884.49	4267632.08	182.24	182.24
DISCCART	688884.49	4267532.08	176.81	190.56

DISCCART	688884.49	4267432.08	186.22	189.68
DISCCART	688884.49	4267332.08	189.74	189.74
DISCCART	688884.49	4267232.08	187.91	188.48
DISCCART	688884.49	4267132.08	179.92	191.81
DISCCART	688884.49	4267032.08	170.55	229.70
DISCCART	688884.49	4266932.08	166.30	229.70
DISCCART	688884.49	4266832.08	165.43	187.82
DISCCART	688884.49	4266732.08	181.42	181.42
DISCCART	688884.49	4266632.08	175.89	175.89
DISCCART	688884.49	4268132.08	169.34	182.87
DISCCART	688884.49	4268232.08	158.84	182.88
DISCCART	688884.49	4268332.08	152.30	182.88
DISCCART	688884.49	4268432.08	149.79	168.74
DISCCART	688884.49	4268532.08	153.55	167.63
DISCCART	688884.49	4268632.08	153.35	159.75
DISCCART	688884.49	4268732.08	144.93	161.24
DISCCART	688884.49	4271432.08	138.68	138.68
DISCCART	688884.49	4271532.08	138.68	138.68
DISCCART	688884.49	4271632.08	138.68	138.68
DISCCART	688884.49	4271732.08	138.67	221.29
DISCCART	688884.49	4271832.08	138.59	221.29
DISCCART	688884.49	4271932.08	138.55	221.29
DISCCART	688884.49	4272032.08	138.54	221.29
DISCCART	688884.49	4272132.08	138.54	221.29
DISCCART	688884.49	4272232.08	143.62	221.29
DISCCART	688884.49	4272332.08	142.39	221.29
DISCCART	688884.49	4272432.08	146.60	221.29
DISCCART	688884.49	4272532.08	190.12	221.29
DISCCART	688884.49	4272632.08	176.79	221.29
DISCCART	688884.49	4272732.08	159.90	221.29
DISCCART	688884.49	4272832.08	149.69	238.32
DISCCART	688884.49	4272932.08	151.77	238.32
DISCCART	688984.49	4268032.08	163.38	184.11
DISCCART	688984.49	4267932.08	174.26	184.10
DISCCART	688984.49	4267832.08	181.56	182.23
DISCCART	688984.49	4267732.08	171.40	184.90
DISCCART	688984.49	4267632.08	178.85	185.14
DISCCART	688984.49	4267532.08	186.28	186.28
DISCCART	688984.49	4267432.08	188.32	188.83
DISCCART	688984.49	4267332.08	186.25	229.70
DISCCART	688984.49	4267232.08	180.70	229.70
DISCCART	688984.49	4267132.08	177.47	242.39
DISCCART	688984.49	4267032.08	177.37	229.70
DISCCART	688984.49	4266932.08	169.78	242.39
DISCCART	688984.49	4266832.08	174.74	187.48
DISCCART	688984.49	4266732.08	183.07	183.07
DISCCART	688984.49	4266632.08	173.77	173.77
DISCCART	688984.49	4268132.08	155.85	183.44
DISCCART	688984.49	4268232.08	152.33	182.88
DISCCART	688984.49	4268332.08	155.83	170.44
DISCCART	688984.49	4268432.08	158.24	168.74
DISCCART	688984.49	4268532.08	160.65	167.69
DISCCART	688984.49	4268632.08	160.66	160.66
DISCCART	688984.49	4268732.08	152.61	161.11
DISCCART	688984.49	4268832.08	145.01	160.03
DISCCART	688984.49	4271532.08	138.68	138.68
DISCCART	688984.49	4271632.08	138.65	138.65
DISCCART	688984.49	4271732.08	138.61	221.29
DISCCART	688984.49	4271832.08	138.56	221.29
DISCCART	688984.49	4271932.08	138.54	221.29
DISCCART	688984.49	4272032.08	138.54	221.29
DISCCART	688984.49	4272132.08	138.54	221.29
DISCCART	688984.49	4272232.08	141.66	221.29
DISCCART	688984.49	4272332.08	143.77	221.29
DISCCART	688984.49	4272432.08	142.83	221.29
DISCCART	688984.49	4272532.08	214.34	221.29

DISCCART	688984.49	4272632.08	192.61	221.29
DISCCART	688984.49	4272732.08	160.41	221.29
DISCCART	688984.49	4272832.08	149.21	238.32
DISCCART	688984.49	4272932.08	153.35	238.32
DISCCART	689084.49	4268032.08	153.67	184.11
DISCCART	689084.49	4267932.08	159.37	184.21
DISCCART	689084.49	4267832.08	163.74	229.70
DISCCART	689084.49	4267732.08	161.52	242.39
DISCCART	689084.49	4267632.08	166.54	242.39
DISCCART	689084.49	4267532.08	170.33	242.39
DISCCART	689084.49	4267432.08	171.59	242.39
DISCCART	689084.49	4267332.08	187.27	229.70
DISCCART	689084.49	4267232.08	190.48	229.70
DISCCART	689084.49	4267132.08	186.31	242.39
DISCCART	689084.49	4267032.08	178.36	242.39
DISCCART	689084.49	4266932.08	168.96	242.39
DISCCART	689084.49	4266832.08	181.46	186.50
DISCCART	689084.49	4266732.08	185.10	189.44
DISCCART	689084.49	4266632.08	175.94	189.73
DISCCART	689084.49	4268132.08	155.66	179.58
DISCCART	689084.49	4268232.08	160.42	177.27
DISCCART	689084.49	4268332.08	166.65	166.65
DISCCART	689084.49	4268432.08	168.33	168.33
DISCCART	689084.49	4268532.08	163.11	168.15
DISCCART	689084.49	4268632.08	154.85	167.69
DISCCART	689084.49	4268732.08	148.00	161.53
DISCCART	689084.49	4268832.08	144.82	161.94
DISCCART	689084.49	4271732.08	138.57	221.29
DISCCART	689084.49	4271832.08	138.54	221.29
DISCCART	689084.49	4271932.08	138.54	221.29
DISCCART	689084.49	4272032.08	138.54	221.29
DISCCART	689084.49	4272132.08	138.54	221.29
DISCCART	689084.49	4272232.08	140.54	221.29
DISCCART	689084.49	4272332.08	142.34	221.29
DISCCART	689084.49	4272432.08	143.61	221.29
DISCCART	689084.49	4272532.08	157.87	221.29
DISCCART	689084.49	4272632.08	196.66	221.29
DISCCART	689084.49	4272732.08	162.70	221.29
DISCCART	689084.49	4272832.08	147.69	221.29
DISCCART	689084.49	4272932.08	152.95	221.29
DISCCART	689184.49	4268032.08	158.32	179.58
DISCCART	689184.49	4267932.08	157.37	245.21
DISCCART	689184.49	4267832.08	159.61	245.21
DISCCART	689184.49	4267732.08	168.18	245.21
DISCCART	689184.49	4267632.08	172.93	245.21
DISCCART	689184.49	4267532.08	174.02	245.21
DISCCART	689184.49	4267432.08	183.78	242.39
DISCCART	689184.49	4267332.08	191.46	242.39
DISCCART	689184.49	4267232.08	188.77	242.39
DISCCART	689184.49	4267132.08	178.24	242.39
DISCCART	689184.49	4267032.08	180.72	242.39
DISCCART	689184.49	4266932.08	174.63	242.39
DISCCART	689184.49	4266832.08	179.08	242.39
DISCCART	689184.49	4266732.08	186.04	189.24
DISCCART	689184.49	4266632.08	175.07	189.73
DISCCART	689184.49	4268132.08	165.76	179.58
DISCCART	689184.49	4268232.08	171.94	174.51
DISCCART	689184.49	4268332.08	173.15	174.34
DISCCART	689184.49	4268432.08	165.45	172.80
DISCCART	689184.49	4268532.08	157.77	169.08
DISCCART	689184.49	4268632.08	157.39	157.39
DISCCART	689184.49	4268732.08	158.07	161.53
DISCCART	689184.49	4268832.08	144.98	175.70
DISCCART	689184.49	4268932.08	144.91	177.55
DISCCART	689184.49	4271832.08	138.54	221.29
DISCCART	689184.49	4271932.08	138.54	221.29

DISCCART	689184.49	4272032.08	138.54	221.29
DISCCART	689184.49	4272132.08	138.54	221.29
DISCCART	689184.49	4272232.08	138.54	221.29
DISCCART	689184.49	4272332.08	138.54	221.29
DISCCART	689184.49	4272432.08	143.86	221.29
DISCCART	689184.49	4272532.08	142.55	221.29
DISCCART	689184.49	4272632.08	192.51	221.29
DISCCART	689184.49	4272732.08	161.80	221.29
DISCCART	689184.49	4272832.08	145.83	221.29
DISCCART	689184.49	4272932.08	149.67	221.29
DISCCART	689284.49	4268032.08	163.83	180.44
DISCCART	689284.49	4267932.08	166.29	245.21
DISCCART	689284.49	4267832.08	164.20	245.21
DISCCART	689284.49	4267732.08	163.54	245.21
DISCCART	689284.49	4267632.08	177.32	245.21
DISCCART	689284.49	4267532.08	186.36	244.49
DISCCART	689284.49	4267432.08	193.80	242.39
DISCCART	689284.49	4267332.08	206.12	229.70
DISCCART	689284.49	4267232.08	204.93	242.39
DISCCART	689284.49	4267132.08	195.14	242.39
DISCCART	689284.49	4267032.08	186.94	242.39
DISCCART	689284.49	4266932.08	181.05	242.39
DISCCART	689284.49	4266832.08	183.50	242.39
DISCCART	689284.49	4266732.08	182.20	242.39
DISCCART	689284.49	4266632.08	179.70	242.39
DISCCART	689284.49	4268132.08	176.88	176.88
DISCCART	689284.49	4268232.08	177.98	177.98
DISCCART	689284.49	4268332.08	169.66	176.58
DISCCART	689284.49	4268432.08	166.28	176.86
DISCCART	689284.49	4268532.08	168.63	168.63
DISCCART	689284.49	4268632.08	156.73	170.17
DISCCART	689284.49	4268732.08	160.22	160.22
DISCCART	689284.49	4268832.08	147.65	179.38
DISCCART	689284.49	4268932.08	145.20	179.59
DISCCART	689284.49	4271932.08	138.54	221.29
DISCCART	689284.49	4272032.08	138.54	221.29
DISCCART	689284.49	4272132.08	138.54	221.29
DISCCART	689284.49	4272232.08	138.54	221.29
DISCCART	689284.49	4272332.08	138.54	221.29
DISCCART	689284.49	4272432.08	143.96	221.29
DISCCART	689284.49	4272532.08	142.09	221.29
DISCCART	689284.49	4272632.08	208.62	208.99
DISCCART	689284.49	4272732.08	180.07	221.29
DISCCART	689284.49	4272832.08	146.40	221.29
DISCCART	689284.49	4272932.08	151.33	221.29
DISCCART	689384.49	4268032.08	177.04	177.04
DISCCART	689384.49	4267932.08	170.71	245.21
DISCCART	689384.49	4267832.08	177.61	245.21
DISCCART	689384.49	4267732.08	166.01	245.21
DISCCART	689384.49	4267632.08	162.91	245.21
DISCCART	689384.49	4267532.08	170.98	245.21
DISCCART	689384.49	4267432.08	184.81	245.21
DISCCART	689384.49	4267332.08	215.81	229.70
DISCCART	689384.49	4267232.08	217.12	229.70
DISCCART	689384.49	4267132.08	196.92	242.39
DISCCART	689384.49	4267032.08	184.34	245.21
DISCCART	689384.49	4266932.08	182.95	242.39
DISCCART	689384.49	4266832.08	185.66	242.39
DISCCART	689384.49	4266732.08	190.61	242.39
DISCCART	689384.49	4266632.08	181.06	251.66
DISCCART	689384.49	4268132.08	177.26	177.26
DISCCART	689384.49	4268232.08	175.58	175.58
DISCCART	689384.49	4268332.08	171.39	171.39
DISCCART	689384.49	4268432.08	168.67	176.86
DISCCART	689384.49	4268532.08	158.90	176.86
DISCCART	689384.49	4268632.08	151.25	176.86

DISCCART	689384.49	4268732.08	149.00	179.24
DISCCART	689384.49	4268832.08	149.78	179.59
DISCCART	689384.49	4268932.08	152.65	179.59
DISCCART	689384.49	4269032.08	144.42	179.59
DISCCART	689384.49	4271632.08	143.68	143.68
DISCCART	689384.49	4271732.08	139.68	139.68
DISCCART	689384.49	4271832.08	138.54	221.29
DISCCART	689384.49	4271932.08	138.68	221.29
DISCCART	689384.49	4272032.08	138.54	221.29
DISCCART	689384.49	4272132.08	138.54	221.29
DISCCART	689384.49	4272232.08	138.54	221.29
DISCCART	689384.49	4272332.08	138.54	221.29
DISCCART	689384.49	4272432.08	138.54	221.29
DISCCART	689384.49	4272532.08	142.77	221.29
DISCCART	689384.49	4272632.08	173.63	221.29
DISCCART	689384.49	4272732.08	179.86	220.61
DISCCART	689384.49	4272832.08	145.52	221.29
DISCCART	689384.49	4272932.08	158.24	221.29
DISCCART	689484.49	4268032.08	178.43	178.43
DISCCART	689484.49	4267932.08	182.02	233.93
DISCCART	689484.49	4267832.08	180.95	245.21
DISCCART	689484.49	4267732.08	178.43	245.21
DISCCART	689484.49	4267632.08	167.13	245.21
DISCCART	689484.49	4267532.08	170.09	245.21
DISCCART	689484.49	4267432.08	181.67	245.21
DISCCART	689484.49	4267332.08	191.72	245.21
DISCCART	689484.49	4267232.08	213.99	242.39
DISCCART	689484.49	4267132.08	205.91	242.39
DISCCART	689484.49	4267032.08	197.10	242.39
DISCCART	689484.49	4266932.08	190.15	242.39
DISCCART	689484.49	4266832.08	193.00	242.39
DISCCART	689484.49	4266732.08	188.83	251.89
DISCCART	689484.49	4266632.08	177.37	253.19
DISCCART	689484.49	4268132.08	169.09	233.93
DISCCART	689484.49	4268232.08	162.53	233.93
DISCCART	689484.49	4268332.08	156.47	179.58
DISCCART	689484.49	4268432.08	153.25	177.50
DISCCART	689484.49	4268532.08	153.76	176.86
DISCCART	689484.49	4268632.08	148.68	176.86
DISCCART	689484.49	4268732.08	155.57	178.16
DISCCART	689484.49	4268832.08	169.57	172.20
DISCCART	689484.49	4268932.08	176.07	176.07
DISCCART	689484.49	4269032.08	161.12	179.59
DISCCART	689484.49	4269132.08	144.54	179.87
DISCCART	689484.49	4271632.08	143.23	143.23
DISCCART	689484.49	4271732.08	141.84	142.47
DISCCART	689484.49	4271832.08	139.09	139.09
DISCCART	689484.49	4271932.08	138.54	221.29
DISCCART	689484.49	4272032.08	138.54	221.29
DISCCART	689484.49	4272132.08	138.54	221.29
DISCCART	689484.49	4272232.08	138.54	221.29
DISCCART	689484.49	4272332.08	138.54	221.29
DISCCART	689484.49	4272432.08	138.54	221.29
DISCCART	689484.49	4272532.08	138.54	221.29
DISCCART	689484.49	4272632.08	145.82	221.29
DISCCART	689484.49	4272732.08	179.75	209.45
DISCCART	689484.49	4272832.08	142.53	221.29
DISCCART	689484.49	4272932.08	157.67	221.29
DISCCART	689584.49	4268032.08	168.46	245.21
DISCCART	689584.49	4267932.08	176.89	245.21
DISCCART	689584.49	4267832.08	189.05	245.21
DISCCART	689584.49	4267732.08	180.60	245.21
DISCCART	689584.49	4267632.08	175.43	245.21
DISCCART	689584.49	4267532.08	182.94	245.21
DISCCART	689584.49	4267432.08	181.15	245.21
DISCCART	689584.49	4267332.08	184.22	245.21

DISCCART	689584.49	4267232.08	216.27	242.39
DISCCART	689584.49	4267132.08	224.48	242.39
DISCCART	689584.49	4267032.08	213.32	242.39
DISCCART	689584.49	4266932.08	201.16	242.39
DISCCART	689584.49	4266832.08	194.45	251.89
DISCCART	689584.49	4266732.08	185.25	252.73
DISCCART	689584.49	4266632.08	175.90	253.19
DISCCART	689584.49	4268132.08	163.40	245.21
DISCCART	689584.49	4268232.08	166.20	233.93
DISCCART	689584.49	4268332.08	164.75	164.75
DISCCART	689584.49	4268432.08	163.82	163.82
DISCCART	689584.49	4268532.08	161.15	161.15
DISCCART	689584.49	4268632.08	153.01	174.78
DISCCART	689584.49	4268732.08	161.70	170.39
DISCCART	689584.49	4268832.08	168.01	176.88
DISCCART	689584.49	4268932.08	176.17	177.63
DISCCART	689584.49	4269032.08	176.49	179.31
DISCCART	689584.49	4269132.08	174.47	174.47
DISCCART	689584.49	4271532.08	143.59	143.59
DISCCART	689584.49	4271632.08	143.96	143.96
DISCCART	689584.49	4271732.08	138.55	142.31
DISCCART	689584.49	4271832.08	138.54	138.54
DISCCART	689584.49	4271932.08	142.72	142.72
DISCCART	689584.49	4272032.08	141.77	221.29
DISCCART	689584.49	4272132.08	138.57	221.29
DISCCART	689584.49	4272232.08	138.54	221.29
DISCCART	689584.49	4272332.08	138.54	221.29
DISCCART	689584.49	4272432.08	138.54	221.29
DISCCART	689584.49	4272532.08	138.54	221.29
DISCCART	689584.49	4272632.08	140.95	221.29
DISCCART	689584.49	4272732.08	176.88	209.45
DISCCART	689584.49	4272832.08	143.49	221.29
DISCCART	689584.49	4272932.08	156.07	209.45
DISCCART	689684.49	4268032.08	179.07	245.21
DISCCART	689684.49	4267932.08	182.62	245.21
DISCCART	689684.49	4267832.08	190.34	245.21
DISCCART	689684.49	4267732.08	182.04	245.21
DISCCART	689684.49	4267632.08	188.17	245.21
DISCCART	689684.49	4267532.08	186.99	245.21
DISCCART	689684.49	4267432.08	197.96	245.21
DISCCART	689684.49	4267332.08	200.49	245.21
DISCCART	689684.49	4267232.08	225.46	242.39
DISCCART	689684.49	4267132.08	235.74	242.39
DISCCART	689684.49	4267032.08	206.32	242.39
DISCCART	689684.49	4266932.08	192.67	252.03
DISCCART	689684.49	4266832.08	185.54	253.19
DISCCART	689684.49	4266732.08	180.04	253.19
DISCCART	689684.49	4266632.08	180.53	253.19
DISCCART	689684.49	4268132.08	176.99	233.93
DISCCART	689684.49	4268232.08	174.61	176.47
DISCCART	689684.49	4268332.08	172.05	173.86
DISCCART	689684.49	4268432.08	170.36	170.36
DISCCART	689684.49	4268532.08	155.12	177.99
DISCCART	689684.49	4268632.08	161.58	168.91
DISCCART	689684.49	4268732.08	169.70	169.70
DISCCART	689684.49	4268832.08	171.25	177.51
DISCCART	689684.49	4268932.08	178.90	178.90
DISCCART	689684.49	4269032.08	165.75	179.87
DISCCART	689684.49	4269132.08	158.51	179.87
DISCCART	689684.49	4269232.08	147.10	179.87
DISCCART	689684.49	4271532.08	143.28	143.28
DISCCART	689684.49	4271632.08	142.49	142.49
DISCCART	689684.49	4271732.08	139.98	142.32
DISCCART	689684.49	4271832.08	138.55	138.55
DISCCART	689684.49	4271932.08	143.14	143.14
DISCCART	689684.49	4272032.08	143.74	143.74

DISCCART	689684.49	4272132.08	138.54	221.29
DISCCART	689684.49	4272232.08	138.54	221.29
DISCCART	689684.49	4272332.08	138.54	221.29
DISCCART	689684.49	4272432.08	138.54	221.29
DISCCART	689684.49	4272532.08	138.54	221.29
DISCCART	689684.49	4272632.08	138.54	221.29
DISCCART	689684.49	4272732.08	144.36	221.29
DISCCART	689684.49	4272832.08	143.84	221.29
DISCCART	689684.49	4272932.08	144.36	220.61
DISCCART	689784.49	4268032.08	178.63	245.21
DISCCART	689784.49	4267932.08	179.53	245.21
DISCCART	689784.49	4267832.08	187.93	245.21
DISCCART	689784.49	4267732.08	200.48	245.21
DISCCART	689784.49	4267632.08	205.70	245.21
DISCCART	689784.49	4267532.08	199.02	245.21
DISCCART	689784.49	4267432.08	224.99	245.21
DISCCART	689784.49	4267332.08	232.53	245.21
DISCCART	689784.49	4267232.08	210.66	245.21
DISCCART	689784.49	4267132.08	216.03	245.21
DISCCART	689784.49	4267032.08	217.34	242.39
DISCCART	689784.49	4266932.08	195.28	252.08
DISCCART	689784.49	4266832.08	194.00	253.19
DISCCART	689784.49	4266732.08	192.06	253.19
DISCCART	689784.49	4266632.08	184.29	253.19
DISCCART	689784.49	4268132.08	177.61	233.93
DISCCART	689784.49	4268232.08	177.32	233.92
DISCCART	689784.49	4268332.08	177.16	177.16
DISCCART	689784.49	4268432.08	166.72	177.99
DISCCART	689784.49	4268532.08	157.84	177.73
DISCCART	689784.49	4268632.08	162.75	176.33
DISCCART	689784.49	4268732.08	171.20	176.82
DISCCART	689784.49	4268832.08	177.48	177.48
DISCCART	689784.49	4268932.08	177.29	178.14
DISCCART	689784.49	4269032.08	175.28	175.28
DISCCART	689784.49	4269132.08	158.21	179.87
DISCCART	689784.49	4269232.08	145.83	179.87
DISCCART	689784.49	4271532.08	142.01	142.01
DISCCART	689784.49	4271632.08	141.78	141.78
DISCCART	689784.49	4271732.08	139.75	139.75
DISCCART	689784.49	4271832.08	138.55	138.55
DISCCART	689784.49	4271932.08	143.13	143.13
DISCCART	689784.49	4272032.08	143.73	143.73
DISCCART	689784.49	4272132.08	143.98	143.98
DISCCART	689784.49	4272232.08	138.54	209.45
DISCCART	689784.49	4272332.08	138.54	221.29
DISCCART	689784.49	4272432.08	138.54	221.29
DISCCART	689784.49	4272532.08	138.54	221.29
DISCCART	689784.49	4272632.08	138.54	221.29
DISCCART	689784.49	4272732.08	138.54	221.29
DISCCART	689784.49	4272832.08	144.95	209.45
DISCCART	689784.49	4272932.08	143.90	209.45
DISCCART	689884.49	4268032.08	172.96	245.21
DISCCART	689884.49	4267932.08	179.88	245.21
DISCCART	689884.49	4267832.08	194.10	245.21
DISCCART	689884.49	4267732.08	207.73	245.21
DISCCART	689884.49	4267632.08	232.16	232.16
DISCCART	689884.49	4267532.08	229.41	245.21
DISCCART	689884.49	4267432.08	242.71	245.04
DISCCART	689884.49	4267332.08	226.60	245.21
DISCCART	689884.49	4267232.08	199.23	245.21
DISCCART	689884.49	4267132.08	189.91	252.03
DISCCART	689884.49	4267032.08	213.69	242.39
DISCCART	689884.49	4266932.08	216.02	239.80
DISCCART	689884.49	4266832.08	210.84	252.03
DISCCART	689884.49	4266732.08	190.75	253.19
DISCCART	689884.49	4266632.08	200.72	253.19

DISCCART	689884.49	4268132.08	166.46	245.21
DISCCART	689884.49	4268232.08	162.91	245.14
DISCCART	689884.49	4268332.08	160.54	233.93
DISCCART	689884.49	4268432.08	158.03	233.92
DISCCART	689884.49	4268532.08	164.05	170.54
DISCCART	689884.49	4268632.08	168.09	174.65
DISCCART	689884.49	4268732.08	174.94	174.94
DISCCART	689884.49	4268832.08	172.33	172.33
DISCCART	689884.49	4268932.08	168.09	168.09
DISCCART	689884.49	4269032.08	167.83	175.05
DISCCART	689884.49	4269132.08	156.17	179.87
DISCCART	689884.49	4269232.08	145.44	179.87
DISCCART	689884.49	4271532.08	143.90	146.97
DISCCART	689884.49	4271632.08	142.41	147.19
DISCCART	689884.49	4271732.08	139.21	139.21
DISCCART	689884.49	4271832.08	138.55	138.55
DISCCART	689884.49	4271932.08	142.00	142.00
DISCCART	689884.49	4272032.08	143.21	143.21
DISCCART	689884.49	4272132.08	142.98	142.98
DISCCART	689884.49	4272232.08	144.13	144.13
DISCCART	689884.49	4272332.08	139.03	209.45
DISCCART	689884.49	4272432.08	138.54	209.45
DISCCART	689884.49	4272532.08	138.54	209.45
DISCCART	689884.49	4272632.08	138.54	209.45
DISCCART	689884.49	4272732.08	138.54	209.45
DISCCART	689884.49	4272832.08	138.58	209.45
DISCCART	689884.49	4272932.08	143.62	209.45
DISCCART	689984.49	4268032.08	186.11	233.93
DISCCART	689984.49	4267932.08	182.12	245.21
DISCCART	689984.49	4267832.08	199.45	245.21
DISCCART	689984.49	4267732.08	231.21	232.97
DISCCART	689984.49	4267632.08	212.37	245.21
DISCCART	689984.49	4267532.08	195.53	245.21
DISCCART	689984.49	4267432.08	219.80	245.21
DISCCART	689984.49	4267332.08	207.73	245.21
DISCCART	689984.49	4267232.08	189.71	245.21
DISCCART	689984.49	4267132.08	183.87	252.13
DISCCART	689984.49	4267032.08	216.17	239.80
DISCCART	689984.49	4266932.08	237.59	239.80
DISCCART	689984.49	4266832.08	220.19	252.03
DISCCART	689984.49	4266732.08	202.31	253.19
DISCCART	689984.49	4266632.08	218.29	253.19
DISCCART	689984.49	4268132.08	176.19	233.93
DISCCART	689984.49	4268232.08	171.65	233.93
DISCCART	689984.49	4268332.08	168.90	233.92
DISCCART	689984.49	4268432.08	168.84	215.37
DISCCART	689984.49	4268532.08	171.85	171.85
DISCCART	689984.49	4268632.08	175.97	175.97
DISCCART	689984.49	4268732.08	175.38	175.38
DISCCART	689984.49	4268832.08	169.19	169.19
DISCCART	689984.49	4268932.08	163.00	163.74
DISCCART	689984.49	4269032.08	153.30	179.87
DISCCART	689984.49	4269132.08	149.64	179.87
DISCCART	689984.49	4269232.08	146.22	177.17
DISCCART	689984.49	4271532.08	142.96	142.96
DISCCART	689984.49	4271632.08	139.51	147.19
DISCCART	689984.49	4271732.08	142.55	147.03
DISCCART	689984.49	4271832.08	139.64	142.11
DISCCART	689984.49	4271932.08	142.05	142.05
DISCCART	689984.49	4272032.08	143.65	143.65
DISCCART	689984.49	4272132.08	142.91	142.91
DISCCART	689984.49	4272232.08	143.65	143.65
DISCCART	689984.49	4272332.08	144.05	144.05
DISCCART	689984.49	4272432.08	138.55	209.14
DISCCART	689984.49	4272532.08	138.54	209.45
DISCCART	689984.49	4272632.08	138.54	209.45

DISCCART	689984.49	4272732.08	138.54	209.45
DISCCART	689984.49	4272832.08	138.54	209.18
DISCCART	689984.49	4272932.08	143.72	205.28
DISCCART	690084.49	4268032.08	199.96	232.97
DISCCART	690084.49	4267932.08	204.40	233.92
DISCCART	690084.49	4267832.08	213.68	233.92
DISCCART	690084.49	4267732.08	223.02	230.10
DISCCART	690084.49	4267632.08	193.49	245.21
DISCCART	690084.49	4267532.08	176.18	245.21
DISCCART	690084.49	4267432.08	193.57	245.21
DISCCART	690084.49	4267332.08	194.12	245.21
DISCCART	690084.49	4267232.08	182.66	252.03
DISCCART	690084.49	4267132.08	185.64	252.13
DISCCART	690084.49	4267032.08	201.21	252.03
DISCCART	690084.49	4266932.08	206.31	252.13
DISCCART	690084.49	4266832.08	220.77	252.03
DISCCART	690084.49	4266732.08	223.28	252.18
DISCCART	690084.49	4266632.08	237.38	252.08
DISCCART	690084.49	4268132.08	187.26	233.92
DISCCART	690084.49	4268232.08	174.38	233.92
DISCCART	690084.49	4268332.08	177.36	215.37
DISCCART	690084.49	4268432.08	172.64	185.21
DISCCART	690084.49	4268532.08	168.98	175.47
DISCCART	690084.49	4268632.08	170.81	175.90
DISCCART	690084.49	4268732.08	171.34	171.34
DISCCART	690084.49	4268832.08	168.07	168.07
DISCCART	690084.49	4268932.08	163.97	165.69
DISCCART	690084.49	4269032.08	155.81	165.94
DISCCART	690084.49	4269132.08	149.41	158.26
DISCCART	690084.49	4269232.08	147.15	147.15
DISCCART	690084.49	4271532.08	142.63	142.63
DISCCART	690084.49	4271632.08	142.48	142.48
DISCCART	690084.49	4271732.08	142.68	142.68
DISCCART	690084.49	4271832.08	145.81	146.78
DISCCART	690084.49	4271932.08	142.89	142.89
DISCCART	690084.49	4272032.08	143.67	143.67
DISCCART	690084.49	4272132.08	143.18	143.18
DISCCART	690084.49	4272232.08	142.71	142.71
DISCCART	690084.49	4272332.08	142.62	142.62
DISCCART	690084.49	4272432.08	143.22	143.22
DISCCART	690084.49	4272532.08	138.55	144.68
DISCCART	690084.49	4272632.08	138.54	200.04
DISCCART	690084.49	4272732.08	138.54	205.02
DISCCART	690084.49	4272832.08	138.22	205.28
DISCCART	690084.49	4272932.08	138.09	218.47
DISCCART	690184.49	4268032.08	205.05	215.37
DISCCART	690184.49	4267932.08	202.77	233.41
DISCCART	690184.49	4267832.08	194.28	233.93
DISCCART	690184.49	4267732.08	201.10	233.93
DISCCART	690184.49	4267632.08	190.02	245.21
DISCCART	690184.49	4267532.08	175.00	245.21
DISCCART	690184.49	4267432.08	173.31	245.21
DISCCART	690184.49	4267332.08	182.05	245.21
DISCCART	690184.49	4267232.08	174.37	252.73
DISCCART	690184.49	4267132.08	182.01	253.19
DISCCART	690184.49	4267032.08	181.91	253.19
DISCCART	690184.49	4266932.08	188.66	253.19
DISCCART	690184.49	4266832.08	220.09	252.03
DISCCART	690184.49	4266732.08	235.45	239.49
DISCCART	690184.49	4266632.08	227.29	253.19
DISCCART	690184.49	4268132.08	184.96	233.78
DISCCART	690184.49	4268232.08	174.31	233.92
DISCCART	690184.49	4268332.08	184.58	184.58
DISCCART	690184.49	4268432.08	174.72	185.21
DISCCART	690184.49	4268532.08	160.95	215.37
DISCCART	690184.49	4268632.08	160.15	177.00

DISCCART	690184.49	4268732.08	164.42	169.77
DISCCART	690184.49	4268832.08	163.96	171.15
DISCCART	690184.49	4268932.08	157.93	170.34
DISCCART	690184.49	4269032.08	156.47	156.47
DISCCART	690184.49	4269132.08	153.66	157.45
DISCCART	690184.49	4269232.08	148.41	172.56
DISCCART	690184.49	4271532.08	142.56	142.56
DISCCART	690184.49	4271632.08	142.55	142.55
DISCCART	690184.49	4271732.08	142.45	142.45
DISCCART	690184.49	4271832.08	142.85	142.85
DISCCART	690184.49	4271932.08	143.96	146.64
DISCCART	690184.49	4272032.08	143.33	143.33
DISCCART	690184.49	4272132.08	142.92	142.92
DISCCART	690184.49	4272232.08	142.86	142.86
DISCCART	690184.49	4272332.08	142.72	142.72
DISCCART	690184.49	4272432.08	142.79	142.79
DISCCART	690184.49	4272532.08	138.55	144.15
DISCCART	690184.49	4272632.08	138.54	198.29
DISCCART	690184.49	4272732.08	138.37	203.34
DISCCART	690184.49	4272832.08	138.09	205.28
DISCCART	690184.49	4272932.08	138.09	218.47
DISCCART	690284.49	4268032.08	177.46	233.93
DISCCART	690284.49	4267932.08	185.84	233.93
DISCCART	690284.49	4267832.08	174.54	245.21
DISCCART	690284.49	4267732.08	185.48	245.21
DISCCART	690284.49	4267632.08	179.02	245.21
DISCCART	690284.49	4267532.08	175.34	245.21
DISCCART	690284.49	4267432.08	164.45	245.21
DISCCART	690284.49	4267332.08	169.12	252.03
DISCCART	690284.49	4267232.08	168.67	253.19
DISCCART	690284.49	4267132.08	175.97	253.19
DISCCART	690284.49	4267032.08	175.93	253.19
DISCCART	690284.49	4266932.08	187.74	253.19
DISCCART	690284.49	4266832.08	194.74	253.19
DISCCART	690284.49	4266732.08	201.79	253.19
DISCCART	690284.49	4266632.08	199.76	253.19
DISCCART	690284.49	4268132.08	166.77	233.93
DISCCART	690284.49	4268232.08	167.16	233.92
DISCCART	690284.49	4268332.08	177.84	215.37
DISCCART	690284.49	4268432.08	166.25	215.37
DISCCART	690284.49	4268532.08	158.97	215.37
DISCCART	690284.49	4268632.08	153.64	185.21
DISCCART	690284.49	4268732.08	147.80	234.29
DISCCART	690284.49	4268832.08	147.96	234.40
DISCCART	690284.49	4268932.08	149.54	234.40
DISCCART	690284.49	4269032.08	145.68	234.40
DISCCART	690284.49	4269132.08	145.63	234.40
DISCCART	690284.49	4269232.08	146.24	172.56
DISCCART	690284.49	4269332.08	145.26	172.56
DISCCART	690284.49	4271632.08	142.40	142.40
DISCCART	690284.49	4271732.08	142.41	142.41
DISCCART	690284.49	4271832.08	142.78	142.78
DISCCART	690284.49	4271932.08	142.89	142.89
DISCCART	690284.49	4272032.08	143.47	143.47
DISCCART	690284.49	4272132.08	143.48	146.58
DISCCART	690284.49	4272232.08	145.49	145.49
DISCCART	690284.49	4272332.08	142.43	142.43
DISCCART	690284.49	4272432.08	142.66	142.66
DISCCART	690284.49	4272532.08	143.34	143.34
DISCCART	690284.49	4272632.08	138.34	144.25
DISCCART	690284.49	4272732.08	138.09	200.23
DISCCART	690284.49	4272832.08	138.09	203.34
DISCCART	690284.49	4272932.08	138.09	218.47
DISCCART	690384.49	4268032.08	172.75	233.93
DISCCART	690384.49	4267932.08	176.72	233.93
DISCCART	690384.49	4267832.08	170.58	245.21

DISCCART	690384.49	4267732.08	174.26	245.21
DISCCART	690384.49	4267632.08	171.94	245.21
DISCCART	690384.49	4267532.08	168.73	245.21
DISCCART	690384.49	4267432.08	163.01	245.21
DISCCART	690384.49	4267332.08	174.01	245.21
DISCCART	690384.49	4267232.08	178.38	251.89
DISCCART	690384.49	4267132.08	180.81	253.19
DISCCART	690384.49	4267032.08	175.84	253.19
DISCCART	690384.49	4266932.08	178.38	253.19
DISCCART	690384.49	4266832.08	179.96	253.19
DISCCART	690384.49	4266732.08	182.32	253.19
DISCCART	690384.49	4266632.08	188.00	259.49
DISCCART	690384.49	4268132.08	159.09	233.93
DISCCART	690384.49	4268232.08	165.16	233.87
DISCCART	690384.49	4268332.08	169.30	215.37
DISCCART	690384.49	4268432.08	165.76	165.76
DISCCART	690384.49	4268532.08	157.37	227.98
DISCCART	690384.49	4268632.08	149.90	238.58
DISCCART	690384.49	4268732.08	151.98	234.40
DISCCART	690384.49	4268832.08	153.26	234.40
DISCCART	690384.49	4268932.08	152.72	234.40
DISCCART	690384.49	4269032.08	153.42	234.40
DISCCART	690384.49	4269132.08	157.68	172.56
DISCCART	690384.49	4269232.08	167.86	172.56
DISCCART	690384.49	4269332.08	164.22	171.48
DISCCART	690384.49	4271632.08	142.40	142.40
DISCCART	690384.49	4271732.08	142.64	142.64
DISCCART	690384.49	4271832.08	142.83	142.83
DISCCART	690384.49	4271932.08	142.90	142.90
DISCCART	690384.49	4272032.08	143.04	143.04
DISCCART	690384.49	4272132.08	143.16	143.16
DISCCART	690384.49	4272232.08	143.21	143.21
DISCCART	690384.49	4272332.08	143.15	143.15
DISCCART	690384.49	4272432.08	143.55	145.30
DISCCART	690384.49	4272532.08	142.39	142.39
DISCCART	690384.49	4272632.08	143.41	143.41
DISCCART	690384.49	4272732.08	138.10	198.28
DISCCART	690384.49	4272832.08	138.10	202.66
DISCCART	690384.49	4272932.08	138.09	218.47
DISCCART	690484.49	4268032.08	164.58	233.93
DISCCART	690484.49	4267932.08	165.58	233.93
DISCCART	690484.49	4267832.08	163.31	245.21
DISCCART	690484.49	4267732.08	163.37	245.21
DISCCART	690484.49	4267632.08	165.74	245.21
DISCCART	690484.49	4267532.08	162.30	245.21
DISCCART	690484.49	4267432.08	176.10	245.21
DISCCART	690484.49	4267332.08	192.66	242.20
DISCCART	690484.49	4267232.08	198.94	242.20
DISCCART	690484.49	4267132.08	198.78	242.20
DISCCART	690484.49	4267032.08	188.63	252.13
DISCCART	690484.49	4266932.08	192.54	253.19
DISCCART	690484.49	4266832.08	191.10	253.19
DISCCART	690484.49	4266732.08	199.03	253.19
DISCCART	690484.49	4266632.08	200.24	253.19
DISCCART	690484.49	4268132.08	154.59	238.58
DISCCART	690484.49	4268232.08	154.38	238.58
DISCCART	690484.49	4268332.08	152.39	238.58
DISCCART	690484.49	4268432.08	152.53	238.58
DISCCART	690484.49	4268532.08	154.05	238.58
DISCCART	690484.49	4268632.08	154.48	238.58
DISCCART	690484.49	4268732.08	160.76	234.40
DISCCART	690484.49	4268832.08	163.72	234.40
DISCCART	690484.49	4268932.08	159.52	234.40
DISCCART	690484.49	4269032.08	158.75	234.40
DISCCART	690484.49	4269132.08	168.34	168.34
DISCCART	690484.49	4269232.08	169.30	169.30

DISCCART	690484.49	4269332.08	157.54	234.40
DISCCART	690484.49	4271632.08	142.40	142.40
DISCCART	690484.49	4271732.08	142.63	142.63
DISCCART	690484.49	4271832.08	142.78	142.78
DISCCART	690484.49	4271932.08	142.88	142.88
DISCCART	690484.49	4272032.08	142.85	142.85
DISCCART	690484.49	4272132.08	142.75	142.75
DISCCART	690484.49	4272232.08	143.01	143.01
DISCCART	690484.49	4272332.08	142.92	142.92
DISCCART	690484.49	4272432.08	142.85	142.85
DISCCART	690484.49	4272532.08	143.23	143.23
DISCCART	690484.49	4272632.08	142.83	142.83
DISCCART	690484.49	4272732.08	142.89	143.15
DISCCART	690484.49	4272832.08	138.07	198.02
DISCCART	690484.49	4272932.08	138.08	218.47
DISCCART	690584.49	4268032.08	156.27	238.58
DISCCART	690584.49	4267932.08	156.37	245.14
DISCCART	690584.49	4267832.08	158.98	245.21
DISCCART	690584.49	4267732.08	158.05	245.21
DISCCART	690584.49	4267632.08	164.95	245.21
DISCCART	690584.49	4267532.08	175.62	242.20
DISCCART	690584.49	4267432.08	187.22	242.20
DISCCART	690584.49	4267332.08	208.91	226.12
DISCCART	690584.49	4267232.08	223.74	226.12
DISCCART	690584.49	4267132.08	222.35	239.46
DISCCART	690584.49	4267032.08	212.54	242.20
DISCCART	690584.49	4266932.08	218.83	242.20
DISCCART	690584.49	4266832.08	219.77	242.20
DISCCART	690584.49	4266732.08	212.57	242.20
DISCCART	690584.49	4266632.08	206.41	253.19
DISCCART	690584.49	4268132.08	158.54	238.58
DISCCART	690584.49	4268232.08	158.89	238.58
DISCCART	690584.49	4268332.08	158.29	238.58
DISCCART	690584.49	4268432.08	158.70	238.58
DISCCART	690584.49	4268532.08	160.77	238.58
DISCCART	690584.49	4268632.08	163.20	238.58
DISCCART	690584.49	4268732.08	156.24	238.58
DISCCART	690584.49	4268832.08	165.49	234.40
DISCCART	690584.49	4268932.08	169.40	234.40
DISCCART	690584.49	4269032.08	164.85	234.40
DISCCART	690584.49	4269132.08	169.86	234.40
DISCCART	690584.49	4269232.08	167.92	234.40
DISCCART	690584.49	4269332.08	160.42	234.40
DISCCART	690584.49	4269432.08	147.13	234.40
DISCCART	690584.49	4271632.08	142.54	142.54
DISCCART	690584.49	4271732.08	142.55	142.55
DISCCART	690584.49	4271832.08	142.67	142.67
DISCCART	690584.49	4271932.08	142.78	142.78
DISCCART	690584.49	4272032.08	142.80	142.80
DISCCART	690584.49	4272132.08	142.72	142.72
DISCCART	690584.49	4272232.08	142.70	142.70
DISCCART	690584.49	4272332.08	142.64	142.64
DISCCART	690584.49	4272432.08	142.65	142.65
DISCCART	690584.49	4272532.08	143.69	143.69
DISCCART	690584.49	4272632.08	140.69	142.80
DISCCART	690584.49	4272732.08	143.14	143.14
DISCCART	690584.49	4272832.08	138.05	143.72
DISCCART	690584.49	4272932.08	138.07	218.47
DISCCART	690684.49	4268032.08	165.27	238.58
DISCCART	690684.49	4267932.08	165.86	238.58
DISCCART	690684.49	4267832.08	164.50	238.58
DISCCART	690684.49	4267732.08	158.51	246.15
DISCCART	690684.49	4267632.08	166.78	246.15
DISCCART	690684.49	4267532.08	173.23	242.20
DISCCART	690684.49	4267432.08	177.01	242.20
DISCCART	690684.49	4267332.08	189.12	242.20

DISCCART	690684.49	4267232.08	191.85	242.20
DISCCART	690684.49	4267132.08	203.25	242.20
DISCCART	690684.49	4267032.08	232.43	241.30
DISCCART	690684.49	4266932.08	240.61	242.14
DISCCART	690684.49	4266832.08	216.18	242.20
DISCCART	690684.49	4266732.08	202.95	247.45
DISCCART	690684.49	4266632.08	195.63	254.19
DISCCART	690684.49	4268132.08	167.00	238.58
DISCCART	690684.49	4268232.08	163.77	238.58
DISCCART	690684.49	4268332.08	166.52	238.58
DISCCART	690684.49	4268432.08	167.50	238.58
DISCCART	690684.49	4268532.08	163.67	238.58
DISCCART	690684.49	4268632.08	169.08	238.58
DISCCART	690684.49	4268732.08	162.43	238.58
DISCCART	690684.49	4268832.08	167.14	234.40
DISCCART	690684.49	4268932.08	174.29	234.40
DISCCART	690684.49	4269032.08	172.69	234.40
DISCCART	690684.49	4269132.08	171.50	234.40
DISCCART	690684.49	4269232.08	170.04	234.40
DISCCART	690684.49	4269332.08	170.94	234.40
DISCCART	690684.49	4269432.08	154.25	234.40
DISCCART	690684.49	4271632.08	142.77	142.77
DISCCART	690684.49	4271732.08	142.67	142.67
DISCCART	690684.49	4271832.08	142.54	142.54
DISCCART	690684.49	4271932.08	142.67	142.67
DISCCART	690684.49	4272032.08	142.74	142.74
DISCCART	690684.49	4272132.08	142.64	142.64
DISCCART	690684.49	4272232.08	142.45	142.45
DISCCART	690684.49	4272332.08	142.32	142.32
DISCCART	690684.49	4272432.08	142.41	142.41
DISCCART	690684.49	4272532.08	143.18	143.18
DISCCART	690684.49	4272632.08	142.24	145.21
DISCCART	690684.49	4272732.08	140.99	140.99
DISCCART	690684.49	4272832.08	143.61	143.61
DISCCART	690684.49	4272932.08	138.09	218.47
DISCCART	690784.49	4268032.08	175.10	238.58
DISCCART	690784.49	4267932.08	172.00	238.58
DISCCART	690784.49	4267832.08	175.86	234.99
DISCCART	690784.49	4267732.08	168.91	246.15
DISCCART	690784.49	4267632.08	167.54	246.15
DISCCART	690784.49	4267532.08	168.56	250.23
DISCCART	690784.49	4267432.08	167.90	250.23
DISCCART	690784.49	4267332.08	168.62	250.23
DISCCART	690784.49	4267232.08	169.79	250.82
DISCCART	690784.49	4267132.08	181.99	250.23
DISCCART	690784.49	4267032.08	195.42	242.20
DISCCART	690784.49	4266932.08	217.83	242.20
DISCCART	690784.49	4266832.08	203.77	242.20
DISCCART	690784.49	4266732.08	192.64	253.40
DISCCART	690784.49	4266632.08	195.25	257.37
DISCCART	690784.49	4268132.08	172.26	238.58
DISCCART	690784.49	4268232.08	168.41	238.58
DISCCART	690784.49	4268332.08	175.02	238.58
DISCCART	690784.49	4268432.08	173.39	238.58
DISCCART	690784.49	4268532.08	170.28	238.58
DISCCART	690784.49	4268632.08	175.06	238.58
DISCCART	690784.49	4268732.08	174.83	238.58
DISCCART	690784.49	4268832.08	176.32	234.40
DISCCART	690784.49	4268932.08	175.37	234.40
DISCCART	690784.49	4269032.08	164.91	234.40
DISCCART	690784.49	4269132.08	158.78	234.40
DISCCART	690784.49	4269232.08	161.91	234.40
DISCCART	690784.49	4269332.08	161.16	234.40
DISCCART	690784.49	4269432.08	148.46	234.40
DISCCART	690784.49	4271732.08	142.62	142.62
DISCCART	690784.49	4271832.08	142.50	142.50

DISCCART	690784.49	4271932.08	142.58	142.58
DISCCART	690784.49	4272032.08	142.66	142.66
DISCCART	690784.49	4272132.08	142.48	142.48
DISCCART	690784.49	4272232.08	142.06	142.06
DISCCART	690784.49	4272332.08	142.08	142.08
DISCCART	690784.49	4272432.08	142.25	142.25
DISCCART	690784.49	4272532.08	142.51	142.51
DISCCART	690784.49	4272632.08	143.52	143.52
DISCCART	690784.49	4272732.08	144.50	145.15
DISCCART	690784.49	4272832.08	142.19	142.19
DISCCART	690784.49	4272932.08	138.11	144.19
DISCCART	690884.49	4268032.08	188.34	238.58
DISCCART	690884.49	4267932.08	184.52	238.58
DISCCART	690884.49	4267832.08	182.76	234.99
DISCCART	690884.49	4267732.08	171.86	246.15
DISCCART	690884.49	4267632.08	173.57	246.15
DISCCART	690884.49	4267532.08	183.72	246.15
DISCCART	690884.49	4267432.08	188.52	246.15
DISCCART	690884.49	4267332.08	189.25	250.23
DISCCART	690884.49	4267232.08	193.05	250.23
DISCCART	690884.49	4267132.08	191.45	250.23
DISCCART	690884.49	4267032.08	193.28	250.23
DISCCART	690884.49	4266932.08	195.98	251.89
DISCCART	690884.49	4266832.08	189.57	256.23
DISCCART	690884.49	4266732.08	189.79	257.21
DISCCART	690884.49	4266632.08	195.02	258.67
DISCCART	690884.49	4268132.08	173.85	238.58
DISCCART	690884.49	4268232.08	174.48	238.58
DISCCART	690884.49	4268332.08	183.54	238.58
DISCCART	690884.49	4268432.08	188.08	238.58
DISCCART	690884.49	4268532.08	184.53	238.58
DISCCART	690884.49	4268632.08	183.68	238.58
DISCCART	690884.49	4268732.08	188.51	234.40
DISCCART	690884.49	4268832.08	194.06	234.40
DISCCART	690884.49	4268932.08	177.42	234.40
DISCCART	690884.49	4269032.08	172.18	234.40
DISCCART	690884.49	4269132.08	163.02	234.40
DISCCART	690884.49	4269232.08	156.45	234.40
DISCCART	690884.49	4269332.08	150.92	234.40
DISCCART	690884.49	4269432.08	149.36	234.40
DISCCART	690884.49	4271732.08	142.38	142.38
DISCCART	690884.49	4271832.08	142.49	142.49
DISCCART	690884.49	4271932.08	142.55	142.55
DISCCART	690884.49	4272032.08	142.47	142.47
DISCCART	690884.49	4272132.08	141.96	141.96
DISCCART	690884.49	4272232.08	142.27	142.27
DISCCART	690884.49	4272332.08	142.20	142.20
DISCCART	690884.49	4272432.08	142.01	142.01
DISCCART	690884.49	4272532.08	141.94	141.94
DISCCART	690884.49	4272632.08	142.68	142.68
DISCCART	690884.49	4272732.08	142.62	142.62
DISCCART	690884.49	4272832.08	142.83	142.83
DISCCART	690884.49	4272932.08	143.47	143.47
DISCCART	690984.49	4268032.08	201.81	234.99
DISCCART	690984.49	4267932.08	204.29	234.99
DISCCART	690984.49	4267832.08	184.08	234.99
DISCCART	690984.49	4267732.08	175.85	246.15
DISCCART	690984.49	4267632.08	184.69	246.15
DISCCART	690984.49	4267532.08	206.14	214.36
DISCCART	690984.49	4267432.08	211.19	214.36
DISCCART	690984.49	4267332.08	206.10	209.21
DISCCART	690984.49	4267232.08	197.46	250.23
DISCCART	690984.49	4267132.08	182.64	251.89
DISCCART	690984.49	4267032.08	184.49	251.91
DISCCART	690984.49	4266932.08	185.86	254.04
DISCCART	690984.49	4266832.08	187.49	256.93

DISCCART	690984.49	4266732.08	204.52	251.91
DISCCART	690984.49	4266632.08	208.39	256.23
DISCCART	690984.49	4268132.08	180.80	238.58
DISCCART	690984.49	4268232.08	181.86	238.58
DISCCART	690984.49	4268332.08	197.12	238.58
DISCCART	690984.49	4268432.08	211.54	238.58
DISCCART	690984.49	4268532.08	212.91	227.98
DISCCART	690984.49	4268632.08	209.38	227.47
DISCCART	690984.49	4268732.08	210.23	234.06
DISCCART	690984.49	4268832.08	216.84	234.29
DISCCART	690984.49	4268932.08	199.56	234.40
DISCCART	690984.49	4269032.08	190.15	234.40
DISCCART	690984.49	4269132.08	175.57	234.40
DISCCART	690984.49	4269232.08	158.63	234.40
DISCCART	690984.49	4269332.08	165.73	234.40
DISCCART	690984.49	4269432.08	153.68	234.40
DISCCART	690984.49	4271732.08	142.37	142.37
DISCCART	690984.49	4271832.08	142.19	142.19
DISCCART	690984.49	4271932.08	142.25	142.25
DISCCART	690984.49	4272032.08	141.97	141.97
DISCCART	690984.49	4272132.08	141.82	141.82
DISCCART	690984.49	4272232.08	142.44	142.44
DISCCART	690984.49	4272332.08	142.26	142.26
DISCCART	690984.49	4272432.08	142.06	142.06
DISCCART	690984.49	4272532.08	141.67	141.67
DISCCART	690984.49	4272632.08	142.61	142.61
DISCCART	690984.49	4272732.08	142.85	142.85
DISCCART	690984.49	4272832.08	142.15	145.09
DISCCART	690984.49	4272932.08	143.18	143.18
DISCCART	691084.49	4268032.08	211.76	234.99
DISCCART	691084.49	4267932.08	221.94	232.06
DISCCART	691084.49	4267832.08	200.73	234.99
DISCCART	691084.49	4267732.08	196.83	234.99
DISCCART	691084.49	4267632.08	197.96	246.15
DISCCART	691084.49	4267532.08	196.56	246.15
DISCCART	691084.49	4267432.08	190.49	250.23
DISCCART	691084.49	4267332.08	185.57	250.82
DISCCART	691084.49	4267232.08	182.45	250.82
DISCCART	691084.49	4267132.08	181.82	253.73
DISCCART	691084.49	4267032.08	192.67	251.89
DISCCART	691084.49	4266932.08	196.60	251.91
DISCCART	691084.49	4266832.08	190.48	256.93
DISCCART	691084.49	4266732.08	199.09	256.93
DISCCART	691084.49	4266632.08	214.97	256.23
DISCCART	691084.49	4268132.08	198.38	238.58
DISCCART	691084.49	4268232.08	188.46	238.58
DISCCART	691084.49	4268332.08	209.00	238.58
DISCCART	691084.49	4268432.08	222.84	227.98
DISCCART	691084.49	4268532.08	208.93	238.58
DISCCART	691084.49	4268632.08	210.95	222.15
DISCCART	691084.49	4268732.08	207.81	234.40
DISCCART	691084.49	4268832.08	220.60	234.40
DISCCART	691084.49	4268932.08	226.35	234.40
DISCCART	691084.49	4269032.08	207.60	234.40
DISCCART	691084.49	4269132.08	189.56	234.40
DISCCART	691084.49	4269232.08	175.19	234.40
DISCCART	691084.49	4269332.08	168.34	234.40
DISCCART	691084.49	4269432.08	151.93	234.40
DISCCART	691084.49	4269532.08	153.21	234.40
DISCCART	691084.49	4271732.08	142.30	142.30
DISCCART	691084.49	4271832.08	142.11	142.11
DISCCART	691084.49	4271932.08	142.54	142.54
DISCCART	691084.49	4272032.08	142.10	142.10
DISCCART	691084.49	4272132.08	142.68	142.68
DISCCART	691084.49	4272232.08	142.39	142.39
DISCCART	691084.49	4272332.08	142.27	142.27

DISCCART	691084.49	4272432.08	142.70	142.70
DISCCART	691084.49	4272532.08	142.66	142.66
DISCCART	691084.49	4272632.08	143.89	143.93
DISCCART	691084.49	4272732.08	143.49	143.49
DISCCART	691084.49	4272832.08	143.98	143.98
DISCCART	691084.49	4272932.08	142.65	142.65
DISCCART	691184.49	4268032.08	220.18	232.06
DISCCART	691184.49	4267932.08	222.10	234.99
DISCCART	691184.49	4267832.08	230.00	234.99
DISCCART	691184.49	4267732.08	209.62	234.99
DISCCART	691184.49	4267632.08	195.45	246.15
DISCCART	691184.49	4267532.08	181.81	250.82
DISCCART	691184.49	4267432.08	178.64	250.82
DISCCART	691184.49	4267332.08	177.07	250.82
DISCCART	691184.49	4267232.08	185.56	250.82
DISCCART	691184.49	4267132.08	194.59	250.82
DISCCART	691184.49	4267032.08	213.59	250.82
DISCCART	691184.49	4266932.08	219.40	250.23
DISCCART	691184.49	4266832.08	197.57	256.93
DISCCART	691184.49	4266732.08	200.93	256.93
DISCCART	691184.49	4266632.08	229.83	251.91
DISCCART	691184.49	4268132.08	224.51	226.90
DISCCART	691184.49	4268232.08	221.15	238.58
DISCCART	691184.49	4268332.08	233.47	238.58
DISCCART	691184.49	4268432.08	206.59	238.58
DISCCART	691184.49	4268532.08	181.38	238.58
DISCCART	691184.49	4268632.08	184.28	238.58
DISCCART	691184.49	4268732.08	183.75	238.58
DISCCART	691184.49	4268832.08	206.29	234.40
DISCCART	691184.49	4268932.08	231.34	231.88
DISCCART	691184.49	4269032.08	208.73	234.40
DISCCART	691184.49	4269132.08	183.19	234.40
DISCCART	691184.49	4269232.08	159.53	234.40
DISCCART	691184.49	4269332.08	151.33	234.40
DISCCART	691184.49	4269432.08	157.79	234.40
DISCCART	691184.49	4269532.08	168.91	234.40
DISCCART	691184.49	4271732.08	142.26	142.26
DISCCART	691184.49	4271832.08	142.07	142.07
DISCCART	691184.49	4271932.08	142.17	142.17
DISCCART	691184.49	4272032.08	142.30	142.30
DISCCART	691184.49	4272132.08	142.51	142.51
DISCCART	691184.49	4272232.08	142.01	143.81
DISCCART	691184.49	4272332.08	142.28	142.28
DISCCART	691184.49	4272432.08	142.06	142.06
DISCCART	691184.49	4272532.08	142.23	142.23
DISCCART	691184.49	4272632.08	142.48	142.48
DISCCART	691184.49	4272732.08	142.78	142.78
DISCCART	691184.49	4272832.08	142.78	142.78
DISCCART	691184.49	4272932.08	141.58	141.58
DISCCART	691284.49	4268032.08	185.45	238.58
DISCCART	691284.49	4267932.08	214.37	234.99
DISCCART	691284.49	4267832.08	221.68	234.99
DISCCART	691284.49	4267732.08	200.27	246.15
DISCCART	691284.49	4267632.08	184.68	246.15
DISCCART	691284.49	4267532.08	174.30	250.82
DISCCART	691284.49	4267432.08	190.29	250.82
DISCCART	691284.49	4267332.08	208.48	250.23
DISCCART	691284.49	4267232.08	208.37	250.82
DISCCART	691284.49	4267132.08	204.25	250.82
DISCCART	691284.49	4267032.08	231.90	250.23
DISCCART	691284.49	4266932.08	230.31	250.23
DISCCART	691284.49	4266832.08	211.38	256.93
DISCCART	691284.49	4266732.08	197.92	256.93
DISCCART	691284.49	4266632.08	206.38	257.39
DISCCART	691284.49	4268132.08	195.48	238.58
DISCCART	691284.49	4268232.08	205.81	238.58

DISCCART	691284.49	4268332.08	224.59	238.58
DISCCART	691284.49	4268432.08	214.23	238.58
DISCCART	691284.49	4268532.08	192.25	238.58
DISCCART	691284.49	4268632.08	174.53	238.58
DISCCART	691284.49	4268732.08	182.08	238.58
DISCCART	691284.49	4268832.08	197.34	234.40
DISCCART	691284.49	4268932.08	212.93	234.40
DISCCART	691284.49	4269032.08	204.98	234.40
DISCCART	691284.49	4269132.08	171.06	234.40
DISCCART	691284.49	4269232.08	169.40	234.40
DISCCART	691284.49	4269332.08	162.32	234.40
DISCCART	691284.49	4269432.08	163.31	234.40
DISCCART	691284.49	4269532.08	172.45	234.40
DISCCART	691284.49	4269632.08	152.23	234.40
DISCCART	691284.49	4271732.08	142.45	142.45
DISCCART	691284.49	4271832.08	142.16	142.16
DISCCART	691284.49	4271932.08	141.93	141.93
DISCCART	691284.49	4272032.08	142.24	142.24
DISCCART	691284.49	4272132.08	141.44	141.44
DISCCART	691284.49	4272232.08	142.37	142.37
DISCCART	691284.49	4272332.08	142.13	142.13
DISCCART	691284.49	4272432.08	142.04	142.04
DISCCART	691284.49	4272532.08	142.13	142.13
DISCCART	691284.49	4272632.08	142.16	142.16
DISCCART	691284.49	4272732.08	142.48	142.48
DISCCART	691284.49	4272832.08	142.91	142.91
DISCCART	691284.49	4272932.08	142.73	144.58
DISCCART	691384.49	4268032.08	203.28	238.58
DISCCART	691384.49	4267932.08	230.13	231.89
DISCCART	691384.49	4267832.08	203.96	234.99
DISCCART	691384.49	4267732.08	189.23	246.15
DISCCART	691384.49	4267632.08	177.16	250.82
DISCCART	691384.49	4267532.08	180.65	250.82
DISCCART	691384.49	4267432.08	207.46	246.15
DISCCART	691384.49	4267332.08	235.90	246.15
DISCCART	691384.49	4267232.08	238.45	246.15
DISCCART	691384.49	4267132.08	228.47	250.23
DISCCART	691384.49	4267032.08	234.63	250.23
DISCCART	691384.49	4266932.08	246.93	246.93
DISCCART	691384.49	4266832.08	217.50	256.93
DISCCART	691384.49	4266732.08	206.89	256.93
DISCCART	691384.49	4266632.08	212.08	256.93
DISCCART	691384.49	4268132.08	177.36	238.58
DISCCART	691384.49	4268232.08	180.90	238.58
DISCCART	691384.49	4268332.08	198.15	238.58
DISCCART	691384.49	4268432.08	209.07	238.58
DISCCART	691384.49	4268532.08	198.73	238.58
DISCCART	691384.49	4268632.08	174.41	238.58
DISCCART	691384.49	4268732.08	176.04	238.58
DISCCART	691384.49	4268832.08	187.22	234.40
DISCCART	691384.49	4268932.08	193.48	234.40
DISCCART	691384.49	4269032.08	205.52	234.40
DISCCART	691384.49	4269132.08	202.89	233.21
DISCCART	691384.49	4269232.08	181.96	234.40
DISCCART	691384.49	4269332.08	166.81	234.40
DISCCART	691384.49	4269432.08	169.01	234.40
DISCCART	691384.49	4269532.08	178.74	198.97
DISCCART	691384.49	4269632.08	153.65	234.40
DISCCART	691384.49	4271732.08	142.43	142.43
DISCCART	691384.49	4271832.08	141.64	141.64
DISCCART	691384.49	4271932.08	142.04	142.04
DISCCART	691384.49	4272032.08	142.19	142.19
DISCCART	691384.49	4272132.08	141.98	141.98
DISCCART	691384.49	4272232.08	142.41	142.41
DISCCART	691384.49	4272332.08	142.21	142.21
DISCCART	691384.49	4272432.08	142.11	142.11

DISCCART	691384.49	4272532.08	142.11	142.11
DISCCART	691384.49	4272632.08	142.05	142.05
DISCCART	691384.49	4272732.08	142.47	142.47
DISCCART	691384.49	4272832.08	142.84	142.84
DISCCART	691384.49	4272932.08	141.32	145.11
DISCCART	691484.49	4268032.08	210.40	231.89
DISCCART	691484.49	4267932.08	211.77	231.89
DISCCART	691484.49	4267832.08	195.26	245.29
DISCCART	691484.49	4267732.08	179.95	246.15
DISCCART	691484.49	4267632.08	171.60	250.82
DISCCART	691484.49	4267532.08	202.00	246.15
DISCCART	691484.49	4267432.08	230.39	246.15
DISCCART	691484.49	4267332.08	237.21	246.15
DISCCART	691484.49	4267232.08	219.43	250.82
DISCCART	691484.49	4267132.08	199.65	254.04
DISCCART	691484.49	4267032.08	218.89	250.82
DISCCART	691484.49	4266932.08	247.15	247.15
DISCCART	691484.49	4266832.08	229.87	253.30
DISCCART	691484.49	4266732.08	226.31	256.93
DISCCART	691484.49	4266632.08	237.48	256.93
DISCCART	691484.49	4268132.08	179.89	238.58
DISCCART	691484.49	4268232.08	171.17	238.58
DISCCART	691484.49	4268332.08	176.51	238.58
DISCCART	691484.49	4268432.08	180.18	238.58
DISCCART	691484.49	4268532.08	187.16	238.58
DISCCART	691484.49	4268632.08	175.13	238.58
DISCCART	691484.49	4268732.08	171.21	238.58
DISCCART	691484.49	4268832.08	174.85	238.58
DISCCART	691484.49	4268932.08	175.76	234.40
DISCCART	691484.49	4269032.08	193.61	234.40
DISCCART	691484.49	4269132.08	212.26	213.04
DISCCART	691484.49	4269232.08	187.09	234.40
DISCCART	691484.49	4269332.08	166.28	234.40
DISCCART	691484.49	4269432.08	168.10	234.40
DISCCART	691484.49	4269532.08	184.08	198.97
DISCCART	691484.49	4269632.08	172.96	198.97
DISCCART	691484.49	4269732.08	147.65	232.23
DISCCART	691484.49	4271632.08	141.94	141.94
DISCCART	691484.49	4271732.08	141.61	141.61
DISCCART	691484.49	4271832.08	142.09	142.09
DISCCART	691484.49	4271932.08	142.25	142.25
DISCCART	691484.49	4272032.08	141.60	143.36
DISCCART	691484.49	4272132.08	142.11	142.11
DISCCART	691484.49	4272232.08	142.28	142.28
DISCCART	691484.49	4272332.08	142.21	142.21
DISCCART	691484.49	4272432.08	142.30	142.30
DISCCART	691484.49	4272532.08	142.42	142.42
DISCCART	691484.49	4272632.08	142.25	142.25
DISCCART	691484.49	4272732.08	142.25	142.25
DISCCART	691484.49	4272832.08	142.46	142.46
DISCCART	691484.49	4272932.08	144.53	145.16
DISCCART	691584.49	4268032.08	207.20	233.59
DISCCART	691584.49	4267932.08	200.02	233.99
DISCCART	691584.49	4267832.08	181.97	246.15
DISCCART	691584.49	4267732.08	175.69	246.15
DISCCART	691584.49	4267632.08	175.81	250.82
DISCCART	691584.49	4267532.08	216.75	246.15
DISCCART	691584.49	4267432.08	241.41	245.29
DISCCART	691584.49	4267332.08	209.74	250.82
DISCCART	691584.49	4267232.08	198.72	250.82
DISCCART	691584.49	4267132.08	200.10	254.04
DISCCART	691584.49	4267032.08	234.56	250.82
DISCCART	691584.49	4266932.08	238.02	250.82
DISCCART	691584.49	4266832.08	229.43	254.28
DISCCART	691584.49	4266732.08	245.86	252.44
DISCCART	691584.49	4266632.08	252.90	252.90

DISCCART	691584.49	4268132.08	178.11	238.58
DISCCART	691584.49	4268232.08	176.02	238.58
DISCCART	691584.49	4268332.08	169.05	238.58
DISCCART	691584.49	4268432.08	163.06	244.78
DISCCART	691584.49	4268532.08	161.88	238.58
DISCCART	691584.49	4268632.08	165.50	238.58
DISCCART	691584.49	4268732.08	164.28	238.58
DISCCART	691584.49	4268832.08	167.35	238.58
DISCCART	691584.49	4268932.08	175.73	234.40
DISCCART	691584.49	4269032.08	186.88	234.40
DISCCART	691584.49	4269132.08	205.83	206.50
DISCCART	691584.49	4269232.08	178.18	234.40
DISCCART	691584.49	4269332.08	173.20	234.40
DISCCART	691584.49	4269432.08	181.55	213.04
DISCCART	691584.49	4269532.08	197.02	198.55
DISCCART	691584.49	4269632.08	185.32	198.97
DISCCART	691584.49	4269732.08	170.47	198.97
DISCCART	691584.49	4269832.08	142.80	212.71
DISCCART	691584.49	4269932.08	141.36	203.31
DISCCART	691584.49	4270032.08	141.44	198.97
DISCCART	691584.49	4270132.08	141.55	198.97
DISCCART	691584.49	4270232.08	141.52	141.52
DISCCART	691584.49	4270332.08	141.28	141.28
DISCCART	691584.49	4270432.08	141.08	141.08
DISCCART	691584.49	4270532.08	141.08	141.08
DISCCART	691584.49	4270632.08	141.31	141.31
DISCCART	691584.49	4270732.08	141.38	141.38
DISCCART	691584.49	4270832.08	141.54	141.54
DISCCART	691584.49	4270932.08	141.88	141.88
DISCCART	691584.49	4271032.08	141.44	141.44
DISCCART	691584.49	4271132.08	141.95	141.95
DISCCART	691584.49	4271232.08	141.29	141.29
DISCCART	691584.49	4271332.08	142.07	142.07
DISCCART	691584.49	4271432.08	142.17	142.17
DISCCART	691584.49	4271532.08	142.04	142.04
DISCCART	691584.49	4271632.08	141.62	141.62
DISCCART	691584.49	4271732.08	141.55	141.55
DISCCART	691584.49	4271832.08	142.15	142.15
DISCCART	691584.49	4271932.08	142.43	142.43
DISCCART	691584.49	4272032.08	142.38	142.38
DISCCART	691584.49	4272132.08	142.30	142.30
DISCCART	691584.49	4272232.08	142.34	142.34
DISCCART	691584.49	4272332.08	142.26	142.26
DISCCART	691584.49	4272432.08	142.32	142.32
DISCCART	691584.49	4272532.08	142.31	142.31
DISCCART	691584.49	4272632.08	142.33	142.33
DISCCART	691584.49	4272732.08	142.05	142.05
DISCCART	691584.49	4272832.08	142.33	142.33
DISCCART	691584.49	4272932.08	142.64	142.64
DISCCART	691684.49	4268032.08	223.27	229.54
DISCCART	691684.49	4267932.08	203.18	233.99
DISCCART	691684.49	4267832.08	180.16	246.15
DISCCART	691684.49	4267732.08	172.20	246.15
DISCCART	691684.49	4267632.08	177.60	250.82
DISCCART	691684.49	4267532.08	220.54	245.29
DISCCART	691684.49	4267432.08	224.42	245.29
DISCCART	691684.49	4267332.08	198.68	250.82
DISCCART	691684.49	4267232.08	184.00	256.67
DISCCART	691684.49	4267132.08	206.56	251.58
DISCCART	691684.49	4267032.08	236.07	236.07
DISCCART	691684.49	4266932.08	216.29	254.47
DISCCART	691684.49	4266832.08	211.35	256.93
DISCCART	691684.49	4266732.08	237.95	254.04
DISCCART	691684.49	4266632.08	239.55	256.93
DISCCART	691684.49	4268132.08	211.91	233.99
DISCCART	691684.49	4268232.08	196.07	233.99

DISCCART	691684.49	4268332.08	186.88	238.58
DISCCART	691684.49	4268432.08	175.97	238.58
DISCCART	691684.49	4268532.08	167.09	238.58
DISCCART	691684.49	4268632.08	158.80	245.05
DISCCART	691684.49	4268732.08	162.81	238.58
DISCCART	691684.49	4268832.08	171.82	234.40
DISCCART	691684.49	4268932.08	170.75	234.40
DISCCART	691684.49	4269032.08	177.75	234.40
DISCCART	691684.49	4269132.08	195.21	206.74
DISCCART	691684.49	4269232.08	198.84	198.84
DISCCART	691684.49	4269332.08	193.95	203.31
DISCCART	691684.49	4269432.08	195.32	203.31
DISCCART	691684.49	4269532.08	185.41	203.31
DISCCART	691684.49	4269632.08	173.12	203.31
DISCCART	691684.49	4269732.08	175.92	198.97
DISCCART	691684.49	4269832.08	161.94	203.00
DISCCART	691684.49	4269932.08	141.80	203.31
DISCCART	691684.49	4270032.08	141.33	203.29
DISCCART	691684.49	4270132.08	141.33	198.87
DISCCART	691684.49	4270232.08	141.10	141.10
DISCCART	691684.49	4270332.08	141.10	141.10
DISCCART	691684.49	4270432.08	141.06	141.06
DISCCART	691684.49	4270532.08	141.13	141.13
DISCCART	691684.49	4270632.08	141.26	141.26
DISCCART	691684.49	4270732.08	141.48	141.48
DISCCART	691684.49	4270832.08	141.67	141.67
DISCCART	691684.49	4270932.08	142.05	142.05
DISCCART	691684.49	4271032.08	141.58	141.58
DISCCART	691684.49	4271132.08	142.56	142.56
DISCCART	691684.49	4271232.08	141.60	141.60
DISCCART	691684.49	4271332.08	142.05	142.05
DISCCART	691684.49	4271432.08	141.91	141.91
DISCCART	691684.49	4271532.08	141.89	141.89
DISCCART	691684.49	4271632.08	141.38	141.38
DISCCART	691684.49	4271732.08	142.06	142.06
DISCCART	691684.49	4271832.08	142.13	142.13
DISCCART	691684.49	4271932.08	141.86	141.86
DISCCART	691684.49	4272032.08	142.33	142.33
DISCCART	691684.49	4272132.08	142.43	142.43
DISCCART	691684.49	4272232.08	142.25	142.25
DISCCART	691684.49	4272332.08	142.13	142.13
DISCCART	691684.49	4272432.08	142.38	142.38
DISCCART	691684.49	4272532.08	142.51	142.51
DISCCART	691684.49	4272632.08	142.35	142.35
DISCCART	691684.49	4272732.08	142.16	142.16
DISCCART	691684.49	4272832.08	142.41	142.41
DISCCART	691684.49	4272932.08	142.55	142.55
DISCCART	691784.49	4268032.08	224.22	233.99
DISCCART	691784.49	4267932.08	207.88	233.99
DISCCART	691784.49	4267832.08	187.64	245.29
DISCCART	691784.49	4267732.08	173.64	246.15
DISCCART	691784.49	4267632.08	175.57	250.82
DISCCART	691784.49	4267532.08	211.31	245.29
DISCCART	691784.49	4267432.08	213.77	245.29
DISCCART	691784.49	4267332.08	188.84	250.82
DISCCART	691784.49	4267232.08	186.34	254.28
DISCCART	691784.49	4267132.08	221.68	239.31
DISCCART	691784.49	4267032.08	227.09	239.31
DISCCART	691784.49	4266932.08	209.50	256.93
DISCCART	691784.49	4266832.08	197.85	256.93
DISCCART	691784.49	4266732.08	214.32	256.93
DISCCART	691784.49	4266632.08	241.31	245.57
DISCCART	691784.49	4268132.08	206.23	233.99
DISCCART	691784.49	4268232.08	203.88	233.99
DISCCART	691784.49	4268332.08	204.64	210.95
DISCCART	691784.49	4268432.08	194.53	211.42

DISCCART	691784.49	4268532.08	178.42	238.58
DISCCART	691784.49	4268632.08	163.01	245.05
DISCCART	691784.49	4268732.08	160.08	245.05
DISCCART	691784.49	4268832.08	162.12	238.58
DISCCART	691784.49	4268932.08	170.50	232.82
DISCCART	691784.49	4269032.08	178.27	214.42
DISCCART	691784.49	4269132.08	180.86	213.04
DISCCART	691784.49	4269232.08	183.25	206.50
DISCCART	691784.49	4269332.08	188.54	203.31
DISCCART	691784.49	4269432.08	195.32	203.31
DISCCART	691784.49	4269532.08	176.06	203.31
DISCCART	691784.49	4269632.08	161.62	203.31
DISCCART	691784.49	4269732.08	164.85	203.31
DISCCART	691784.49	4269832.08	173.07	176.29
DISCCART	691784.49	4269932.08	141.54	203.31
DISCCART	691784.49	4270032.08	141.36	203.29
DISCCART	691784.49	4270132.08	141.13	176.29
DISCCART	691784.49	4270232.08	141.18	141.18
DISCCART	691784.49	4270332.08	141.10	141.10
DISCCART	691784.49	4270432.08	141.07	141.07
DISCCART	691784.49	4270532.08	141.07	141.07
DISCCART	691784.49	4270632.08	141.08	141.08
DISCCART	691784.49	4270732.08	141.44	141.44
DISCCART	691784.49	4270832.08	141.78	141.78
DISCCART	691784.49	4270932.08	140.95	140.95
DISCCART	691784.49	4271032.08	141.51	141.51
DISCCART	691784.49	4271132.08	141.17	141.17
DISCCART	691784.49	4271232.08	141.44	141.44
DISCCART	691784.49	4271332.08	141.74	141.74
DISCCART	691784.49	4271432.08	142.18	142.18
DISCCART	691784.49	4271532.08	141.55	141.55
DISCCART	691784.49	4271632.08	141.70	141.70
DISCCART	691784.49	4271732.08	142.49	142.72
DISCCART	691784.49	4271832.08	142.27	142.27
DISCCART	691784.49	4271932.08	141.90	141.90
DISCCART	691784.49	4272032.08	142.46	142.46
DISCCART	691784.49	4272132.08	142.30	142.30
DISCCART	691784.49	4272232.08	142.11	142.11
DISCCART	691784.49	4272332.08	142.19	142.19
DISCCART	691784.49	4272432.08	142.32	142.32
DISCCART	691784.49	4272532.08	142.43	142.43
DISCCART	691784.49	4272632.08	142.27	142.27
DISCCART	691784.49	4272732.08	141.72	141.72
DISCCART	691784.49	4272832.08	142.46	142.46
DISCCART	691784.49	4272932.08	142.65	142.65
DISCCART	691884.49	4268032.08	221.44	233.99
DISCCART	691884.49	4267932.08	214.19	233.99
DISCCART	691884.49	4267832.08	190.67	245.29
DISCCART	691884.49	4267732.08	176.64	246.15
DISCCART	691884.49	4267632.08	167.16	250.82
DISCCART	691884.49	4267532.08	194.52	245.65
DISCCART	691884.49	4267432.08	201.11	245.29
DISCCART	691884.49	4267332.08	184.66	250.82
DISCCART	691884.49	4267232.08	183.04	254.28
DISCCART	691884.49	4267132.08	195.01	252.82
DISCCART	691884.49	4267032.08	193.14	256.93
DISCCART	691884.49	4266932.08	188.78	256.93
DISCCART	691884.49	4266832.08	214.46	254.61
DISCCART	691884.49	4266732.08	236.56	246.60
DISCCART	691884.49	4266632.08	244.53	245.97
DISCCART	691884.49	4268132.08	185.05	245.05
DISCCART	691884.49	4268232.08	176.49	245.05
DISCCART	691884.49	4268332.08	175.75	245.05
DISCCART	691884.49	4268432.08	179.49	245.05
DISCCART	691884.49	4268532.08	177.25	245.05
DISCCART	691884.49	4268632.08	170.83	245.05

DISCCART	691884.49	4268732.08	154.32	245.05
DISCCART	691884.49	4268832.08	159.85	232.82
DISCCART	691884.49	4268932.08	168.87	208.49
DISCCART	691884.49	4269032.08	171.37	213.04
DISCCART	691884.49	4269132.08	164.92	214.42
DISCCART	691884.49	4269232.08	170.72	213.04
DISCCART	691884.49	4269332.08	180.98	203.31
DISCCART	691884.49	4269432.08	179.05	203.31
DISCCART	691884.49	4269532.08	161.06	203.31
DISCCART	691884.49	4269632.08	160.59	203.31
DISCCART	691884.49	4269732.08	161.32	203.31
DISCCART	691884.49	4269832.08	163.49	176.29
DISCCART	691884.49	4269932.08	157.55	176.29
DISCCART	691884.49	4270032.08	141.72	198.97
DISCCART	691884.49	4270132.08	141.33	176.29
DISCCART	691884.49	4270232.08	140.95	140.95
DISCCART	691884.49	4270332.08	141.01	141.01
DISCCART	691884.49	4270432.08	140.90	140.90
DISCCART	691884.49	4270532.08	140.79	140.79
DISCCART	691884.49	4270632.08	140.93	140.93
DISCCART	691884.49	4270732.08	141.51	141.51
DISCCART	691884.49	4270832.08	141.27	141.27
DISCCART	691884.49	4270932.08	141.12	141.12
DISCCART	691884.49	4271032.08	142.47	142.47
DISCCART	691884.49	4271132.08	141.23	141.23
DISCCART	691884.49	4271232.08	141.75	141.75
DISCCART	691884.49	4271332.08	141.90	141.90
DISCCART	691884.49	4271432.08	142.11	142.11
DISCCART	691884.49	4271532.08	141.65	141.65
DISCCART	691884.49	4271632.08	141.91	141.91
DISCCART	691884.49	4271732.08	141.71	141.71
DISCCART	691884.49	4271832.08	141.96	141.96
DISCCART	691884.49	4271932.08	142.45	142.45
DISCCART	691884.49	4272032.08	142.12	142.12
DISCCART	691884.49	4272132.08	142.14	142.14
DISCCART	691884.49	4272232.08	142.16	142.16
DISCCART	691884.49	4272332.08	142.24	142.24
DISCCART	691884.49	4272432.08	142.35	142.35
DISCCART	691884.49	4272532.08	142.43	142.43
DISCCART	691884.49	4272632.08	142.43	142.43
DISCCART	691884.49	4272732.08	142.18	142.18
DISCCART	691884.49	4272832.08	142.68	142.68
DISCCART	691884.49	4272932.08	142.81	142.81
DISCCART	691984.49	4268032.08	189.00	245.05
DISCCART	691984.49	4267932.08	216.43	233.99
DISCCART	691984.49	4267832.08	189.79	245.05
DISCCART	691984.49	4267732.08	177.21	245.65
DISCCART	691984.49	4267632.08	166.83	250.82
DISCCART	691984.49	4267532.08	190.64	245.29
DISCCART	691984.49	4267432.08	186.88	245.95
DISCCART	691984.49	4267332.08	174.93	252.44
DISCCART	691984.49	4267232.08	174.21	256.93
DISCCART	691984.49	4267132.08	179.33	256.93
DISCCART	691984.49	4267032.08	194.23	254.28
DISCCART	691984.49	4266932.08	197.91	256.93
DISCCART	691984.49	4266832.08	201.64	256.93
DISCCART	691984.49	4266732.08	207.24	256.93
DISCCART	691984.49	4266632.08	217.19	248.07
DISCCART	691984.49	4268132.08	180.73	245.05
DISCCART	691984.49	4268232.08	168.49	245.05
DISCCART	691984.49	4268332.08	164.95	245.05
DISCCART	691984.49	4268432.08	161.24	245.05
DISCCART	691984.49	4268532.08	164.53	245.05
DISCCART	691984.49	4268632.08	166.16	245.05
DISCCART	691984.49	4268732.08	155.60	245.05
DISCCART	691984.49	4268832.08	158.98	245.05

DISCCART	691984.49	4268932.08	162.68	162.68
DISCCART	691984.49	4269032.08	164.13	206.74
DISCCART	691984.49	4269132.08	158.20	214.42
DISCCART	691984.49	4269232.08	169.45	203.31
DISCCART	691984.49	4269332.08	171.22	203.31
DISCCART	691984.49	4269432.08	166.92	203.31
DISCCART	691984.49	4269532.08	163.89	203.31
DISCCART	691984.49	4269632.08	148.68	203.31
DISCCART	691984.49	4269732.08	160.76	203.31
DISCCART	691984.49	4269832.08	157.33	161.54
DISCCART	691984.49	4269932.08	144.35	203.31
DISCCART	691984.49	4270032.08	142.67	176.29
DISCCART	691984.49	4270132.08	141.15	176.20
DISCCART	691984.49	4270232.08	140.83	140.83
DISCCART	691984.49	4270332.08	140.69	140.69
DISCCART	691984.49	4270432.08	140.79	140.79
DISCCART	691984.49	4270532.08	140.90	140.90
DISCCART	691984.49	4270632.08	141.12	141.12
DISCCART	691984.49	4270732.08	141.39	141.39
DISCCART	691984.49	4270832.08	140.06	140.06
DISCCART	691984.49	4270932.08	141.53	141.53
DISCCART	691984.49	4271032.08	140.31	144.50
DISCCART	691984.49	4271132.08	141.45	141.45
DISCCART	691984.49	4271232.08	141.57	141.57
DISCCART	691984.49	4271332.08	142.02	142.02
DISCCART	691984.49	4271432.08	141.89	141.89
DISCCART	691984.49	4271532.08	141.69	141.69
DISCCART	691984.49	4271632.08	141.80	141.80
DISCCART	691984.49	4271732.08	141.93	141.93
DISCCART	691984.49	4271832.08	142.53	142.53
DISCCART	691984.49	4271932.08	142.22	142.22
DISCCART	691984.49	4272032.08	142.24	142.24
DISCCART	691984.49	4272132.08	142.07	142.07
DISCCART	691984.49	4272232.08	142.20	142.20
DISCCART	691984.49	4272332.08	142.31	142.31
DISCCART	691984.49	4272432.08	142.43	142.43
DISCCART	691984.49	4272532.08	142.50	142.50
DISCCART	691984.49	4272632.08	142.26	142.26
DISCCART	691984.49	4272732.08	142.30	142.30
DISCCART	691984.49	4272832.08	142.75	142.75
DISCCART	691984.49	4272932.08	142.87	142.87
DISCCART	692084.49	4268032.08	188.64	245.05
DISCCART	692084.49	4267932.08	222.10	222.76
DISCCART	692084.49	4267832.08	201.10	245.05
DISCCART	692084.49	4267732.08	180.94	245.29
DISCCART	692084.49	4267632.08	169.35	246.15
DISCCART	692084.49	4267532.08	164.74	250.82
DISCCART	692084.49	4267432.08	168.39	250.82
DISCCART	692084.49	4267332.08	170.44	252.22
DISCCART	692084.49	4267232.08	172.33	254.28
DISCCART	692084.49	4267132.08	181.33	254.04
DISCCART	692084.49	4267032.08	182.88	256.93
DISCCART	692084.49	4266932.08	190.36	256.93
DISCCART	692084.49	4266832.08	209.82	248.07
DISCCART	692084.49	4266732.08	212.86	248.07
DISCCART	692084.49	4266632.08	213.61	248.07
DISCCART	692084.49	4268132.08	179.60	245.05
DISCCART	692084.49	4268232.08	177.00	245.05
DISCCART	692084.49	4268332.08	183.00	245.05
DISCCART	692084.49	4268432.08	175.49	245.05
DISCCART	692084.49	4268532.08	160.89	245.05
DISCCART	692084.49	4268632.08	157.41	245.05
DISCCART	692084.49	4268732.08	159.29	245.05
DISCCART	692084.49	4268832.08	150.95	245.05
DISCCART	692084.49	4268932.08	158.99	228.44
DISCCART	692084.49	4269032.08	159.72	220.63

DISCCART	692084.49	4269132.08	156.80	205.80
DISCCART	692084.49	4269232.08	162.70	203.31
DISCCART	692084.49	4269332.08	164.06	203.31
DISCCART	692084.49	4269432.08	160.58	203.31
DISCCART	692084.49	4269532.08	154.56	203.31
DISCCART	692084.49	4269632.08	157.61	203.31
DISCCART	692084.49	4269732.08	158.69	158.69
DISCCART	692084.49	4269832.08	142.40	203.31
DISCCART	692084.49	4269932.08	146.35	156.50
DISCCART	692084.49	4270032.08	142.43	147.41
DISCCART	692084.49	4270132.08	141.25	141.25
DISCCART	692084.49	4270232.08	140.05	140.05
DISCCART	692084.49	4270332.08	140.51	140.51
DISCCART	692084.49	4270432.08	140.47	140.47
DISCCART	692084.49	4270532.08	140.56	140.56
DISCCART	692084.49	4270632.08	140.88	140.88
DISCCART	692084.49	4270732.08	141.31	141.31
DISCCART	692084.49	4270832.08	140.66	140.66
DISCCART	692084.49	4270932.08	141.21	141.21
DISCCART	692084.49	4271032.08	140.97	140.97
DISCCART	692084.49	4271132.08	141.60	141.60
DISCCART	692084.49	4271232.08	141.46	141.46
DISCCART	692084.49	4271332.08	141.93	141.93
DISCCART	692084.49	4271432.08	141.69	141.69
DISCCART	692084.49	4271532.08	142.07	142.07
DISCCART	692084.49	4271632.08	141.55	143.31
DISCCART	692084.49	4271732.08	141.86	141.86
DISCCART	692084.49	4271832.08	141.92	141.92
DISCCART	692084.49	4271932.08	141.90	141.90
DISCCART	692084.49	4272032.08	141.87	141.87
DISCCART	692084.49	4272132.08	141.92	141.92
DISCCART	692084.49	4272232.08	142.37	142.37
DISCCART	692084.49	4272332.08	142.35	142.35
DISCCART	692084.49	4272432.08	142.47	142.47
DISCCART	692084.49	4272532.08	142.55	142.55
DISCCART	692084.49	4272632.08	142.09	142.09
DISCCART	692084.49	4272732.08	142.19	142.19
DISCCART	692084.49	4272832.08	142.62	142.62
DISCCART	692084.49	4272932.08	142.65	142.65
DISCCART	692184.49	4268032.08	195.25	245.05
DISCCART	692184.49	4267932.08	225.16	238.21
DISCCART	692184.49	4267832.08	206.19	245.05
DISCCART	692184.49	4267732.08	187.47	245.05
DISCCART	692184.49	4267632.08	174.16	245.73
DISCCART	692184.49	4267532.08	165.35	245.95
DISCCART	692184.49	4267432.08	169.58	247.78
DISCCART	692184.49	4267332.08	179.52	247.78
DISCCART	692184.49	4267232.08	187.05	248.07
DISCCART	692184.49	4267132.08	189.22	248.07
DISCCART	692184.49	4267032.08	189.92	248.07
DISCCART	692184.49	4266932.08	192.41	248.07
DISCCART	692184.49	4266832.08	205.88	248.07
DISCCART	692184.49	4266732.08	234.76	248.07
DISCCART	692184.49	4266632.08	243.69	248.07
DISCCART	692184.49	4268132.08	205.65	245.05
DISCCART	692184.49	4268232.08	202.76	245.05
DISCCART	692184.49	4268332.08	213.87	245.05
DISCCART	692184.49	4268432.08	196.72	245.05
DISCCART	692184.49	4268532.08	173.70	245.05
DISCCART	692184.49	4268632.08	158.21	245.05
DISCCART	692184.49	4268732.08	156.53	245.05
DISCCART	692184.49	4268832.08	153.94	245.05
DISCCART	692184.49	4268932.08	149.46	245.05
DISCCART	692184.49	4269032.08	147.55	245.05
DISCCART	692184.49	4269132.08	160.38	220.63
DISCCART	692184.49	4269232.08	154.27	220.63

DISCCART	692184.49	4269332.08	157.33	203.10
DISCCART	692184.49	4269432.08	160.36	160.36
DISCCART	692184.49	4269532.08	159.33	161.32
DISCCART	692184.49	4269632.08	150.18	203.31
DISCCART	692184.49	4269732.08	142.87	203.31
DISCCART	692184.49	4269832.08	142.95	159.99
DISCCART	692184.49	4269932.08	144.94	148.28
DISCCART	692184.49	4270032.08	144.05	144.81
DISCCART	692184.49	4270132.08	140.86	140.86
DISCCART	692184.49	4270232.08	140.74	140.74
DISCCART	692184.49	4270332.08	140.38	140.38
DISCCART	692184.49	4270432.08	140.18	140.18
DISCCART	692184.49	4270532.08	140.25	140.25
DISCCART	692184.49	4270632.08	140.46	140.46
DISCCART	692184.49	4270732.08	140.78	140.78
DISCCART	692184.49	4270832.08	140.57	140.57
DISCCART	692184.49	4270932.08	141.75	144.46
DISCCART	692184.49	4271032.08	141.49	141.49
DISCCART	692184.49	4271132.08	141.61	141.61
DISCCART	692184.49	4271232.08	141.81	141.81
DISCCART	692184.49	4271332.08	141.97	141.97
DISCCART	692184.49	4271432.08	141.52	141.52
DISCCART	692184.49	4271532.08	142.29	142.29
DISCCART	692184.49	4271632.08	141.84	141.84
DISCCART	692184.49	4271732.08	141.90	141.90
DISCCART	692184.49	4271832.08	141.67	141.67
DISCCART	692184.49	4271932.08	141.51	141.51
DISCCART	692184.49	4272032.08	141.93	141.93
DISCCART	692184.49	4272132.08	141.90	141.90
DISCCART	692184.49	4272232.08	141.85	141.85
DISCCART	692184.49	4272332.08	142.42	142.42
DISCCART	692184.49	4272432.08	142.51	142.51
DISCCART	692184.49	4272532.08	142.49	142.49
DISCCART	692184.49	4272632.08	142.22	142.22
DISCCART	692184.49	4272732.08	142.25	142.25
DISCCART	692184.49	4272832.08	142.27	142.27
DISCCART	692184.49	4272932.08	142.24	142.24
DISCCART	692284.49	4268032.08	228.47	245.05
DISCCART	692284.49	4267932.08	231.17	238.21
DISCCART	692284.49	4267832.08	210.26	245.05
DISCCART	692284.49	4267732.08	185.15	245.05
DISCCART	692284.49	4267632.08	171.70	245.73
DISCCART	692284.49	4267532.08	162.90	245.73
DISCCART	692284.49	4267432.08	192.85	245.73
DISCCART	692284.49	4267332.08	208.11	245.02
DISCCART	692284.49	4267232.08	215.51	245.73
DISCCART	692284.49	4267132.08	218.23	245.73
DISCCART	692284.49	4267032.08	217.25	245.73
DISCCART	692284.49	4266932.08	217.72	247.78
DISCCART	692284.49	4266832.08	225.00	248.07
DISCCART	692284.49	4266732.08	233.87	248.07
DISCCART	692284.49	4266632.08	230.46	248.07
DISCCART	692284.49	4268132.08	236.07	245.05
DISCCART	692284.49	4268232.08	228.84	245.05
DISCCART	692284.49	4268332.08	213.25	245.05
DISCCART	692284.49	4268432.08	191.40	245.05
DISCCART	692284.49	4268532.08	166.00	245.05
DISCCART	692284.49	4268632.08	159.68	245.05
DISCCART	692284.49	4268732.08	164.14	245.05
DISCCART	692284.49	4268832.08	156.94	245.05
DISCCART	692284.49	4268932.08	153.52	245.05
DISCCART	692284.49	4269032.08	150.57	244.35
DISCCART	692284.49	4269132.08	151.95	220.63
DISCCART	692284.49	4269232.08	150.63	220.63
DISCCART	692284.49	4269332.08	150.87	220.63
DISCCART	692284.49	4269432.08	152.78	159.56

DISCCART	692284.49	4269532.08	140.94	203.31
DISCCART	692284.49	4269632.08	142.79	203.31
DISCCART	692284.49	4269732.08	146.64	146.64
DISCCART	692284.49	4269832.08	145.98	147.26
DISCCART	692284.49	4269932.08	145.35	148.19
DISCCART	692284.49	4270032.08	143.10	145.31
DISCCART	692284.49	4270132.08	140.97	140.97
DISCCART	692284.49	4270232.08	140.41	211.02
DISCCART	692284.49	4270332.08	140.47	211.02
DISCCART	692284.49	4270432.08	140.19	211.02
DISCCART	692284.49	4270532.08	140.17	211.02
DISCCART	692284.49	4270632.08	140.34	211.02
DISCCART	692284.49	4270732.08	140.57	211.02
DISCCART	692284.49	4270832.08	140.78	140.78
DISCCART	692284.49	4270932.08	140.13	144.46
DISCCART	692284.49	4271032.08	141.44	141.44
DISCCART	692284.49	4271132.08	141.72	141.72
DISCCART	692284.49	4271232.08	141.82	141.82
DISCCART	692284.49	4271332.08	141.81	141.81
DISCCART	692284.49	4271432.08	141.62	141.62
DISCCART	692284.49	4271532.08	141.52	141.52
DISCCART	692284.49	4271632.08	141.54	141.54
DISCCART	692284.49	4271732.08	141.59	141.59
DISCCART	692284.49	4271832.08	141.73	141.73
DISCCART	692284.49	4271932.08	141.81	141.81
DISCCART	692284.49	4272032.08	141.48	141.48
DISCCART	692284.49	4272132.08	141.81	141.81
DISCCART	692284.49	4272232.08	142.37	142.37
DISCCART	692284.49	4272332.08	142.26	142.26
DISCCART	692284.49	4272432.08	142.34	142.34
DISCCART	692284.49	4272532.08	142.30	142.30
DISCCART	692284.49	4272632.08	142.31	142.31
DISCCART	692284.49	4272732.08	141.70	141.70
DISCCART	692284.49	4272832.08	141.84	141.84
DISCCART	692284.49	4272932.08	141.92	141.92
DISCCART	692384.49	4268032.08	228.95	245.05
DISCCART	692384.49	4267932.08	208.99	245.05
DISCCART	692384.49	4267832.08	193.45	245.05
DISCCART	692384.49	4267732.08	178.74	245.05
DISCCART	692384.49	4267632.08	167.46	245.73
DISCCART	692384.49	4267532.08	161.72	245.73
DISCCART	692384.49	4267432.08	175.21	245.73
DISCCART	692384.49	4267332.08	190.70	245.73
DISCCART	692384.49	4267232.08	198.04	245.73
DISCCART	692384.49	4267132.08	226.15	245.73
DISCCART	692384.49	4267032.08	232.74	245.73
DISCCART	692384.49	4266932.08	244.00	245.73
DISCCART	692384.49	4266832.08	226.02	245.73
DISCCART	692384.49	4266732.08	199.41	248.07
DISCCART	692384.49	4266632.08	194.46	248.07
DISCCART	692384.49	4268132.08	224.55	245.05
DISCCART	692384.49	4268232.08	207.69	245.05
DISCCART	692384.49	4268332.08	191.01	245.05
DISCCART	692384.49	4268432.08	167.34	245.05
DISCCART	692384.49	4268532.08	162.10	245.05
DISCCART	692384.49	4268632.08	167.64	245.05
DISCCART	692384.49	4268732.08	172.33	245.05
DISCCART	692384.49	4268832.08	166.86	245.05
DISCCART	692384.49	4268932.08	158.53	245.05
DISCCART	692384.49	4269032.08	153.41	228.44
DISCCART	692384.49	4269132.08	151.14	220.63
DISCCART	692384.49	4269232.08	148.36	220.63
DISCCART	692384.49	4269332.08	145.09	220.63
DISCCART	692384.49	4269432.08	146.25	220.63
DISCCART	692384.49	4269532.08	145.58	148.83
DISCCART	692384.49	4269632.08	141.95	149.16

DISCCART	692384.49	4269732.08	147.32	147.32
DISCCART	692384.49	4269832.08	148.53	148.53
DISCCART	692384.49	4269932.08	143.76	149.14
DISCCART	692384.49	4270032.08	144.55	148.59
DISCCART	692384.49	4270132.08	141.33	211.71
DISCCART	692384.49	4270232.08	140.76	217.09
DISCCART	692384.49	4270332.08	140.70	220.74
DISCCART	692384.49	4270432.08	140.31	221.45
DISCCART	692384.49	4270532.08	140.21	221.45
DISCCART	692384.49	4270632.08	140.31	221.22
DISCCART	692384.49	4270732.08	140.21	217.09
DISCCART	692384.49	4270832.08	140.30	211.02
DISCCART	692384.49	4270932.08	140.24	202.96
DISCCART	692384.49	4271032.08	141.52	202.34
DISCCART	692384.49	4271132.08	141.60	141.60
DISCCART	692384.49	4271232.08	141.65	141.65
DISCCART	692384.49	4271332.08	141.68	141.68
DISCCART	692384.49	4271432.08	141.61	141.61
DISCCART	692384.49	4271532.08	142.34	142.34
DISCCART	692384.49	4271632.08	142.01	142.01
DISCCART	692384.49	4271732.08	141.47	141.47
DISCCART	692384.49	4271832.08	141.66	141.66
DISCCART	692384.49	4271932.08	141.72	141.72
DISCCART	692384.49	4272032.08	141.20	141.20
DISCCART	692384.49	4272132.08	142.10	142.10
DISCCART	692384.49	4272232.08	142.15	142.15
DISCCART	692384.49	4272332.08	142.38	142.38
DISCCART	692384.49	4272432.08	142.33	142.33
DISCCART	692384.49	4272532.08	141.93	141.93
DISCCART	692384.49	4272632.08	142.15	142.15
DISCCART	692384.49	4272732.08	141.01	141.01
DISCCART	692384.49	4272832.08	141.27	141.27
DISCCART	692384.49	4272932.08	141.51	141.51
DISCCART	692484.49	4268032.08	226.16	245.05
DISCCART	692484.49	4267932.08	190.63	245.05
DISCCART	692484.49	4267832.08	183.08	245.05
DISCCART	692484.49	4267732.08	178.42	245.05
DISCCART	692484.49	4267632.08	173.74	245.73
DISCCART	692484.49	4267532.08	163.48	245.73
DISCCART	692484.49	4267432.08	160.73	248.07
DISCCART	692484.49	4267332.08	171.38	248.07
DISCCART	692484.49	4267232.08	202.90	245.73
DISCCART	692484.49	4267132.08	198.01	245.73
DISCCART	692484.49	4267032.08	211.39	245.73
DISCCART	692484.49	4266932.08	211.75	245.73
DISCCART	692484.49	4266832.08	202.02	248.07
DISCCART	692484.49	4266732.08	182.71	248.07
DISCCART	692484.49	4266632.08	214.87	248.07
DISCCART	692484.49	4268132.08	222.79	245.05
DISCCART	692484.49	4268232.08	181.23	245.05
DISCCART	692484.49	4268332.08	171.80	245.05
DISCCART	692484.49	4268432.08	174.65	245.05
DISCCART	692484.49	4268532.08	177.09	245.05
DISCCART	692484.49	4268632.08	183.34	245.05
DISCCART	692484.49	4268732.08	184.50	220.63
DISCCART	692484.49	4268832.08	182.17	220.63
DISCCART	692484.49	4268932.08	165.34	220.63
DISCCART	692484.49	4269032.08	158.07	220.63
DISCCART	692484.49	4269132.08	159.54	220.63
DISCCART	692484.49	4269232.08	147.41	220.63
DISCCART	692484.49	4269332.08	146.27	220.63
DISCCART	692484.49	4269432.08	147.72	220.63
DISCCART	692484.49	4269532.08	146.39	228.99
DISCCART	692484.49	4269632.08	147.44	232.87
DISCCART	692484.49	4269732.08	148.16	229.16
DISCCART	692484.49	4269832.08	150.09	227.92

DISCCART	692484.49	4269932.08	149.50	167.15
DISCCART	692484.49	4270032.08	148.02	211.02
DISCCART	692484.49	4270132.08	140.23	228.36
DISCCART	692484.49	4270232.08	141.26	221.45
DISCCART	692484.49	4270332.08	140.45	221.45
DISCCART	692484.49	4270432.08	140.67	221.45
DISCCART	692484.49	4270532.08	140.36	221.45
DISCCART	692484.49	4270632.08	140.40	221.45
DISCCART	692484.49	4270732.08	139.88	221.45
DISCCART	692484.49	4270832.08	140.16	221.45
DISCCART	692484.49	4270932.08	140.67	214.37
DISCCART	692484.49	4271032.08	141.44	205.40
DISCCART	692484.49	4271132.08	141.72	205.40
DISCCART	692484.49	4271232.08	141.70	205.40
DISCCART	692484.49	4271332.08	141.54	205.29
DISCCART	692484.49	4271432.08	141.64	205.26
DISCCART	692484.49	4271532.08	141.30	141.30
DISCCART	692484.49	4271632.08	141.48	141.48
DISCCART	692484.49	4271732.08	141.13	141.13
DISCCART	692484.49	4271832.08	140.76	140.76
DISCCART	692484.49	4271932.08	141.45	141.45
DISCCART	692484.49	4272032.08	141.71	141.71
DISCCART	692484.49	4272132.08	141.92	141.92
DISCCART	692484.49	4272232.08	142.43	142.43
DISCCART	692484.49	4272332.08	142.42	142.42
DISCCART	692484.49	4272432.08	142.46	142.46
DISCCART	692484.49	4272532.08	142.23	142.23
DISCCART	692484.49	4272632.08	142.38	142.38
DISCCART	692484.49	4272732.08	141.30	141.30
DISCCART	692484.49	4272832.08	141.57	141.57
DISCCART	692484.49	4272932.08	141.32	141.32
DISCCART	692584.49	4268032.08	211.53	245.05
DISCCART	692584.49	4267932.08	217.75	239.07
DISCCART	692584.49	4267832.08	211.05	239.07
DISCCART	692584.49	4267732.08	198.24	245.05
DISCCART	692584.49	4267632.08	182.82	245.05
DISCCART	692584.49	4267532.08	167.68	245.73
DISCCART	692584.49	4267432.08	160.22	247.78
DISCCART	692584.49	4267332.08	183.36	245.73
DISCCART	692584.49	4267232.08	202.15	245.73
DISCCART	692584.49	4267132.08	176.86	248.07
DISCCART	692584.49	4267032.08	195.27	247.03
DISCCART	692584.49	4266932.08	184.82	248.07
DISCCART	692584.49	4266832.08	176.74	248.07
DISCCART	692584.49	4266732.08	193.00	248.07
DISCCART	692584.49	4266632.08	228.52	243.79
DISCCART	692584.49	4268132.08	222.26	239.07
DISCCART	692584.49	4268232.08	214.75	245.05
DISCCART	692584.49	4268332.08	197.87	245.05
DISCCART	692584.49	4268432.08	192.43	245.05
DISCCART	692584.49	4268532.08	197.30	220.63
DISCCART	692584.49	4268632.08	204.64	220.63
DISCCART	692584.49	4268732.08	215.98	220.63
DISCCART	692584.49	4268832.08	194.92	220.63
DISCCART	692584.49	4268932.08	171.86	220.63
DISCCART	692584.49	4269032.08	166.16	220.63
DISCCART	692584.49	4269132.08	159.50	220.63
DISCCART	692584.49	4269232.08	145.83	220.63
DISCCART	692584.49	4269332.08	146.25	233.24
DISCCART	692584.49	4269432.08	145.47	233.24
DISCCART	692584.49	4269532.08	143.22	233.24
DISCCART	692584.49	4269632.08	142.85	233.24
DISCCART	692584.49	4269732.08	158.74	228.99
DISCCART	692584.49	4269832.08	161.41	167.46
DISCCART	692584.49	4269932.08	153.96	233.16
DISCCART	692584.49	4270032.08	150.72	233.16

DISCCART	692584.49	4270132.08	148.71	228.59
DISCCART	692584.49	4270232.08	141.69	232.87
DISCCART	692584.49	4270332.08	143.15	226.54
DISCCART	692584.49	4270432.08	140.67	226.54
DISCCART	692584.49	4270532.08	140.24	226.54
DISCCART	692584.49	4270632.08	140.10	226.54
DISCCART	692584.49	4270732.08	140.28	224.35
DISCCART	692584.49	4270832.08	139.97	224.35
DISCCART	692584.49	4270932.08	140.52	224.35
DISCCART	692584.49	4271032.08	140.83	224.35
DISCCART	692584.49	4271132.08	141.02	224.35
DISCCART	692584.49	4271232.08	141.65	223.67
DISCCART	692584.49	4271332.08	141.61	205.40
DISCCART	692584.49	4271432.08	141.65	205.29
DISCCART	692584.49	4271532.08	141.10	205.29
DISCCART	692584.49	4271632.08	141.63	232.10
DISCCART	692584.49	4271732.08	140.71	232.10
DISCCART	692584.49	4271832.08	140.51	232.10
DISCCART	692584.49	4271932.08	141.42	232.10
DISCCART	692584.49	4272032.08	143.03	143.03
DISCCART	692584.49	4272132.08	143.02	143.02
DISCCART	692584.49	4272232.08	143.30	143.30
DISCCART	692584.49	4272332.08	142.40	142.40
DISCCART	692584.49	4272432.08	142.24	142.24
DISCCART	692584.49	4272532.08	142.32	142.32
DISCCART	692584.49	4272632.08	142.41	142.41
DISCCART	692584.49	4272732.08	142.17	142.17
DISCCART	692584.49	4272832.08	141.34	141.34
DISCCART	692584.49	4272932.08	141.10	141.10
DISCCART	686234.49	4266382.08	202.32	202.32
DISCCART	686234.49	4266132.08	187.01	197.45
DISCCART	686234.49	4265882.08	197.72	197.72
DISCCART	686234.49	4265632.08	197.59	197.59
DISCCART	686234.49	4265382.08	175.82	197.27
DISCCART	686234.49	4265132.08	171.34	198.23
DISCCART	686234.49	4264882.08	175.21	184.26
DISCCART	686234.49	4264632.08	161.08	161.08
DISCCART	686234.49	4264382.08	174.64	184.99
DISCCART	686234.49	4264132.08	169.34	191.28
DISCCART	686234.49	4263882.08	184.83	189.10
DISCCART	686234.49	4266632.08	187.99	193.45
DISCCART	686234.49	4266882.08	175.26	183.54
DISCCART	686234.49	4267132.08	163.49	185.64
DISCCART	686234.49	4267382.08	172.00	183.11
DISCCART	686234.49	4267632.08	176.96	176.96
DISCCART	686234.49	4267882.08	144.39	189.85
DISCCART	686234.49	4268132.08	143.05	178.83
DISCCART	686234.49	4268382.08	143.22	143.22
DISCCART	686234.49	4268632.08	143.49	143.49
DISCCART	686234.49	4268882.08	143.60	143.60
DISCCART	686234.49	4269132.08	144.58	144.58
DISCCART	686234.49	4269382.08	142.59	144.80
DISCCART	686234.49	4269632.08	138.83	144.53
DISCCART	686234.49	4269882.08	138.83	138.83
DISCCART	686234.49	4270132.08	144.57	144.57
DISCCART	686234.49	4270382.08	143.69	143.69
DISCCART	686234.49	4270632.08	143.46	143.46
DISCCART	686234.49	4270882.08	142.64	142.64
DISCCART	686234.49	4271132.08	142.60	142.60
DISCCART	686234.49	4271382.08	141.53	170.41
DISCCART	686234.49	4271632.08	159.65	170.54
DISCCART	686234.49	4271882.08	162.57	166.16
DISCCART	686234.49	4272132.08	164.11	164.11
DISCCART	686234.49	4272382.08	171.49	259.59
DISCCART	686234.49	4272632.08	165.31	266.77
DISCCART	686234.49	4272882.08	169.40	266.77

DISCCART	686234.49	4273132.08	174.60	266.77
DISCCART	686234.49	4273382.08	192.17	266.77
DISCCART	686234.49	4273632.08	209.81	266.77
DISCCART	686234.49	4273882.08	202.09	266.77
DISCCART	686234.49	4274132.08	254.69	257.44
DISCCART	686234.49	4274382.08	231.34	261.17
DISCCART	686234.49	4274632.08	248.84	259.30
DISCCART	686234.49	4274882.08	214.13	266.41
DISCCART	686234.49	4275132.08	247.19	257.09
DISCCART	686234.49	4275382.08	216.82	263.43
DISCCART	686234.49	4275632.08	248.65	254.20
DISCCART	685984.49	4266382.08	182.94	200.03
DISCCART	685984.49	4266132.08	179.88	190.40
DISCCART	685984.49	4265882.08	178.00	196.87
DISCCART	685984.49	4265632.08	198.20	198.20
DISCCART	685984.49	4265382.08	192.19	192.19
DISCCART	685984.49	4265132.08	198.17	198.17
DISCCART	685984.49	4264882.08	187.85	188.47
DISCCART	685984.49	4264632.08	170.17	190.66
DISCCART	685984.49	4264382.08	160.67	160.67
DISCCART	685984.49	4264132.08	178.11	184.18
DISCCART	685984.49	4263882.08	164.85	189.61
DISCCART	685984.49	4266632.08	195.62	195.62
DISCCART	685984.49	4266882.08	175.58	198.14
DISCCART	685984.49	4267132.08	172.70	190.20
DISCCART	685984.49	4267382.08	173.10	191.01
DISCCART	685984.49	4267632.08	184.27	186.77
DISCCART	685984.49	4267882.08	143.97	191.11
DISCCART	685984.49	4268132.08	143.76	143.76
DISCCART	685984.49	4268382.08	143.56	143.56
DISCCART	685984.49	4268632.08	144.14	146.06
DISCCART	685984.49	4268882.08	144.17	144.17
DISCCART	685984.49	4269132.08	144.70	144.70
DISCCART	685984.49	4269382.08	139.87	144.83
DISCCART	685984.49	4269632.08	138.83	138.83
DISCCART	685984.49	4269882.08	138.83	138.83
DISCCART	685984.49	4270132.08	145.58	146.51
DISCCART	685984.49	4270382.08	143.33	143.33
DISCCART	685984.49	4270632.08	142.90	142.90
DISCCART	685984.49	4270882.08	142.97	142.97
DISCCART	685984.49	4271132.08	142.23	142.23
DISCCART	685984.49	4271382.08	141.95	141.95
DISCCART	685984.49	4271632.08	147.96	170.46
DISCCART	685984.49	4271882.08	160.22	165.35
DISCCART	685984.49	4272132.08	161.95	166.50
DISCCART	685984.49	4272382.08	158.80	259.59
DISCCART	685984.49	4272632.08	163.69	259.59
DISCCART	685984.49	4272882.08	173.36	266.77
DISCCART	685984.49	4273132.08	185.81	266.77
DISCCART	685984.49	4273382.08	182.21	266.77
DISCCART	685984.49	4273632.08	174.29	266.77
DISCCART	685984.49	4273882.08	197.41	265.93
DISCCART	685984.49	4274132.08	198.78	266.41
DISCCART	685984.49	4274382.08	247.65	251.68
DISCCART	685984.49	4274632.08	260.16	264.20
DISCCART	685984.49	4274882.08	231.98	266.41
DISCCART	685984.49	4275132.08	251.89	263.09
DISCCART	685984.49	4275382.08	258.38	258.38
DISCCART	685984.49	4275632.08	243.30	260.69
DISCCART	685734.49	4266382.08	188.74	188.74
DISCCART	685734.49	4266132.08	162.10	192.47
DISCCART	685734.49	4265882.08	188.84	189.31
DISCCART	685734.49	4265632.08	191.11	191.11
DISCCART	685734.49	4265382.08	183.29	183.29
DISCCART	685734.49	4265132.08	182.99	196.11
DISCCART	685734.49	4264882.08	181.75	197.52

DISCCART	685734.49	4264632.08	189.28	189.28
DISCCART	685734.49	4264382.08	170.53	177.22
DISCCART	685734.49	4264132.08	163.80	197.23
DISCCART	685734.49	4263882.08	166.95	166.95
DISCCART	685734.49	4266632.08	196.32	196.32
DISCCART	685734.49	4266882.08	195.71	195.71
DISCCART	685734.49	4267132.08	185.99	185.99
DISCCART	685734.49	4267382.08	179.05	191.11
DISCCART	685734.49	4267632.08	160.73	191.11
DISCCART	685734.49	4267882.08	143.64	191.11
DISCCART	685734.49	4268132.08	143.65	143.65
DISCCART	685734.49	4268382.08	143.81	143.81
DISCCART	685734.49	4268632.08	144.22	144.22
DISCCART	685734.49	4268882.08	144.69	144.69
DISCCART	685734.49	4269132.08	144.16	144.55
DISCCART	685734.49	4269382.08	144.77	144.77
DISCCART	685734.49	4269632.08	138.83	138.83
DISCCART	685734.49	4269882.08	138.83	145.77
DISCCART	685734.49	4270132.08	144.52	144.52
DISCCART	685734.49	4270382.08	143.69	143.69
DISCCART	685734.49	4270632.08	143.34	143.34
DISCCART	685734.49	4270882.08	142.53	142.53
DISCCART	685734.49	4271132.08	142.32	142.32
DISCCART	685734.49	4271382.08	142.36	142.36
DISCCART	685734.49	4271632.08	158.83	162.88
DISCCART	685734.49	4271882.08	145.82	166.92
DISCCART	685734.49	4272132.08	150.57	165.79
DISCCART	685734.49	4272382.08	148.05	161.65
DISCCART	685734.49	4272632.08	159.41	162.66
DISCCART	685734.49	4272882.08	165.79	220.14
DISCCART	685734.49	4273132.08	167.33	266.59
DISCCART	685734.49	4273382.08	164.42	266.77
DISCCART	685734.49	4273632.08	166.49	266.77
DISCCART	685734.49	4273882.08	174.68	266.41
DISCCART	685734.49	4274132.08	195.58	266.41
DISCCART	685734.49	4274382.08	211.91	266.41
DISCCART	685734.49	4274632.08	264.00	264.00
DISCCART	685734.49	4274882.08	252.33	259.69
DISCCART	685734.49	4275132.08	256.24	257.79
DISCCART	685734.49	4275382.08	236.90	260.70
DISCCART	685734.49	4275632.08	244.02	260.69
DISCCART	685484.49	4266382.08	176.39	176.56
DISCCART	685484.49	4266132.08	161.82	184.96
DISCCART	685484.49	4265882.08	169.63	185.40
DISCCART	685484.49	4265632.08	170.87	184.66
DISCCART	685484.49	4265382.08	173.10	179.37
DISCCART	685484.49	4265132.08	180.83	196.26
DISCCART	685484.49	4264882.08	192.96	209.05
DISCCART	685484.49	4264632.08	189.39	209.05
DISCCART	685484.49	4264382.08	170.47	197.73
DISCCART	685484.49	4264132.08	194.81	196.09
DISCCART	685484.49	4263882.08	176.20	184.40
DISCCART	685484.49	4266632.08	177.76	190.03
DISCCART	685484.49	4266882.08	189.68	189.68
DISCCART	685484.49	4267132.08	178.10	184.89
DISCCART	685484.49	4267382.08	169.02	190.21
DISCCART	685484.49	4267632.08	144.53	192.59
DISCCART	685484.49	4267882.08	143.17	187.24
DISCCART	685484.49	4268132.08	143.13	143.13
DISCCART	685484.49	4268382.08	144.03	144.03
DISCCART	685484.49	4268632.08	144.86	144.86
DISCCART	685484.49	4268882.08	139.37	145.29
DISCCART	685484.49	4269132.08	144.76	144.76
DISCCART	685484.49	4269382.08	138.83	138.83
DISCCART	685484.49	4269632.08	138.83	138.83
DISCCART	685484.49	4269882.08	146.12	147.07

DISCCART	685484.49	4270132.08	143.59	143.59
DISCCART	685484.49	4270382.08	143.29	143.29
DISCCART	685484.49	4270632.08	143.12	143.12
DISCCART	685484.49	4270882.08	142.79	142.79
DISCCART	685484.49	4271132.08	142.11	142.11
DISCCART	685484.49	4271382.08	147.12	169.26
DISCCART	685484.49	4271632.08	160.04	174.12
DISCCART	685484.49	4271882.08	159.55	159.55
DISCCART	685484.49	4272132.08	164.56	164.56
DISCCART	685484.49	4272382.08	166.78	237.81
DISCCART	685484.49	4272632.08	152.22	244.10
DISCCART	685484.49	4272882.08	155.97	238.58
DISCCART	685484.49	4273132.08	156.90	238.58
DISCCART	685484.49	4273382.08	164.75	239.54
DISCCART	685484.49	4273632.08	161.13	265.67
DISCCART	685484.49	4273882.08	170.71	266.41
DISCCART	685484.49	4274132.08	193.76	266.41
DISCCART	685484.49	4274382.08	200.45	266.41
DISCCART	685484.49	4274632.08	256.55	263.65
DISCCART	685484.49	4274882.08	227.55	265.67
DISCCART	685484.49	4275132.08	209.79	265.67
DISCCART	685484.49	4275382.08	198.30	263.43
DISCCART	685484.49	4275632.08	211.76	260.69
DISCCART	685234.49	4266382.08	159.15	180.40
DISCCART	685234.49	4266132.08	153.85	196.80
DISCCART	685234.49	4265882.08	169.22	177.48
DISCCART	685234.49	4265632.08	176.86	176.86
DISCCART	685234.49	4265382.08	174.58	179.47
DISCCART	685234.49	4265132.08	186.92	186.92
DISCCART	685234.49	4264882.08	201.32	201.32
DISCCART	685234.49	4264632.08	194.68	206.76
DISCCART	685234.49	4264382.08	177.32	214.97
DISCCART	685234.49	4264132.08	186.80	214.89
DISCCART	685234.49	4263882.08	196.48	201.49
DISCCART	685234.49	4266632.08	171.69	177.18
DISCCART	685234.49	4266882.08	170.71	185.11
DISCCART	685234.49	4267132.08	174.45	191.99
DISCCART	685234.49	4267382.08	186.48	191.93
DISCCART	685234.49	4267632.08	143.16	192.59
DISCCART	685234.49	4267882.08	142.97	187.24
DISCCART	685234.49	4268132.08	143.04	143.04
DISCCART	685234.49	4268382.08	145.01	145.08
DISCCART	685234.49	4268632.08	144.29	144.29
DISCCART	685234.49	4268882.08	144.11	144.11
DISCCART	685234.49	4269132.08	138.89	145.64
DISCCART	685234.49	4269382.08	138.82	138.82
DISCCART	685234.49	4269632.08	144.26	145.64
DISCCART	685234.49	4269882.08	143.86	143.86
DISCCART	685234.49	4270132.08	143.38	143.38
DISCCART	685234.49	4270382.08	143.04	143.04
DISCCART	685234.49	4270632.08	142.95	142.95
DISCCART	685234.49	4270882.08	142.49	142.49
DISCCART	685234.49	4271132.08	142.76	177.24
DISCCART	685234.49	4271382.08	163.67	181.06
DISCCART	685234.49	4271632.08	178.11	196.73
DISCCART	685234.49	4271882.08	167.51	197.44
DISCCART	685234.49	4272132.08	164.54	237.81
DISCCART	685234.49	4272382.08	182.40	237.81
DISCCART	685234.49	4272632.08	166.07	244.10
DISCCART	685234.49	4272882.08	163.95	244.10
DISCCART	685234.49	4273132.08	170.18	244.10
DISCCART	685234.49	4273382.08	168.88	239.54
DISCCART	685234.49	4273632.08	197.78	239.54
DISCCART	685234.49	4273882.08	177.91	265.67
DISCCART	685234.49	4274132.08	175.82	266.41
DISCCART	685234.49	4274382.08	188.93	266.41

DISCCART	685234.49	4274632.08	229.10	264.34
DISCCART	685234.49	4274882.08	248.98	262.54
DISCCART	685234.49	4275132.08	217.54	263.48
DISCCART	685234.49	4275382.08	238.98	245.61
DISCCART	685234.49	4275632.08	191.33	260.69
DISCCART	684984.49	4266382.08	177.63	196.38
DISCCART	684984.49	4266132.08	185.01	185.01
DISCCART	684984.49	4265882.08	171.39	201.51
DISCCART	684984.49	4265632.08	193.95	201.93
DISCCART	684984.49	4265382.08	189.07	200.78
DISCCART	684984.49	4265132.08	179.08	202.75
DISCCART	684984.49	4264882.08	178.18	203.55
DISCCART	684984.49	4264632.08	192.67	203.30
DISCCART	684984.49	4264382.08	199.21	213.26
DISCCART	684984.49	4264132.08	213.74	213.74
DISCCART	684984.49	4263882.08	191.22	210.05
DISCCART	684984.49	4266632.08	156.94	196.38
DISCCART	684984.49	4266882.08	153.04	174.11
DISCCART	684984.49	4267132.08	176.74	176.74
DISCCART	684984.49	4267382.08	153.64	192.59
DISCCART	684984.49	4267632.08	143.48	192.59
DISCCART	684984.49	4267882.08	142.96	142.96
DISCCART	684984.49	4268132.08	143.73	143.73
DISCCART	684984.49	4268382.08	144.46	144.46
DISCCART	684984.49	4268632.08	139.28	145.17
DISCCART	684984.49	4268882.08	144.18	144.18
DISCCART	684984.49	4269132.08	138.84	138.84
DISCCART	684984.49	4269382.08	138.84	138.84
DISCCART	684984.49	4269632.08	144.03	144.03
DISCCART	684984.49	4269882.08	143.53	143.53
DISCCART	684984.49	4270132.08	143.30	143.30
DISCCART	684984.49	4270382.08	142.94	142.94
DISCCART	684984.49	4270632.08	142.70	142.70
DISCCART	684984.49	4270882.08	143.26	143.26
DISCCART	684984.49	4271132.08	142.76	178.63
DISCCART	684984.49	4271382.08	163.87	182.10
DISCCART	684984.49	4271632.08	184.18	197.08
DISCCART	684984.49	4271882.08	192.62	194.00
DISCCART	684984.49	4272132.08	184.01	237.81
DISCCART	684984.49	4272382.08	185.81	244.10
DISCCART	684984.49	4272632.08	177.15	244.10
DISCCART	684984.49	4272882.08	186.02	244.10
DISCCART	684984.49	4273132.08	175.79	244.10
DISCCART	684984.49	4273382.08	186.96	239.54
DISCCART	684984.49	4273632.08	229.06	234.48
DISCCART	684984.49	4273882.08	229.04	239.54
DISCCART	684984.49	4274132.08	176.16	265.67
DISCCART	684984.49	4274382.08	195.61	264.34
DISCCART	684984.49	4274632.08	212.87	263.75
DISCCART	684984.49	4274882.08	245.23	261.72
DISCCART	684984.49	4275132.08	200.41	263.72
DISCCART	684984.49	4275382.08	192.04	262.62
DISCCART	684984.49	4275632.08	191.75	250.64
DISCCART	684734.49	4266382.08	174.73	198.14
DISCCART	684734.49	4266132.08	195.41	196.93
DISCCART	684734.49	4265882.08	189.07	194.62
DISCCART	684734.49	4265632.08	179.12	208.16
DISCCART	684734.49	4265382.08	195.95	207.53
DISCCART	684734.49	4265132.08	201.73	201.73
DISCCART	684734.49	4264882.08	188.32	188.32
DISCCART	684734.49	4264632.08	185.97	221.51
DISCCART	684734.49	4264382.08	209.13	220.12
DISCCART	684734.49	4264132.08	199.83	220.95
DISCCART	684734.49	4263882.08	196.88	196.88
DISCCART	684734.49	4266632.08	178.98	178.98
DISCCART	684734.49	4266882.08	147.18	183.20

DISCCART	684734.49	4267132.08	169.14	173.20
DISCCART	684734.49	4267382.08	143.90	192.59
DISCCART	684734.49	4267632.08	143.29	143.29
DISCCART	684734.49	4267882.08	143.11	143.11
DISCCART	684734.49	4268132.08	143.70	143.70
DISCCART	684734.49	4268382.08	144.71	144.71
DISCCART	684734.49	4268632.08	145.07	145.07
DISCCART	684734.49	4268882.08	138.91	138.91
DISCCART	684734.49	4269132.08	139.33	139.33
DISCCART	684734.49	4269382.08	144.31	144.31
DISCCART	684734.49	4269632.08	144.61	144.61
DISCCART	684734.49	4269882.08	143.50	143.50
DISCCART	684734.49	4270132.08	144.01	144.01
DISCCART	684734.49	4270382.08	143.08	143.08
DISCCART	684734.49	4270632.08	143.28	143.28
DISCCART	684734.49	4270882.08	142.88	142.88
DISCCART	684734.49	4271132.08	144.22	171.65
DISCCART	684734.49	4271382.08	169.55	169.55
DISCCART	684734.49	4271632.08	184.97	189.34
DISCCART	684734.49	4271882.08	171.08	237.81
DISCCART	684734.49	4272132.08	168.52	244.10
DISCCART	684734.49	4272382.08	193.99	244.10
DISCCART	684734.49	4272632.08	232.25	232.25
DISCCART	684734.49	4272882.08	207.42	244.10
DISCCART	684734.49	4273132.08	212.34	238.58
DISCCART	684734.49	4273382.08	202.94	238.58
DISCCART	684734.49	4273632.08	188.64	239.54
DISCCART	684734.49	4273882.08	232.59	239.38
DISCCART	684734.49	4274132.08	212.43	239.38
DISCCART	684734.49	4274382.08	221.44	258.27
DISCCART	684734.49	4274632.08	227.98	261.72
DISCCART	684734.49	4274882.08	234.26	261.72
DISCCART	684734.49	4275132.08	202.58	262.62
DISCCART	684734.49	4275382.08	233.34	239.90
DISCCART	684734.49	4275632.08	202.94	251.63
DISCCART	684484.49	4266382.08	179.37	182.79
DISCCART	684484.49	4266132.08	164.28	204.00
DISCCART	684484.49	4265882.08	177.01	207.69
DISCCART	684484.49	4265632.08	199.76	207.69
DISCCART	684484.49	4265382.08	198.88	208.07
DISCCART	684484.49	4265132.08	199.53	209.33
DISCCART	684484.49	4264882.08	195.21	221.32
DISCCART	684484.49	4264632.08	211.27	221.47
DISCCART	684484.49	4264382.08	206.08	221.30
DISCCART	684484.49	4264132.08	208.57	220.95
DISCCART	684484.49	4263882.08	193.11	220.03
DISCCART	684484.49	4266632.08	155.30	184.93
DISCCART	684484.49	4266882.08	155.62	178.44
DISCCART	684484.49	4267132.08	145.58	178.93
DISCCART	684484.49	4267382.08	145.00	176.66
DISCCART	684484.49	4267632.08	143.18	143.18
DISCCART	684484.49	4267882.08	143.45	146.43
DISCCART	684484.49	4268132.08	144.31	144.31
DISCCART	684484.49	4268382.08	145.17	145.17
DISCCART	684484.49	4268632.08	139.74	139.74
DISCCART	684484.49	4268882.08	139.22	139.22
DISCCART	684484.49	4269132.08	139.68	144.71
DISCCART	684484.49	4269382.08	145.42	146.84
DISCCART	684484.49	4269632.08	143.63	143.63
DISCCART	684484.49	4269882.08	144.38	144.38
DISCCART	684484.49	4270132.08	142.93	142.93
DISCCART	684484.49	4270382.08	143.46	143.46
DISCCART	684484.49	4270632.08	142.67	142.67
DISCCART	684484.49	4270882.08	143.54	143.54
DISCCART	684484.49	4271132.08	144.03	179.12
DISCCART	684484.49	4271382.08	164.73	164.73

DISCCART	684484.49	4271632.08	170.01	182.10
DISCCART	684484.49	4271882.08	164.62	237.81
DISCCART	684484.49	4272132.08	172.99	244.10
DISCCART	684484.49	4272382.08	190.96	244.10
DISCCART	684484.49	4272632.08	186.47	244.10
DISCCART	684484.49	4272882.08	213.02	244.10
DISCCART	684484.49	4273132.08	177.18	244.10
DISCCART	684484.49	4273382.08	178.69	244.10
DISCCART	684484.49	4273632.08	182.55	239.54
DISCCART	684484.49	4273882.08	189.60	239.54
DISCCART	684484.49	4274132.08	183.37	258.27
DISCCART	684484.49	4274382.08	198.35	262.62
DISCCART	684484.49	4274632.08	248.68	251.61
DISCCART	684484.49	4274882.08	227.78	262.62
DISCCART	684484.49	4275132.08	212.28	262.62
DISCCART	684484.49	4275382.08	236.39	246.63
DISCCART	684484.49	4275632.08	227.19	251.63
DISCCART	684234.49	4266382.08	169.86	179.15
DISCCART	684234.49	4266132.08	160.65	204.00
DISCCART	684234.49	4265882.08	182.84	203.62
DISCCART	684234.49	4265632.08	182.21	207.69
DISCCART	684234.49	4265382.08	183.22	215.64
DISCCART	684234.49	4265132.08	213.53	213.53
DISCCART	684234.49	4264882.08	212.70	221.32
DISCCART	684234.49	4264632.08	204.32	221.52
DISCCART	684234.49	4264382.08	209.68	220.91
DISCCART	684234.49	4264132.08	214.76	214.76
DISCCART	684234.49	4263882.08	195.39	231.98
DISCCART	684234.49	4266632.08	176.08	177.80
DISCCART	684234.49	4266882.08	148.76	178.90
DISCCART	684234.49	4267132.08	144.83	144.83
DISCCART	684234.49	4267382.08	144.46	144.46
DISCCART	684234.49	4267632.08	144.53	144.53
DISCCART	684234.49	4267882.08	144.25	144.25
DISCCART	684234.49	4268132.08	145.00	145.00
DISCCART	684234.49	4268382.08	139.74	139.74
DISCCART	684234.49	4268632.08	139.74	139.74
DISCCART	684234.49	4268882.08	139.71	139.71
DISCCART	684234.49	4269132.08	143.83	143.83
DISCCART	684234.49	4269382.08	145.11	146.92
DISCCART	684234.49	4269632.08	143.50	143.50
DISCCART	684234.49	4269882.08	144.37	144.37
DISCCART	684234.49	4270132.08	143.33	143.33
DISCCART	684234.49	4270382.08	142.93	142.93
DISCCART	684234.49	4270632.08	142.73	142.73
DISCCART	684234.49	4270882.08	143.01	179.12
DISCCART	684234.49	4271132.08	151.94	179.43
DISCCART	684234.49	4271382.08	174.92	174.92
DISCCART	684234.49	4271632.08	159.68	159.68
DISCCART	684234.49	4271882.08	181.55	183.18
DISCCART	684234.49	4272132.08	178.84	178.84
DISCCART	684234.49	4272382.08	189.81	189.81
DISCCART	684234.49	4272632.08	168.21	244.10
DISCCART	684234.49	4272882.08	178.19	244.10
DISCCART	684234.49	4273132.08	164.25	244.10
DISCCART	684234.49	4273382.08	178.77	238.58
DISCCART	684234.49	4273632.08	165.79	239.54
DISCCART	684234.49	4273882.08	170.42	258.27
DISCCART	684234.49	4274132.08	184.39	262.58
DISCCART	684234.49	4274382.08	221.69	257.48
DISCCART	684234.49	4274632.08	221.72	262.62
DISCCART	684234.49	4274882.08	259.28	262.58
DISCCART	684234.49	4275132.08	244.15	257.37
DISCCART	684234.49	4275382.08	237.52	251.57
DISCCART	684234.49	4275632.08	236.90	251.63
DISCCART	683984.49	4266382.08	161.86	183.88

DISCCART	683984.49	4266132.08	181.10	181.10
DISCCART	683984.49	4265882.08	176.76	184.78
DISCCART	683984.49	4265632.08	177.28	215.11
DISCCART	683984.49	4265382.08	208.94	208.94
DISCCART	683984.49	4265132.08	201.71	214.80
DISCCART	683984.49	4264882.08	185.88	221.32
DISCCART	683984.49	4264632.08	182.16	221.52
DISCCART	683984.49	4264382.08	204.40	208.73
DISCCART	683984.49	4264132.08	201.85	229.50
DISCCART	683984.49	4263882.08	228.34	228.34
DISCCART	683984.49	4266632.08	152.36	179.06
DISCCART	683984.49	4266882.08	149.32	176.30
DISCCART	683984.49	4267132.08	144.48	144.48
DISCCART	683984.49	4267382.08	144.10	144.10
DISCCART	683984.49	4267632.08	144.00	144.00
DISCCART	683984.49	4267882.08	145.01	145.01
DISCCART	683984.49	4268132.08	139.74	139.74
DISCCART	683984.49	4268382.08	139.74	139.74
DISCCART	683984.49	4268632.08	139.74	139.74
DISCCART	683984.49	4268882.08	143.27	143.27
DISCCART	683984.49	4269132.08	142.78	142.78
DISCCART	683984.49	4269382.08	144.37	144.37
DISCCART	683984.49	4269632.08	144.42	144.42
DISCCART	683984.49	4269882.08	144.01	144.01
DISCCART	683984.49	4270132.08	143.04	143.04
DISCCART	683984.49	4270382.08	142.62	142.62
DISCCART	683984.49	4270632.08	143.37	143.37
DISCCART	683984.49	4270882.08	143.23	177.80
DISCCART	683984.49	4271132.08	157.66	179.43
DISCCART	683984.49	4271382.08	166.44	178.59
DISCCART	683984.49	4271632.08	166.67	171.08
DISCCART	683984.49	4271882.08	162.15	177.47
DISCCART	683984.49	4272132.08	172.28	176.65
DISCCART	683984.49	4272382.08	177.00	177.00
DISCCART	683984.49	4272632.08	165.52	244.10
DISCCART	683984.49	4272882.08	157.62	244.10
DISCCART	683984.49	4273132.08	171.67	244.10
DISCCART	683984.49	4273382.08	170.86	177.82
DISCCART	683984.49	4273632.08	162.81	167.26
DISCCART	683984.49	4273882.08	176.56	246.72
DISCCART	683984.49	4274132.08	187.55	257.48
DISCCART	683984.49	4274382.08	215.48	243.59
DISCCART	683984.49	4274632.08	201.48	263.27
DISCCART	683984.49	4274882.08	249.94	257.95
DISCCART	683984.49	4275132.08	210.83	262.62
DISCCART	683984.49	4275382.08	201.23	262.62
DISCCART	683984.49	4275632.08	189.05	262.62
DISCCART	683734.49	4266382.08	154.15	189.87
DISCCART	683734.49	4266132.08	158.77	195.65
DISCCART	683734.49	4265882.08	179.75	196.15
DISCCART	683734.49	4265632.08	192.73	201.15
DISCCART	683734.49	4265382.08	176.02	215.22
DISCCART	683734.49	4265132.08	207.19	208.40
DISCCART	683734.49	4264882.08	180.76	213.67
DISCCART	683734.49	4264632.08	195.76	195.76
DISCCART	683734.49	4264382.08	193.03	208.76
DISCCART	683734.49	4264132.08	201.10	203.32
DISCCART	683734.49	4263882.08	200.62	231.98
DISCCART	683734.49	4266632.08	163.04	178.34
DISCCART	683734.49	4266882.08	152.40	178.05
DISCCART	683734.49	4267132.08	144.07	144.07
DISCCART	683734.49	4267382.08	144.65	144.65
DISCCART	683734.49	4267632.08	144.31	144.31
DISCCART	683734.49	4267882.08	139.99	145.74
DISCCART	683734.49	4268132.08	139.74	139.74
DISCCART	683734.49	4268382.08	139.74	139.74

DISCCART	683734.49	4268632.08	143.54	143.54
DISCCART	683734.49	4268882.08	143.05	143.05
DISCCART	683734.49	4269132.08	140.26	146.22
DISCCART	683734.49	4269382.08	145.27	145.27
DISCCART	683734.49	4269632.08	144.23	144.23
DISCCART	683734.49	4269882.08	143.71	143.71
DISCCART	683734.49	4270132.08	143.20	143.20
DISCCART	683734.49	4270382.08	143.21	143.21
DISCCART	683734.49	4270632.08	143.64	143.64
DISCCART	683734.49	4270882.08	143.34	183.46
DISCCART	683734.49	4271132.08	162.97	183.46
DISCCART	683734.49	4271382.08	156.49	183.46
DISCCART	683734.49	4271632.08	151.61	168.06
DISCCART	683734.49	4271882.08	169.40	169.40
DISCCART	683734.49	4272132.08	167.03	178.39
DISCCART	683734.49	4272382.08	157.90	178.42
DISCCART	683734.49	4272632.08	153.40	244.10
DISCCART	683734.49	4272882.08	169.37	169.37
DISCCART	683734.49	4273132.08	174.43	174.43
DISCCART	683734.49	4273382.08	162.13	162.13
DISCCART	683734.49	4273632.08	172.28	172.28
DISCCART	683734.49	4273882.08	181.75	182.57
DISCCART	683734.49	4274132.08	174.49	263.27
DISCCART	683734.49	4274382.08	180.36	264.24
DISCCART	683734.49	4274632.08	215.67	263.27
DISCCART	683734.49	4274882.08	240.31	257.78
DISCCART	683734.49	4275132.08	201.89	266.15
DISCCART	683734.49	4275382.08	217.47	263.46
DISCCART	683734.49	4275632.08	216.54	249.49
DISCCART	686484.49	4266382.08	197.90	197.90
DISCCART	686484.49	4266132.08	193.46	193.46
DISCCART	686484.49	4265882.08	182.39	203.32
DISCCART	686484.49	4265632.08	181.97	203.51
DISCCART	686484.49	4265382.08	184.01	192.02
DISCCART	686484.49	4265132.08	174.68	192.05
DISCCART	686484.49	4264882.08	161.01	161.58
DISCCART	686484.49	4264632.08	153.67	196.83
DISCCART	686484.49	4264382.08	170.10	196.86
DISCCART	686484.49	4264132.08	192.74	195.98
DISCCART	686484.49	4263882.08	191.13	192.99
DISCCART	686484.49	4273132.08	206.18	266.77
DISCCART	686484.49	4273382.08	233.68	266.77
DISCCART	686484.49	4273632.08	244.13	266.77
DISCCART	686484.49	4273882.08	246.69	265.60
DISCCART	686484.49	4274132.08	237.30	264.64
DISCCART	686484.49	4274382.08	214.09	265.63
DISCCART	686484.49	4274632.08	205.99	266.28
DISCCART	686484.49	4274882.08	201.12	266.41
DISCCART	686484.49	4275132.08	201.82	263.43
DISCCART	686484.49	4275382.08	194.43	263.43
DISCCART	686484.49	4275632.08	238.02	245.13
DISCCART	686734.49	4266382.08	177.34	197.24
DISCCART	686734.49	4266132.08	171.16	190.38
DISCCART	686734.49	4265882.08	186.05	196.89
DISCCART	686734.49	4265632.08	197.05	197.05
DISCCART	686734.49	4265382.08	166.51	198.41
DISCCART	686734.49	4265132.08	172.22	185.56
DISCCART	686734.49	4264882.08	154.40	187.38
DISCCART	686734.49	4264632.08	171.17	190.63
DISCCART	686734.49	4264382.08	192.02	192.02
DISCCART	686734.49	4264132.08	179.43	196.86
DISCCART	686734.49	4263882.08	169.14	199.70
DISCCART	686734.49	4273132.08	252.37	259.59
DISCCART	686734.49	4273382.08	256.77	258.30
DISCCART	686734.49	4273632.08	253.99	265.73
DISCCART	686734.49	4273882.08	264.50	264.50

DISCCART	686734.49	4274132.08	248.43	264.34
DISCCART	686734.49	4274382.08	256.83	256.83
DISCCART	686734.49	4274632.08	250.74	252.48
DISCCART	686734.49	4274882.08	234.55	252.13
DISCCART	686734.49	4275132.08	233.03	240.02
DISCCART	686734.49	4275382.08	193.91	261.11
DISCCART	686734.49	4275632.08	188.70	254.20
DISCCART	686984.49	4266382.08	159.80	198.54
DISCCART	686984.49	4266132.08	173.08	198.44
DISCCART	686984.49	4265882.08	187.75	198.37
DISCCART	686984.49	4265632.08	174.06	195.77
DISCCART	686984.49	4265382.08	182.80	182.80
DISCCART	686984.49	4265132.08	157.86	183.69
DISCCART	686984.49	4264882.08	152.32	187.75
DISCCART	686984.49	4264632.08	186.27	186.27
DISCCART	686984.49	4264382.08	167.99	191.32
DISCCART	686984.49	4264132.08	171.81	192.11
DISCCART	686984.49	4263882.08	171.09	211.35
DISCCART	686984.49	4273132.08	218.69	266.46
DISCCART	686984.49	4273382.08	219.56	266.77
DISCCART	686984.49	4273632.08	242.98	264.41
DISCCART	686984.49	4273882.08	234.83	265.81
DISCCART	686984.49	4274132.08	240.63	263.93
DISCCART	686984.49	4274382.08	253.02	259.24
DISCCART	686984.49	4274632.08	253.97	256.20
DISCCART	686984.49	4274882.08	247.51	252.65
DISCCART	686984.49	4275132.08	238.93	253.85
DISCCART	686984.49	4275382.08	220.91	253.68
DISCCART	686984.49	4275632.08	206.54	251.91
DISCCART	687234.49	4266382.08	163.93	179.50
DISCCART	687234.49	4266132.08	172.99	198.44
DISCCART	687234.49	4265882.08	175.58	198.44
DISCCART	687234.49	4265632.08	156.01	198.44
DISCCART	687234.49	4265382.08	163.71	177.40
DISCCART	687234.49	4265132.08	156.58	156.58
DISCCART	687234.49	4264882.08	169.88	187.58
DISCCART	687234.49	4264632.08	174.95	186.63
DISCCART	687234.49	4264382.08	162.16	191.11
DISCCART	687234.49	4264132.08	179.06	190.83
DISCCART	687234.49	4263882.08	194.43	194.43
DISCCART	687234.49	4273132.08	209.80	258.91
DISCCART	687234.49	4273382.08	183.56	266.77
DISCCART	687234.49	4273632.08	246.96	265.32
DISCCART	687234.49	4273882.08	256.34	264.92
DISCCART	687234.49	4274132.08	219.28	265.32
DISCCART	687234.49	4274382.08	221.82	260.22
DISCCART	687234.49	4274632.08	208.14	260.65
DISCCART	687234.49	4274882.08	241.66	253.51
DISCCART	687234.49	4275132.08	240.38	254.22
DISCCART	687234.49	4275382.08	240.34	251.91
DISCCART	687234.49	4275632.08	193.91	254.22
DISCCART	687484.49	4266382.08	145.85	195.52
DISCCART	687484.49	4266132.08	145.79	198.44
DISCCART	687484.49	4265882.08	152.24	198.44
DISCCART	687484.49	4265632.08	157.00	169.57
DISCCART	687484.49	4265382.08	158.12	158.12
DISCCART	687484.49	4265132.08	152.06	179.44
DISCCART	687484.49	4264882.08	173.68	179.04
DISCCART	687484.49	4264632.08	160.81	180.21
DISCCART	687484.49	4264382.08	181.43	184.11
DISCCART	687484.49	4264132.08	166.80	189.60
DISCCART	687484.49	4263882.08	163.42	198.61
DISCCART	687484.49	4273132.08	182.90	265.32
DISCCART	687484.49	4273382.08	188.21	265.32
DISCCART	687484.49	4273632.08	237.89	265.32
DISCCART	687484.49	4273882.08	259.04	259.04

DISCCART	687484.49	4274132.08	221.93	265.32
DISCCART	687484.49	4274382.08	206.35	264.92
DISCCART	687484.49	4274632.08	228.22	245.76
DISCCART	687484.49	4274882.08	244.15	246.35
DISCCART	687484.49	4275132.08	213.28	255.10
DISCCART	687484.49	4275382.08	209.39	256.98
DISCCART	687484.49	4275632.08	239.81	240.21
DISCCART	687734.49	4266382.08	179.27	182.74
DISCCART	687734.49	4266132.08	163.54	184.71
DISCCART	687734.49	4265882.08	158.45	158.45
DISCCART	687734.49	4265632.08	162.54	167.25
DISCCART	687734.49	4265382.08	153.16	172.22
DISCCART	687734.49	4265132.08	152.09	179.44
DISCCART	687734.49	4264882.08	159.48	179.44
DISCCART	687734.49	4264632.08	158.83	181.18
DISCCART	687734.49	4264382.08	170.90	189.60
DISCCART	687734.49	4264132.08	183.76	183.76
DISCCART	687734.49	4263882.08	192.00	194.80
DISCCART	687734.49	4273132.08	177.87	265.32
DISCCART	687734.49	4273382.08	236.55	250.96
DISCCART	687734.49	4273632.08	198.10	265.32
DISCCART	687734.49	4273882.08	248.06	262.50
DISCCART	687734.49	4274132.08	219.90	264.81
DISCCART	687734.49	4274382.08	189.02	265.32
DISCCART	687734.49	4274632.08	195.85	254.91
DISCCART	687734.49	4274882.08	239.59	248.49
DISCCART	687734.49	4275132.08	240.90	254.46
DISCCART	687734.49	4275382.08	209.30	256.98
DISCCART	687734.49	4275632.08	190.49	256.98
DISCCART	687984.49	4266382.08	168.03	189.74
DISCCART	687984.49	4266132.08	175.44	190.64
DISCCART	687984.49	4265882.08	159.36	165.08
DISCCART	687984.49	4265632.08	159.86	159.86
DISCCART	687984.49	4265382.08	167.92	167.92
DISCCART	687984.49	4265132.08	160.91	160.91
DISCCART	687984.49	4264882.08	158.27	158.27
DISCCART	687984.49	4264632.08	169.40	185.06
DISCCART	687984.49	4264382.08	180.23	190.13
DISCCART	687984.49	4264132.08	183.75	183.75
DISCCART	687984.49	4263882.08	184.25	190.87
DISCCART	687984.49	4273132.08	184.45	250.96
DISCCART	687984.49	4273382.08	243.89	244.09
DISCCART	687984.49	4273632.08	183.98	265.32
DISCCART	687984.49	4273882.08	215.22	262.50
DISCCART	687984.49	4274132.08	203.37	262.50
DISCCART	687984.49	4274382.08	180.49	264.86
DISCCART	687984.49	4274632.08	190.73	256.98
DISCCART	687984.49	4274882.08	208.65	256.98
DISCCART	687984.49	4275132.08	241.56	256.98
DISCCART	687984.49	4275382.08	231.44	256.98
DISCCART	687984.49	4275632.08	178.61	256.98
DISCCART	688234.49	4266382.08	152.62	190.64
DISCCART	688234.49	4266132.08	185.67	185.67
DISCCART	688234.49	4265882.08	172.12	196.20
DISCCART	688234.49	4265632.08	166.49	196.20
DISCCART	688234.49	4265382.08	169.00	189.65
DISCCART	688234.49	4265132.08	178.27	178.27
DISCCART	688234.49	4264882.08	163.72	163.72
DISCCART	688234.49	4264632.08	160.61	191.51
DISCCART	688234.49	4264382.08	184.63	184.63
DISCCART	688234.49	4264132.08	177.22	191.50
DISCCART	688234.49	4263882.08	177.17	177.17
DISCCART	688234.49	4273132.08	200.80	244.56
DISCCART	688234.49	4273382.08	197.29	250.96
DISCCART	688234.49	4273632.08	174.44	262.50
DISCCART	688234.49	4273882.08	209.83	252.10

DISCCART	688234.49	4274132.08	226.67	252.10
DISCCART	688234.49	4274382.08	176.50	262.50
DISCCART	688234.49	4274632.08	185.97	256.98
DISCCART	688234.49	4274882.08	222.79	254.91
DISCCART	688234.49	4275132.08	240.87	254.91
DISCCART	688234.49	4275382.08	206.19	256.98
DISCCART	688234.49	4275632.08	208.40	256.98
DISCCART	688484.49	4266382.08	157.70	157.70
DISCCART	688484.49	4266132.08	167.04	179.07
DISCCART	688484.49	4265882.08	180.40	196.20
DISCCART	688484.49	4265632.08	182.59	202.35
DISCCART	688484.49	4265382.08	190.71	190.71
DISCCART	688484.49	4265132.08	169.28	205.78
DISCCART	688484.49	4264882.08	160.30	160.30
DISCCART	688484.49	4264632.08	160.80	171.68
DISCCART	688484.49	4264382.08	159.25	184.94
DISCCART	688484.49	4264132.08	160.25	160.25
DISCCART	688484.49	4263882.08	158.03	166.35
DISCCART	688484.49	4273132.08	162.32	252.10
DISCCART	688484.49	4273382.08	188.18	252.10
DISCCART	688484.49	4273632.08	181.24	252.10
DISCCART	688484.49	4273882.08	238.83	246.65
DISCCART	688484.49	4274132.08	218.09	252.10
DISCCART	688484.49	4274382.08	184.89	252.10
DISCCART	688484.49	4274632.08	181.25	254.91
DISCCART	688484.49	4274882.08	190.69	254.91
DISCCART	688484.49	4275132.08	220.50	254.68
DISCCART	688484.49	4275382.08	221.65	252.14
DISCCART	688484.49	4275632.08	216.83	244.88
DISCCART	688734.49	4266382.08	158.54	164.75
DISCCART	688734.49	4266132.08	155.55	190.29
DISCCART	688734.49	4265882.08	178.91	202.31
DISCCART	688734.49	4265632.08	201.77	201.77
DISCCART	688734.49	4265382.08	203.46	203.46
DISCCART	688734.49	4265132.08	170.14	209.63
DISCCART	688734.49	4264882.08	162.09	162.09
DISCCART	688734.49	4264632.08	170.44	170.44
DISCCART	688734.49	4264382.08	176.45	184.44
DISCCART	688734.49	4264132.08	158.86	190.39
DISCCART	688734.49	4263882.08	166.55	170.92
DISCCART	688734.49	4273132.08	185.68	238.32
DISCCART	688734.49	4273382.08	173.61	252.10
DISCCART	688734.49	4273632.08	185.26	252.10
DISCCART	688734.49	4273882.08	188.36	252.10
DISCCART	688734.49	4274132.08	210.02	252.10
DISCCART	688734.49	4274382.08	169.36	252.10
DISCCART	688734.49	4274632.08	172.16	254.91
DISCCART	688734.49	4274882.08	193.86	254.72
DISCCART	688734.49	4275132.08	203.08	252.14
DISCCART	688734.49	4275382.08	215.34	252.14
DISCCART	688734.49	4275632.08	180.48	252.14
DISCCART	688984.49	4266382.08	166.77	185.50
DISCCART	688984.49	4266132.08	170.48	185.50
DISCCART	688984.49	4265882.08	164.68	209.63
DISCCART	688984.49	4265632.08	183.41	209.63
DISCCART	688984.49	4265382.08	201.30	201.30
DISCCART	688984.49	4265132.08	184.15	186.13
DISCCART	688984.49	4264882.08	162.25	191.75
DISCCART	688984.49	4264632.08	178.05	196.83
DISCCART	688984.49	4264382.08	188.83	188.83
DISCCART	688984.49	4264132.08	164.43	190.57
DISCCART	688984.49	4263882.08	176.53	177.09
DISCCART	688984.49	4273132.08	169.63	220.11
DISCCART	688984.49	4273382.08	165.85	248.38
DISCCART	688984.49	4273632.08	194.94	248.38
DISCCART	688984.49	4273882.08	168.25	252.10

DISCCART	688984.49	4274132.08	245.79	245.79
DISCCART	688984.49	4274382.08	174.16	252.10
DISCCART	688984.49	4274632.08	165.00	252.14
DISCCART	688984.49	4274882.08	164.20	254.91
DISCCART	688984.49	4275132.08	193.82	252.14
DISCCART	688984.49	4275382.08	227.58	227.58
DISCCART	688984.49	4275632.08	193.89	240.34
DISCCART	689234.49	4266382.08	165.99	250.78
DISCCART	689234.49	4266132.08	187.26	190.53
DISCCART	689234.49	4265882.08	162.25	260.19
DISCCART	689234.49	4265632.08	198.28	198.28
DISCCART	689234.49	4265382.08	193.72	193.72
DISCCART	689234.49	4265132.08	186.87	196.58
DISCCART	689234.49	4264882.08	164.96	191.19
DISCCART	689234.49	4264632.08	178.23	197.34
DISCCART	689234.49	4264382.08	186.34	198.27
DISCCART	689234.49	4264132.08	170.38	198.15
DISCCART	689234.49	4263882.08	177.14	177.45
DISCCART	689234.49	4273132.08	166.84	220.11
DISCCART	689234.49	4273382.08	169.89	248.38
DISCCART	689234.49	4273632.08	180.06	248.38
DISCCART	689234.49	4273882.08	168.53	248.38
DISCCART	689234.49	4274132.08	221.61	248.38
DISCCART	689234.49	4274382.08	224.29	245.93
DISCCART	689234.49	4274632.08	158.76	251.13
DISCCART	689234.49	4274882.08	174.90	245.93
DISCCART	689234.49	4275132.08	205.20	240.34
DISCCART	689234.49	4275382.08	220.22	240.34
DISCCART	689234.49	4275632.08	192.61	240.34
DISCCART	689484.49	4266382.08	186.90	252.03
DISCCART	689484.49	4266132.08	181.74	261.20
DISCCART	689484.49	4265882.08	178.21	263.07
DISCCART	689484.49	4265632.08	172.44	263.07
DISCCART	689484.49	4265382.08	188.13	201.81
DISCCART	689484.49	4265132.08	186.19	201.85
DISCCART	689484.49	4264882.08	185.03	196.19
DISCCART	689484.49	4264632.08	166.60	198.27
DISCCART	689484.49	4264382.08	191.68	194.12
DISCCART	689484.49	4264132.08	180.02	197.28
DISCCART	689484.49	4263882.08	173.32	192.78
DISCCART	689484.49	4273132.08	168.28	205.28
DISCCART	689484.49	4273382.08	163.98	248.38
DISCCART	689484.49	4273632.08	172.04	248.38
DISCCART	689484.49	4273882.08	169.48	248.38
DISCCART	689484.49	4274132.08	193.89	248.38
DISCCART	689484.49	4274382.08	216.13	245.93
DISCCART	689484.49	4274632.08	166.11	248.38
DISCCART	689484.49	4274882.08	165.17	245.93
DISCCART	689484.49	4275132.08	189.72	240.34
DISCCART	689484.49	4275382.08	203.30	240.34
DISCCART	689484.49	4275632.08	198.83	238.34
DISCCART	689734.49	4266382.08	187.89	262.76
DISCCART	689734.49	4266132.08	196.57	263.07
DISCCART	689734.49	4265882.08	191.06	263.07
DISCCART	689734.49	4265632.08	177.11	264.41
DISCCART	689734.49	4265382.08	176.88	264.58
DISCCART	689734.49	4265132.08	192.61	195.83
DISCCART	689734.49	4264882.08	190.09	190.09
DISCCART	689734.49	4264632.08	171.02	197.45
DISCCART	689734.49	4264382.08	193.67	197.06
DISCCART	689734.49	4264132.08	198.02	201.38
DISCCART	689734.49	4263882.08	175.03	202.48
DISCCART	689734.49	4273132.08	158.86	205.28
DISCCART	689734.49	4273382.08	185.54	205.28
DISCCART	689734.49	4273632.08	151.75	248.38
DISCCART	689734.49	4273882.08	193.42	222.27

DISCCART	689734.49	4274132.08	210.96	210.96
DISCCART	689734.49	4274382.08	174.45	248.38
DISCCART	689734.49	4274632.08	164.21	248.38
DISCCART	689734.49	4274882.08	158.95	245.93
DISCCART	689734.49	4275132.08	181.40	240.34
DISCCART	689734.49	4275382.08	217.07	220.84
DISCCART	689734.49	4275632.08	176.60	238.34
DISCCART	689984.49	4266382.08	206.14	259.05
DISCCART	689984.49	4266132.08	236.79	256.92
DISCCART	689984.49	4265882.08	222.15	263.07
DISCCART	689984.49	4265632.08	199.85	264.41
DISCCART	689984.49	4265382.08	201.71	264.58
DISCCART	689984.49	4265132.08	204.98	264.58
DISCCART	689984.49	4264882.08	190.87	264.58
DISCCART	689984.49	4264632.08	186.45	195.56
DISCCART	689984.49	4264382.08	175.93	260.23
DISCCART	689984.49	4264132.08	199.32	202.22
DISCCART	689984.49	4263882.08	187.55	208.24
DISCCART	689984.49	4273132.08	176.03	205.02
DISCCART	689984.49	4273382.08	148.23	234.71
DISCCART	689984.49	4273632.08	164.36	234.71
DISCCART	689984.49	4273882.08	187.45	234.71
DISCCART	689984.49	4274132.08	196.72	234.71
DISCCART	689984.49	4274382.08	176.90	245.65
DISCCART	689984.49	4274632.08	192.22	234.71
DISCCART	689984.49	4274882.08	156.25	245.65
DISCCART	689984.49	4275132.08	181.23	221.32
DISCCART	689984.49	4275382.08	188.94	221.39
DISCCART	689984.49	4275632.08	175.82	238.34
DISCCART	690234.49	4266382.08	250.51	252.25
DISCCART	690234.49	4266132.08	213.62	263.07
DISCCART	690234.49	4265882.08	260.24	260.24
DISCCART	690234.49	4265632.08	256.46	257.32
DISCCART	690234.49	4265382.08	219.86	264.58
DISCCART	690234.49	4265132.08	224.67	264.58
DISCCART	690234.49	4264882.08	195.22	264.58
DISCCART	690234.49	4264632.08	183.40	269.42
DISCCART	690234.49	4264382.08	197.55	260.37
DISCCART	690234.49	4264132.08	186.86	260.37
DISCCART	690234.49	4263882.08	209.18	209.18
DISCCART	690234.49	4273132.08	144.01	218.53
DISCCART	690234.49	4273382.08	144.14	234.71
DISCCART	690234.49	4273632.08	175.72	230.39
DISCCART	690234.49	4273882.08	190.33	234.71
DISCCART	690234.49	4274132.08	192.76	234.71
DISCCART	690234.49	4274382.08	190.80	234.71
DISCCART	690234.49	4274632.08	160.58	234.71
DISCCART	690234.49	4274882.08	157.54	234.71
DISCCART	690234.49	4275132.08	177.03	214.54
DISCCART	690234.49	4275382.08	168.07	228.90
DISCCART	690234.49	4275632.08	164.41	238.34
DISCCART	690484.49	4266382.08	212.45	253.19
DISCCART	690484.49	4266132.08	217.66	263.07
DISCCART	690484.49	4265882.08	216.68	264.26
DISCCART	690484.49	4265632.08	239.11	264.41
DISCCART	690484.49	4265382.08	258.62	264.41
DISCCART	690484.49	4265132.08	253.08	258.28
DISCCART	690484.49	4264882.08	192.43	269.42
DISCCART	690484.49	4264632.08	201.12	269.42
DISCCART	690484.49	4264382.08	213.06	269.10
DISCCART	690484.49	4264132.08	207.53	260.37
DISCCART	690484.49	4263882.08	205.20	265.35
DISCCART	690484.49	4273132.08	138.12	218.47
DISCCART	690484.49	4273382.08	143.43	230.39
DISCCART	690484.49	4273632.08	206.41	218.47
DISCCART	690484.49	4273882.08	162.32	234.71

DISCCART	690484.49	4274132.08	210.52	215.78
DISCCART	690484.49	4274382.08	163.53	234.71
DISCCART	690484.49	4274632.08	204.82	210.22
DISCCART	690484.49	4274882.08	148.93	234.71
DISCCART	690484.49	4275132.08	159.41	228.90
DISCCART	690484.49	4275382.08	171.58	228.90
DISCCART	690484.49	4275632.08	210.80	228.90
DISCCART	690734.49	4266382.08	229.29	247.45
DISCCART	690734.49	4266132.08	219.74	259.52
DISCCART	690734.49	4265882.08	214.39	264.26
DISCCART	690734.49	4265632.08	256.25	256.25
DISCCART	690734.49	4265382.08	239.46	265.07
DISCCART	690734.49	4265132.08	234.66	265.07
DISCCART	690734.49	4264882.08	206.76	269.42
DISCCART	690734.49	4264632.08	231.59	269.42
DISCCART	690734.49	4264382.08	213.19	269.42
DISCCART	690734.49	4264132.08	218.93	265.81
DISCCART	690734.49	4263882.08	208.56	271.72
DISCCART	690734.49	4273132.08	138.09	218.47
DISCCART	690734.49	4273382.08	138.09	230.39
DISCCART	690734.49	4273632.08	154.52	230.39
DISCCART	690734.49	4273882.08	157.56	234.71
DISCCART	690734.49	4274132.08	214.66	216.49
DISCCART	690734.49	4274382.08	170.73	234.53
DISCCART	690734.49	4274632.08	178.30	210.22
DISCCART	690734.49	4274882.08	159.12	225.73
DISCCART	690734.49	4275132.08	170.53	225.73
DISCCART	690734.49	4275382.08	219.52	221.62
DISCCART	690734.49	4275632.08	180.87	228.90
DISCCART	690984.49	4266382.08	204.11	259.61
DISCCART	690984.49	4266132.08	241.99	259.37
DISCCART	690984.49	4265882.08	245.42	259.61
DISCCART	690984.49	4265632.08	225.95	265.05
DISCCART	690984.49	4265382.08	239.70	265.62
DISCCART	690984.49	4265132.08	243.74	265.74
DISCCART	690984.49	4264882.08	249.24	266.58
DISCCART	690984.49	4264632.08	269.06	269.06
DISCCART	690984.49	4264382.08	226.89	269.42
DISCCART	690984.49	4264132.08	241.82	263.97
DISCCART	690984.49	4263882.08	215.86	270.90
DISCCART	690984.49	4273132.08	138.09	218.47
DISCCART	690984.49	4273382.08	138.09	218.47
DISCCART	690984.49	4273632.08	142.80	218.47
DISCCART	690984.49	4273882.08	143.75	218.47
DISCCART	690984.49	4274132.08	180.41	216.79
DISCCART	690984.49	4274382.08	185.99	187.61
DISCCART	690984.49	4274632.08	145.10	225.73
DISCCART	690984.49	4274882.08	155.91	225.73
DISCCART	690984.49	4275132.08	177.59	225.73
DISCCART	690984.49	4275382.08	216.41	225.73
DISCCART	690984.49	4275632.08	170.86	228.90
DISCCART	691234.49	4266382.08	248.78	251.46
DISCCART	691234.49	4266132.08	256.88	256.88
DISCCART	691234.49	4265882.08	242.55	260.34
DISCCART	691234.49	4265632.08	247.04	263.35
DISCCART	691234.49	4265382.08	252.00	264.09
DISCCART	691234.49	4265132.08	259.89	262.58
DISCCART	691234.49	4264882.08	250.40	266.58
DISCCART	691234.49	4264632.08	234.19	269.42
DISCCART	691234.49	4264382.08	248.51	266.62
DISCCART	691234.49	4264132.08	248.33	253.14
DISCCART	691234.49	4263882.08	231.23	268.96
DISCCART	691234.49	4273132.08	140.54	143.39
DISCCART	691234.49	4273382.08	138.09	212.31
DISCCART	691234.49	4273632.08	138.09	217.11
DISCCART	691234.49	4273882.08	143.06	216.79

DISCCART	691234.49	4274132.08	142.43	216.79
DISCCART	691234.49	4274382.08	143.83	216.79
DISCCART	691234.49	4274632.08	147.02	216.79
DISCCART	691234.49	4274882.08	161.36	225.73
DISCCART	691234.49	4275132.08	177.63	225.73
DISCCART	691234.49	4275382.08	167.67	225.73
DISCCART	691234.49	4275632.08	167.18	226.68
DISCCART	691484.49	4266382.08	232.74	256.93
DISCCART	691484.49	4266132.08	213.07	260.34
DISCCART	691484.49	4265882.08	207.02	264.43
DISCCART	691484.49	4265632.08	210.47	265.74
DISCCART	691484.49	4265382.08	257.35	264.17
DISCCART	691484.49	4265132.08	248.84	265.45
DISCCART	691484.49	4264882.08	225.06	266.59
DISCCART	691484.49	4264632.08	249.01	266.59
DISCCART	691484.49	4264382.08	256.32	266.36
DISCCART	691484.49	4264132.08	223.28	268.48
DISCCART	691484.49	4263882.08	258.92	265.22
DISCCART	691484.49	4273132.08	142.78	142.78
DISCCART	691484.49	4273382.08	138.02	138.02
DISCCART	691484.49	4273632.08	137.85	137.85
DISCCART	691484.49	4273882.08	143.31	143.31
DISCCART	691484.49	4274132.08	142.94	216.79
DISCCART	691484.49	4274382.08	143.74	146.04
DISCCART	691484.49	4274632.08	142.52	210.03
DISCCART	691484.49	4274882.08	165.28	167.80
DISCCART	691484.49	4275132.08	168.66	210.10
DISCCART	691484.49	4275382.08	166.71	225.73
DISCCART	691484.49	4275632.08	157.81	225.73
DISCCART	691734.49	4266382.08	213.01	256.93
DISCCART	691734.49	4266132.08	218.71	254.47
DISCCART	691734.49	4265882.08	206.43	260.67
DISCCART	691734.49	4265632.08	254.37	255.90
DISCCART	691734.49	4265382.08	252.04	260.23
DISCCART	691734.49	4265132.08	223.95	265.45
DISCCART	691734.49	4264882.08	204.77	266.59
DISCCART	691734.49	4264632.08	251.38	265.00
DISCCART	691734.49	4264382.08	241.43	266.52
DISCCART	691734.49	4264132.08	210.44	268.20
DISCCART	691734.49	4263882.08	223.49	268.48
DISCCART	691734.49	4273132.08	139.95	141.42
DISCCART	691734.49	4273382.08	137.85	137.85
DISCCART	691734.49	4273632.08	137.82	137.82
DISCCART	691734.49	4273882.08	142.37	142.37
DISCCART	691734.49	4274132.08	142.28	142.28
DISCCART	691734.49	4274382.08	142.76	142.76
DISCCART	691734.49	4274632.08	142.37	178.85
DISCCART	691734.49	4274882.08	141.57	178.85
DISCCART	691734.49	4275132.08	164.64	172.16
DISCCART	691734.49	4275382.08	166.22	172.58
DISCCART	691734.49	4275632.08	155.32	164.35
DISCCART	691984.49	4266382.08	196.71	256.93
DISCCART	691984.49	4266132.08	195.21	256.93
DISCCART	691984.49	4265882.08	213.16	255.90
DISCCART	691984.49	4265632.08	209.53	260.67
DISCCART	691984.49	4265382.08	213.38	263.80
DISCCART	691984.49	4265132.08	205.51	264.43
DISCCART	691984.49	4264882.08	199.15	266.59
DISCCART	691984.49	4264632.08	233.26	264.81
DISCCART	691984.49	4264382.08	205.74	266.59
DISCCART	691984.49	4264132.08	216.77	266.28
DISCCART	691984.49	4263882.08	256.34	263.87
DISCCART	691984.49	4273132.08	141.20	141.20
DISCCART	691984.49	4273382.08	137.96	137.96
DISCCART	691984.49	4273632.08	137.82	137.82
DISCCART	691984.49	4273882.08	142.82	144.15

DISCCART	691984.49	4274132.08	141.10	146.55
DISCCART	691984.49	4274382.08	142.76	142.76
DISCCART	691984.49	4274632.08	142.83	142.83
DISCCART	691984.49	4274882.08	142.80	178.85
DISCCART	691984.49	4275132.08	141.65	178.49
DISCCART	691984.49	4275382.08	142.99	167.49
DISCCART	691984.49	4275632.08	144.27	163.71
DISCCART	692234.49	4266382.08	214.29	248.07
DISCCART	692234.49	4266132.08	183.23	256.90
DISCCART	692234.49	4265882.08	224.20	242.50
DISCCART	692234.49	4265632.08	204.11	260.23
DISCCART	692234.49	4265382.08	189.47	262.28
DISCCART	692234.49	4265132.08	241.68	241.68
DISCCART	692234.49	4264882.08	196.50	265.00
DISCCART	692234.49	4264632.08	195.11	266.59
DISCCART	692234.49	4264382.08	227.69	266.12
DISCCART	692234.49	4264132.08	262.32	262.32
DISCCART	692234.49	4263882.08	262.66	262.66
DISCCART	692234.49	4273132.08	142.09	144.37
DISCCART	692234.49	4273382.08	142.57	142.57
DISCCART	692234.49	4273632.08	137.71	137.71
DISCCART	692234.49	4273882.08	140.76	144.30
DISCCART	692234.49	4274132.08	141.50	141.50
DISCCART	692234.49	4274382.08	141.91	141.91
DISCCART	692234.49	4274632.08	142.34	142.34
DISCCART	692234.49	4274882.08	142.43	142.43
DISCCART	692234.49	4275132.08	141.91	141.91
DISCCART	692234.49	4275382.08	142.29	142.29
DISCCART	692234.49	4275632.08	142.88	142.88
DISCCART	692484.49	4266382.08	193.86	248.07
DISCCART	692484.49	4266132.08	191.09	248.07
DISCCART	692484.49	4265882.08	198.71	242.50
DISCCART	692484.49	4265632.08	185.99	253.39
DISCCART	692484.49	4265382.08	186.65	252.08
DISCCART	692484.49	4265132.08	185.01	259.96
DISCCART	692484.49	4264882.08	196.31	263.06
DISCCART	692484.49	4264632.08	220.38	263.06
DISCCART	692484.49	4264382.08	240.27	264.04
DISCCART	692484.49	4264132.08	263.27	264.30
DISCCART	692484.49	4263882.08	249.50	258.12
DISCCART	692484.49	4273132.08	142.29	142.29
DISCCART	692484.49	4273382.08	141.41	141.41
DISCCART	692484.49	4273632.08	137.66	137.66
DISCCART	692484.49	4273882.08	137.79	137.79
DISCCART	692484.49	4274132.08	140.58	140.58
DISCCART	692484.49	4274382.08	142.47	142.47
DISCCART	692484.49	4274632.08	142.53	142.53
DISCCART	692484.49	4274882.08	141.80	141.80
DISCCART	692484.49	4275132.08	142.61	142.61
DISCCART	692484.49	4275382.08	143.01	143.01
DISCCART	692484.49	4275632.08	141.82	141.82
DISCCART	692734.49	4266382.08	201.72	243.79
DISCCART	692734.49	4266132.08	178.89	247.76
DISCCART	692734.49	4265882.08	176.22	246.71
DISCCART	692734.49	4265632.08	187.40	251.90
DISCCART	692734.49	4265382.08	193.21	251.90
DISCCART	692734.49	4265132.08	195.04	259.96
DISCCART	692734.49	4264882.08	223.29	259.96
DISCCART	692734.49	4264632.08	251.54	258.88
DISCCART	692734.49	4264382.08	249.61	259.21
DISCCART	692734.49	4264132.08	252.03	257.21
DISCCART	692734.49	4263882.08	236.39	262.83
DISCCART	692734.49	4266632.08	229.32	232.82
DISCCART	692734.49	4266882.08	176.25	248.07
DISCCART	692734.49	4267132.08	164.47	248.07
DISCCART	692734.49	4267382.08	159.12	245.73

DISCCART	692734.49	4267632.08	174.43	245.05
DISCCART	692734.49	4267882.08	224.53	241.73
DISCCART	692734.49	4268132.08	176.23	245.05
DISCCART	692734.49	4268382.08	193.59	245.05
DISCCART	692734.49	4268632.08	176.50	245.05
DISCCART	692734.49	4268882.08	174.62	220.63
DISCCART	692734.49	4269132.08	147.71	233.24
DISCCART	692734.49	4269382.08	144.72	233.24
DISCCART	692734.49	4269632.08	158.03	233.24
DISCCART	692734.49	4269882.08	158.04	233.24
DISCCART	692734.49	4270132.08	164.97	220.35
DISCCART	692734.49	4270382.08	179.27	216.05
DISCCART	692734.49	4270632.08	141.17	232.95
DISCCART	692734.49	4270882.08	142.89	224.35
DISCCART	692734.49	4271132.08	141.24	224.35
DISCCART	692734.49	4271382.08	141.40	232.10
DISCCART	692734.49	4271632.08	141.15	232.10
DISCCART	692734.49	4271882.08	142.21	232.10
DISCCART	692734.49	4272132.08	143.01	232.10
DISCCART	692734.49	4272382.08	142.19	232.10
DISCCART	692734.49	4272632.08	141.80	141.80
DISCCART	692734.49	4272882.08	140.58	140.58
DISCCART	692734.49	4273132.08	141.49	141.49
DISCCART	692734.49	4273382.08	143.71	143.71
DISCCART	692734.49	4273632.08	137.64	137.64
DISCCART	692734.49	4273882.08	137.72	137.72
DISCCART	692734.49	4274132.08	137.99	137.99
DISCCART	692734.49	4274382.08	142.32	142.32
DISCCART	692734.49	4274632.08	142.44	142.44
DISCCART	692734.49	4274882.08	142.43	142.43
DISCCART	692734.49	4275132.08	142.38	142.38
DISCCART	692734.49	4275382.08	142.64	142.64
DISCCART	692734.49	4275632.08	141.64	141.64
DISCCART	692984.49	4266382.08	197.07	243.79
DISCCART	692984.49	4266132.08	171.68	246.64
DISCCART	692984.49	4265882.08	199.47	246.64
DISCCART	692984.49	4265632.08	216.13	246.64
DISCCART	692984.49	4265382.08	227.18	251.90
DISCCART	692984.49	4265132.08	241.56	250.56
DISCCART	692984.49	4264882.08	220.93	254.66
DISCCART	692984.49	4264632.08	247.50	254.14
DISCCART	692984.49	4264382.08	248.68	251.75
DISCCART	692984.49	4264132.08	229.54	260.38
DISCCART	692984.49	4263882.08	242.59	262.03
DISCCART	692984.49	4266632.08	220.08	240.20
DISCCART	692984.49	4266882.08	218.15	228.00
DISCCART	692984.49	4267132.08	213.89	214.28
DISCCART	692984.49	4267382.08	158.62	245.73
DISCCART	692984.49	4267632.08	174.08	241.73
DISCCART	692984.49	4267882.08	213.71	241.73
DISCCART	692984.49	4268132.08	170.26	245.05
DISCCART	692984.49	4268382.08	150.05	245.05
DISCCART	692984.49	4268632.08	149.77	245.05
DISCCART	692984.49	4268882.08	151.12	239.34
DISCCART	692984.49	4269132.08	148.41	238.91
DISCCART	692984.49	4269382.08	155.56	233.24
DISCCART	692984.49	4269632.08	174.24	233.24
DISCCART	692984.49	4269882.08	175.05	233.24
DISCCART	692984.49	4270132.08	165.31	238.36
DISCCART	692984.49	4270382.08	205.71	209.99
DISCCART	692984.49	4270632.08	154.30	232.95
DISCCART	692984.49	4270882.08	192.19	203.78
DISCCART	692984.49	4271132.08	150.99	224.35
DISCCART	692984.49	4271382.08	140.87	234.11
DISCCART	692984.49	4271632.08	141.21	234.11
DISCCART	692984.49	4271882.08	141.76	234.11

DISCCART	692984.49	4272132.08	141.47	234.11
DISCCART	692984.49	4272382.08	141.98	232.10
DISCCART	692984.49	4272632.08	141.63	141.63
DISCCART	692984.49	4272882.08	142.01	142.01
DISCCART	692984.49	4273132.08	140.72	140.72
DISCCART	692984.49	4273382.08	141.87	141.87
DISCCART	692984.49	4273632.08	137.85	141.33
DISCCART	692984.49	4273882.08	137.60	137.60
DISCCART	692984.49	4274132.08	138.21	138.21
DISCCART	692984.49	4274382.08	142.38	142.38
DISCCART	692984.49	4274632.08	140.16	140.16
DISCCART	692984.49	4274882.08	140.87	140.87
DISCCART	692984.49	4275132.08	141.88	141.88
DISCCART	692984.49	4275382.08	142.16	142.16
DISCCART	692984.49	4275632.08	141.71	141.71
DISCCART	693234.49	4266382.08	183.76	240.20
DISCCART	693234.49	4266132.08	166.20	246.64
DISCCART	693234.49	4265882.08	220.48	240.91
DISCCART	693234.49	4265632.08	226.25	240.91
DISCCART	693234.49	4265382.08	202.84	251.90
DISCCART	693234.49	4265132.08	209.19	253.35
DISCCART	693234.49	4264882.08	237.27	253.08
DISCCART	693234.49	4264632.08	248.12	252.68
DISCCART	693234.49	4264382.08	225.57	260.29
DISCCART	693234.49	4264132.08	249.35	260.32
DISCCART	693234.49	4263882.08	259.20	259.20
DISCCART	693234.49	4266632.08	203.61	240.20
DISCCART	693234.49	4266882.08	186.75	240.20
DISCCART	693234.49	4267132.08	163.89	240.20
DISCCART	693234.49	4267382.08	177.10	241.73
DISCCART	693234.49	4267632.08	165.83	241.73
DISCCART	693234.49	4267882.08	163.23	241.73
DISCCART	693234.49	4268132.08	151.31	245.05
DISCCART	693234.49	4268382.08	151.81	241.73
DISCCART	693234.49	4268632.08	152.23	241.73
DISCCART	693234.49	4268882.08	156.59	241.50
DISCCART	693234.49	4269132.08	156.74	241.50
DISCCART	693234.49	4269382.08	170.52	233.24
DISCCART	693234.49	4269632.08	208.67	233.24
DISCCART	693234.49	4269882.08	188.27	233.24
DISCCART	693234.49	4270132.08	185.54	239.15
DISCCART	693234.49	4270382.08	201.49	226.54
DISCCART	693234.49	4270632.08	194.10	221.45
DISCCART	693234.49	4270882.08	201.16	224.35
DISCCART	693234.49	4271132.08	172.29	224.35
DISCCART	693234.49	4271382.08	144.90	239.02
DISCCART	693234.49	4271632.08	150.89	234.11
DISCCART	693234.49	4271882.08	144.06	234.11
DISCCART	693234.49	4272132.08	139.26	234.11
DISCCART	693234.49	4272382.08	140.46	234.11
DISCCART	693234.49	4272632.08	141.13	232.10
DISCCART	693234.49	4272882.08	141.37	141.37
DISCCART	693234.49	4273132.08	141.01	141.01
DISCCART	693234.49	4273382.08	141.92	141.92
DISCCART	693234.49	4273632.08	141.33	141.33
DISCCART	693234.49	4273882.08	137.31	137.31
DISCCART	693234.49	4274132.08	143.99	143.99
DISCCART	693234.49	4274382.08	145.37	145.97
DISCCART	693234.49	4274632.08	139.41	139.41
DISCCART	693234.49	4274882.08	142.32	142.32
DISCCART	693234.49	4275132.08	142.46	142.46
DISCCART	693234.49	4275382.08	142.62	142.62
DISCCART	693234.49	4275632.08	142.57	142.57
DISCCART	693484.49	4266382.08	170.95	240.20
DISCCART	693484.49	4266132.08	186.61	240.85
DISCCART	693484.49	4265882.08	182.12	240.91

DISCCART	693484.49	4265632.08	195.12	240.91
DISCCART	693484.49	4265382.08	196.40	251.90
DISCCART	693484.49	4265132.08	205.52	252.60
DISCCART	693484.49	4264882.08	234.38	249.99
DISCCART	693484.49	4264632.08	230.83	250.44
DISCCART	693484.49	4264382.08	222.19	258.43
DISCCART	693484.49	4264132.08	250.87	258.39
DISCCART	693484.49	4263882.08	245.88	259.05
DISCCART	693484.49	4266632.08	197.45	233.35
DISCCART	693484.49	4266882.08	180.76	233.35
DISCCART	693484.49	4267132.08	160.84	240.90
DISCCART	693484.49	4267382.08	155.37	241.73
DISCCART	693484.49	4267632.08	150.92	241.73
DISCCART	693484.49	4267882.08	158.42	241.73
DISCCART	693484.49	4268132.08	154.59	241.73
DISCCART	693484.49	4268382.08	166.14	241.50
DISCCART	693484.49	4268632.08	196.35	239.52
DISCCART	693484.49	4268882.08	184.60	241.50
DISCCART	693484.49	4269132.08	153.39	241.50
DISCCART	693484.49	4269382.08	169.17	240.39
DISCCART	693484.49	4269632.08	220.83	233.00
DISCCART	693484.49	4269882.08	198.24	239.15
DISCCART	693484.49	4270132.08	182.70	240.03
DISCCART	693484.49	4270382.08	217.58	232.95
DISCCART	693484.49	4270632.08	163.83	240.03
DISCCART	693484.49	4270882.08	220.66	223.95
DISCCART	693484.49	4271132.08	156.39	239.02
DISCCART	693484.49	4271382.08	152.82	239.02
DISCCART	693484.49	4271632.08	169.33	234.11
DISCCART	693484.49	4271882.08	220.81	232.10
DISCCART	693484.49	4272132.08	141.12	234.11
DISCCART	693484.49	4272382.08	143.45	234.11
DISCCART	693484.49	4272632.08	139.92	232.10
DISCCART	693484.49	4272882.08	141.04	141.04
DISCCART	693484.49	4273132.08	140.62	140.62
DISCCART	693484.49	4273382.08	141.34	141.34
DISCCART	693484.49	4273632.08	142.23	142.23
DISCCART	693484.49	4273882.08	137.29	137.29
DISCCART	693484.49	4274132.08	137.29	137.29
DISCCART	693484.49	4274382.08	143.28	143.28
DISCCART	693484.49	4274632.08	142.72	142.72
DISCCART	693484.49	4274882.08	142.40	142.40
DISCCART	693484.49	4275132.08	144.13	144.13
DISCCART	693484.49	4275382.08	142.93	142.93
DISCCART	693484.49	4275632.08	142.96	142.96
DISCCART	693734.49	4266382.08	161.30	240.39
DISCCART	693734.49	4266132.08	166.12	242.48
DISCCART	693734.49	4265882.08	170.04	242.48
DISCCART	693734.49	4265632.08	175.02	248.40
DISCCART	693734.49	4265382.08	210.95	235.10
DISCCART	693734.49	4265132.08	206.41	249.34
DISCCART	693734.49	4264882.08	235.16	248.40
DISCCART	693734.49	4264632.08	220.64	247.29
DISCCART	693734.49	4264382.08	237.48	244.49
DISCCART	693734.49	4264132.08	225.83	258.39
DISCCART	693734.49	4263882.08	241.29	256.93
DISCCART	693734.49	4266632.08	163.90	233.35
DISCCART	693734.49	4266882.08	157.43	240.90
DISCCART	693734.49	4267132.08	162.56	240.90
DISCCART	693734.49	4267382.08	177.34	240.90
DISCCART	693734.49	4267632.08	181.07	240.90
DISCCART	693734.49	4267882.08	182.75	240.73
DISCCART	693734.49	4268132.08	178.76	238.91
DISCCART	693734.49	4268382.08	163.40	241.50
DISCCART	693734.49	4268632.08	224.31	238.91
DISCCART	693734.49	4268882.08	202.70	241.50

DISCCART	693734.49	4269132.08	164.90	241.50
DISCCART	693734.49	4269382.08	164.55	241.50
DISCCART	693734.49	4269632.08	177.07	240.28
DISCCART	693734.49	4269882.08	220.62	227.00
DISCCART	693734.49	4270132.08	217.79	240.03
DISCCART	693734.49	4270382.08	200.68	240.03
DISCCART	693734.49	4270632.08	208.18	233.85
DISCCART	693734.49	4270882.08	190.46	239.02
DISCCART	693734.49	4271132.08	202.12	239.02
DISCCART	693734.49	4271382.08	197.69	239.02
DISCCART	693734.49	4271632.08	229.27	234.11
DISCCART	693734.49	4271882.08	212.77	233.85
DISCCART	693734.49	4272132.08	174.25	234.11
DISCCART	693734.49	4272382.08	146.58	234.11
DISCCART	693734.49	4272632.08	139.91	232.10
DISCCART	693734.49	4272882.08	140.15	198.89
DISCCART	693734.49	4273132.08	140.22	140.22
DISCCART	693734.49	4273382.08	140.82	140.82
DISCCART	693734.49	4273632.08	142.35	142.35
DISCCART	693734.49	4273882.08	137.51	142.33
DISCCART	693734.49	4274132.08	137.29	137.29
DISCCART	693734.49	4274382.08	143.11	143.11
DISCCART	693734.49	4274632.08	142.89	142.89
DISCCART	693734.49	4274882.08	141.52	141.52
DISCCART	693734.49	4275132.08	141.59	141.59
DISCCART	693734.49	4275382.08	142.42	142.42
DISCCART	693734.49	4275632.08	142.66	142.66
DISCCART	693984.49	4266382.08	164.82	242.37
DISCCART	693984.49	4266132.08	177.32	242.48
DISCCART	693984.49	4265882.08	226.54	227.46
DISCCART	693984.49	4265632.08	189.73	247.56
DISCCART	693984.49	4265382.08	209.84	247.37
DISCCART	693984.49	4265132.08	217.11	247.80
DISCCART	693984.49	4264882.08	236.60	246.54
DISCCART	693984.49	4264632.08	214.14	214.14
DISCCART	693984.49	4264382.08	211.51	254.33
DISCCART	693984.49	4264132.08	239.75	254.33
DISCCART	693984.49	4263882.08	236.73	256.29
DISCCART	693984.49	4266632.08	162.49	240.39
DISCCART	693984.49	4266882.08	171.72	240.90
DISCCART	693984.49	4267132.08	171.92	250.21
DISCCART	693984.49	4267382.08	206.56	240.90
DISCCART	693984.49	4267632.08	222.17	239.40
DISCCART	693984.49	4267882.08	186.92	240.90
DISCCART	693984.49	4268132.08	170.95	240.90
DISCCART	693984.49	4268382.08	159.42	241.50
DISCCART	693984.49	4268632.08	184.70	241.50
DISCCART	693984.49	4268882.08	237.12	241.42
DISCCART	693984.49	4269132.08	187.77	241.50
DISCCART	693984.49	4269382.08	170.60	252.66
DISCCART	693984.49	4269632.08	196.71	240.23
DISCCART	693984.49	4269882.08	182.33	246.52
DISCCART	693984.49	4270132.08	232.81	234.27
DISCCART	693984.49	4270382.08	234.15	236.07
DISCCART	693984.49	4270632.08	200.15	236.09
DISCCART	693984.49	4270882.08	218.50	233.61
DISCCART	693984.49	4271132.08	229.26	239.02
DISCCART	693984.49	4271382.08	214.08	233.25
DISCCART	693984.49	4271632.08	163.93	239.02
DISCCART	693984.49	4271882.08	170.10	234.11
DISCCART	693984.49	4272132.08	149.81	234.11
DISCCART	693984.49	4272382.08	144.54	234.11
DISCCART	693984.49	4272632.08	140.52	226.83
DISCCART	693984.49	4272882.08	140.44	219.93
DISCCART	693984.49	4273132.08	143.05	219.93
DISCCART	693984.49	4273382.08	141.09	219.93

DISCCART	693984.49	4273632.08	142.82	142.82
DISCCART	693984.49	4273882.08	142.97	142.97
DISCCART	693984.49	4274132.08	137.29	246.62
DISCCART	693984.49	4274382.08	137.29	253.79
DISCCART	693984.49	4274632.08	141.57	142.63
DISCCART	693984.49	4274882.08	142.80	142.80
DISCCART	693984.49	4275132.08	144.39	145.17
DISCCART	693984.49	4275382.08	141.92	141.92
DISCCART	693984.49	4275632.08	140.94	140.94
DISCCART	694234.49	4266382.08	169.58	240.49
DISCCART	694234.49	4266132.08	212.54	240.39
DISCCART	694234.49	4265882.08	232.56	240.39
DISCCART	694234.49	4265632.08	241.53	242.48
DISCCART	694234.49	4265382.08	214.96	247.15
DISCCART	694234.49	4265132.08	242.33	242.33
DISCCART	694234.49	4264882.08	221.83	247.37
DISCCART	694234.49	4264632.08	209.06	248.15
DISCCART	694234.49	4264382.08	212.72	253.37
DISCCART	694234.49	4264132.08	222.93	254.33
DISCCART	694234.49	4263882.08	234.97	251.29
DISCCART	694234.49	4266632.08	167.82	240.49
DISCCART	694234.49	4266882.08	216.24	227.41
DISCCART	694234.49	4267132.08	205.82	240.16
DISCCART	694234.49	4267382.08	218.47	240.90
DISCCART	694234.49	4267632.08	200.85	250.21
DISCCART	694234.49	4267882.08	185.01	250.01
DISCCART	694234.49	4268132.08	229.04	232.81
DISCCART	694234.49	4268382.08	160.13	246.96
DISCCART	694234.49	4268632.08	177.90	247.72
DISCCART	694234.49	4268882.08	225.67	235.50
DISCCART	694234.49	4269132.08	214.63	227.99
DISCCART	694234.49	4269382.08	170.56	252.66
DISCCART	694234.49	4269632.08	223.53	227.55
DISCCART	694234.49	4269882.08	205.31	246.52
DISCCART	694234.49	4270132.08	211.81	240.84
DISCCART	694234.49	4270382.08	180.43	246.52
DISCCART	694234.49	4270632.08	186.76	239.02
DISCCART	694234.49	4270882.08	170.03	239.02
DISCCART	694234.49	4271132.08	164.62	239.02
DISCCART	694234.49	4271382.08	160.09	239.02
DISCCART	694234.49	4271632.08	150.88	239.02
DISCCART	694234.49	4271882.08	158.78	234.11
DISCCART	694234.49	4272132.08	167.52	233.85
DISCCART	694234.49	4272382.08	191.30	191.30
DISCCART	694234.49	4272632.08	152.23	219.93
DISCCART	694234.49	4272882.08	139.81	229.98
DISCCART	694234.49	4273132.08	140.26	229.98
DISCCART	694234.49	4273382.08	141.38	229.98
DISCCART	694234.49	4273632.08	142.13	245.30
DISCCART	694234.49	4273882.08	142.15	246.62
DISCCART	694234.49	4274132.08	142.22	253.79
DISCCART	694234.49	4274382.08	137.29	263.77
DISCCART	694234.49	4274632.08	137.29	264.06
DISCCART	694234.49	4274882.08	137.63	264.27
DISCCART	694234.49	4275132.08	142.89	264.27
DISCCART	694234.49	4275382.08	141.54	264.27
DISCCART	694234.49	4275632.08	144.22	144.72
DISCCART	694484.49	4266382.08	177.97	242.30
DISCCART	694484.49	4266132.08	197.76	240.49
DISCCART	694484.49	4265882.08	196.91	247.68
DISCCART	694484.49	4265632.08	235.43	246.90
DISCCART	694484.49	4265382.08	228.03	247.68
DISCCART	694484.49	4265132.08	223.66	246.16
DISCCART	694484.49	4264882.08	217.97	245.27
DISCCART	694484.49	4264632.08	201.51	251.90
DISCCART	694484.49	4264382.08	245.96	245.96

DISCCART	694484.49	4264132.08	223.64	251.90
DISCCART	694484.49	4263882.08	223.50	251.29
DISCCART	694484.49	4266632.08	177.55	242.30
DISCCART	694484.49	4266882.08	183.06	250.21
DISCCART	694484.49	4267132.08	199.33	250.21
DISCCART	694484.49	4267382.08	208.71	252.11
DISCCART	694484.49	4267632.08	233.11	246.38
DISCCART	694484.49	4267882.08	219.55	235.41
DISCCART	694484.49	4268132.08	189.49	235.41
DISCCART	694484.49	4268382.08	172.16	246.14
DISCCART	694484.49	4268632.08	182.76	252.66
DISCCART	694484.49	4268882.08	175.58	254.42
DISCCART	694484.49	4269132.08	219.10	252.66
DISCCART	694484.49	4269382.08	198.23	252.66
DISCCART	694484.49	4269632.08	198.31	252.66
DISCCART	694484.49	4269882.08	242.68	246.45
DISCCART	694484.49	4270132.08	219.48	240.84
DISCCART	694484.49	4270382.08	167.84	247.32
DISCCART	694484.49	4270632.08	161.59	247.32
DISCCART	694484.49	4270882.08	180.15	239.02
DISCCART	694484.49	4271132.08	182.67	239.02
DISCCART	694484.49	4271382.08	155.03	239.77
DISCCART	694484.49	4271632.08	190.16	226.49
DISCCART	694484.49	4271882.08	164.29	233.03
DISCCART	694484.49	4272132.08	212.94	215.48
DISCCART	694484.49	4272382.08	157.31	233.03
DISCCART	694484.49	4272632.08	141.90	233.03
DISCCART	694484.49	4272882.08	167.67	228.99
DISCCART	694484.49	4273132.08	194.52	219.93
DISCCART	694484.49	4273382.08	140.61	245.30
DISCCART	694484.49	4273632.08	141.51	252.62
DISCCART	694484.49	4273882.08	142.43	253.79
DISCCART	694484.49	4274132.08	141.21	263.77
DISCCART	694484.49	4274382.08	142.07	264.27
DISCCART	694484.49	4274632.08	137.29	268.83
DISCCART	694484.49	4274882.08	137.15	270.95
DISCCART	694484.49	4275132.08	138.48	271.42
DISCCART	694484.49	4275382.08	143.01	271.12
DISCCART	694484.49	4275632.08	142.60	270.95
DISCCART	694734.49	4266382.08	227.95	240.49
DISCCART	694734.49	4266132.08	191.59	247.99
DISCCART	694734.49	4265882.08	183.47	247.99
DISCCART	694734.49	4265632.08	194.91	247.68
DISCCART	694734.49	4265382.08	225.57	247.55
DISCCART	694734.49	4265132.08	232.66	246.16
DISCCART	694734.49	4264882.08	212.93	246.09
DISCCART	694734.49	4264632.08	202.24	251.90
DISCCART	694734.49	4264382.08	213.56	251.90
DISCCART	694734.49	4264132.08	239.99	251.90
DISCCART	694734.49	4263882.08	212.26	251.90
DISCCART	694734.49	4266632.08	200.98	242.30
DISCCART	694734.49	4266882.08	180.95	252.30
DISCCART	694734.49	4267132.08	229.42	238.28
DISCCART	694734.49	4267382.08	244.06	248.84
DISCCART	694734.49	4267632.08	201.93	252.30
DISCCART	694734.49	4267882.08	179.44	252.75
DISCCART	694734.49	4268132.08	174.46	252.75
DISCCART	694734.49	4268382.08	209.51	232.59
DISCCART	694734.49	4268632.08	204.46	232.78
DISCCART	694734.49	4268882.08	187.74	254.86
DISCCART	694734.49	4269132.08	247.96	247.96
DISCCART	694734.49	4269382.08	230.52	252.66
DISCCART	694734.49	4269632.08	213.88	250.53
DISCCART	694734.49	4269882.08	190.43	252.11
DISCCART	694734.49	4270132.08	171.21	252.32
DISCCART	694734.49	4270382.08	198.91	245.87

DISCCART	694734.49	4270632.08	207.09	217.20
DISCCART	694734.49	4270882.08	210.06	232.61
DISCCART	694734.49	4271132.08	204.04	232.61
DISCCART	694734.49	4271382.08	182.62	239.77
DISCCART	694734.49	4271632.08	184.80	239.77
DISCCART	694734.49	4271882.08	216.41	233.03
DISCCART	694734.49	4272132.08	213.92	222.30
DISCCART	694734.49	4272382.08	144.48	239.44
DISCCART	694734.49	4272632.08	149.98	233.03
DISCCART	694734.49	4272882.08	185.26	219.93
DISCCART	694734.49	4273132.08	189.24	229.98
DISCCART	694734.49	4273382.08	204.33	229.98
DISCCART	694734.49	4273632.08	146.05	253.79
DISCCART	694734.49	4273882.08	140.76	263.64
DISCCART	694734.49	4274132.08	141.80	264.27
DISCCART	694734.49	4274382.08	141.37	268.83
DISCCART	694734.49	4274632.08	138.45	271.42
DISCCART	694734.49	4274882.08	137.05	271.42
DISCCART	694734.49	4275132.08	137.05	271.42
DISCCART	694734.49	4275382.08	138.71	271.42
DISCCART	694734.49	4275632.08	142.98	271.42
DISCCART	694984.49	4266382.08	222.28	242.30
DISCCART	694984.49	4266132.08	226.94	245.57
DISCCART	694984.49	4265882.08	199.72	247.99
DISCCART	694984.49	4265632.08	233.74	241.18
DISCCART	694984.49	4265382.08	238.99	239.38
DISCCART	694984.49	4265132.08	209.92	246.16
DISCCART	694984.49	4264882.08	213.35	239.60
DISCCART	694984.49	4264632.08	206.95	246.50
DISCCART	694984.49	4264382.08	244.23	246.26
DISCCART	694984.49	4264132.08	237.61	251.12
DISCCART	694984.49	4263882.08	245.30	250.94
DISCCART	694984.49	4266632.08	194.62	248.35
DISCCART	694984.49	4266882.08	183.48	252.30
DISCCART	694984.49	4267132.08	220.65	244.51
DISCCART	694984.49	4267382.08	234.71	251.70
DISCCART	694984.49	4267632.08	245.19	245.19
DISCCART	694984.49	4267882.08	189.89	252.75
DISCCART	694984.49	4268132.08	217.07	244.23
DISCCART	694984.49	4268382.08	181.09	248.28
DISCCART	694984.49	4268632.08	214.77	232.78
DISCCART	694984.49	4268882.08	188.01	254.86
DISCCART	694984.49	4269132.08	243.40	251.85
DISCCART	694984.49	4269382.08	220.34	254.86
DISCCART	694984.49	4269632.08	216.09	252.32
DISCCART	694984.49	4269882.08	200.21	252.32
DISCCART	694984.49	4270132.08	183.42	252.32
DISCCART	694984.49	4270382.08	223.61	245.87
DISCCART	694984.49	4270632.08	225.40	245.12
DISCCART	694984.49	4270882.08	179.99	247.32
DISCCART	694984.49	4271132.08	192.76	241.82
DISCCART	694984.49	4271382.08	203.08	239.77
DISCCART	694984.49	4271632.08	194.44	239.90
DISCCART	694984.49	4271882.08	205.49	233.03
DISCCART	694984.49	4272132.08	167.77	239.90
DISCCART	694984.49	4272382.08	156.01	233.13
DISCCART	694984.49	4272632.08	162.68	219.93
DISCCART	694984.49	4272882.08	185.55	229.98
DISCCART	694984.49	4273132.08	197.85	229.98
DISCCART	694984.49	4273382.08	214.89	229.98
DISCCART	694984.49	4273632.08	187.14	250.88
DISCCART	694984.49	4273882.08	211.02	245.30
DISCCART	694984.49	4274132.08	229.45	245.30
DISCCART	694984.49	4274382.08	207.91	253.79
DISCCART	694984.49	4274632.08	142.25	271.42
DISCCART	694984.49	4274882.08	142.57	271.42

DISCCART	694984.49	4275132.08	137.05	271.42
DISCCART	694984.49	4275382.08	137.05	271.42
DISCCART	694984.49	4275632.08	137.05	271.42
DISCCART	695234.49	4266382.08	217.46	248.35
DISCCART	695234.49	4266132.08	241.81	245.45
DISCCART	695234.49	4265882.08	243.89	243.89
DISCCART	695234.49	4265632.08	237.28	246.82
DISCCART	695234.49	4265382.08	212.76	246.82
DISCCART	695234.49	4265132.08	221.83	233.80
DISCCART	695234.49	4264882.08	202.65	235.73
DISCCART	695234.49	4264632.08	214.95	239.31
DISCCART	695234.49	4264382.08	206.70	251.12
DISCCART	695234.49	4264132.08	233.19	248.19
DISCCART	695234.49	4263882.08	227.88	250.94
DISCCART	695234.49	4266632.08	222.18	248.35
DISCCART	695234.49	4266882.08	195.26	251.93
DISCCART	695234.49	4267132.08	201.69	252.26
DISCCART	695234.49	4267382.08	216.10	252.75
DISCCART	695234.49	4267632.08	251.69	251.69
DISCCART	695234.49	4267882.08	237.43	240.39
DISCCART	695234.49	4268132.08	219.30	244.23
DISCCART	695234.49	4268382.08	182.99	253.52
DISCCART	695234.49	4268632.08	214.12	251.59
DISCCART	695234.49	4268882.08	208.17	254.86
DISCCART	695234.49	4269132.08	250.97	253.38
DISCCART	695234.49	4269382.08	234.92	254.86
DISCCART	695234.49	4269632.08	238.79	252.32
DISCCART	695234.49	4269882.08	209.79	252.32
DISCCART	695234.49	4270132.08	196.86	251.76
DISCCART	695234.49	4270382.08	227.96	247.32
DISCCART	695234.49	4270632.08	232.66	247.32
DISCCART	695234.49	4270882.08	237.28	241.82
DISCCART	695234.49	4271132.08	192.06	245.39
DISCCART	695234.49	4271382.08	191.05	241.82
DISCCART	695234.49	4271632.08	221.88	239.77
DISCCART	695234.49	4271882.08	166.96	239.90
DISCCART	695234.49	4272132.08	168.17	239.90
DISCCART	695234.49	4272382.08	151.05	239.90
DISCCART	695234.49	4272632.08	183.64	203.14
DISCCART	695234.49	4272882.08	199.85	202.18
DISCCART	695234.49	4273132.08	180.30	238.00
DISCCART	695234.49	4273382.08	165.38	252.62
DISCCART	695234.49	4273632.08	173.52	252.62
DISCCART	695234.49	4273882.08	183.27	253.79
DISCCART	695234.49	4274132.08	187.14	258.16
DISCCART	695234.49	4274382.08	223.59	253.79
DISCCART	695234.49	4274632.08	236.41	253.79
DISCCART	695234.49	4274882.08	229.08	264.27
DISCCART	695234.49	4275132.08	152.62	271.42
DISCCART	695234.49	4275382.08	140.38	271.42
DISCCART	695234.49	4275632.08	137.05	271.42
DISCCART	683234.49	4263382.08	219.42	224.48
DISCCART	683234.49	4262882.08	192.41	204.66
DISCCART	683234.49	4262382.08	187.71	207.83
DISCCART	683234.49	4261882.08	194.49	208.09
DISCCART	683234.49	4261382.08	214.57	214.57
DISCCART	683234.49	4260882.08	207.61	214.53
DISCCART	683234.49	4260382.08	190.22	201.89
DISCCART	683234.49	4259882.08	174.78	198.52
DISCCART	683234.49	4259382.08	164.87	177.61
DISCCART	683234.49	4258882.08	158.51	195.95
DISCCART	683234.49	4263882.08	192.03	214.60
DISCCART	683234.49	4264382.08	175.66	192.43
DISCCART	683234.49	4264882.08	165.74	165.74
DISCCART	683234.49	4265382.08	194.00	195.94
DISCCART	683234.49	4265882.08	158.01	158.01

DISCCART	683234.49	4266382.08	171.40	183.27
DISCCART	683234.49	4266882.08	146.45	150.78
DISCCART	683234.49	4267382.08	143.71	145.61
DISCCART	683234.49	4267882.08	139.73	139.73
DISCCART	683234.49	4268382.08	142.95	142.95
DISCCART	683234.49	4268882.08	144.17	144.17
DISCCART	683234.49	4269382.08	144.87	147.01
DISCCART	683234.49	4269882.08	143.99	143.99
DISCCART	683234.49	4270382.08	142.76	142.76
DISCCART	683234.49	4270882.08	144.19	144.19
DISCCART	683234.49	4271382.08	153.06	163.86
DISCCART	683234.49	4271882.08	150.68	172.83
DISCCART	683234.49	4272382.08	146.96	178.12
DISCCART	683234.49	4272882.08	150.38	152.46
DISCCART	683234.49	4273382.08	154.24	159.39
DISCCART	683234.49	4273882.08	164.11	263.27
DISCCART	683234.49	4274382.08	187.79	265.85
DISCCART	683234.49	4274882.08	223.95	266.15
DISCCART	683234.49	4275382.08	233.68	266.15
DISCCART	683234.49	4275882.08	211.64	263.76
DISCCART	683234.49	4276382.08	194.76	268.60
DISCCART	683234.49	4276882.08	201.52	262.31
DISCCART	683234.49	4277382.08	232.82	263.39
DISCCART	683234.49	4277882.08	238.45	260.68
DISCCART	683234.49	4278382.08	238.92	258.31
DISCCART	683234.49	4278882.08	207.55	258.16
DISCCART	683234.49	4279382.08	220.18	225.85
DISCCART	683234.49	4279882.08	187.67	187.67
DISCCART	683234.49	4280382.08	166.44	177.59
DISCCART	682734.49	4263382.08	202.86	220.41
DISCCART	682734.49	4262882.08	191.75	207.13
DISCCART	682734.49	4262382.08	197.20	215.05
DISCCART	682734.49	4261882.08	218.65	218.65
DISCCART	682734.49	4261382.08	210.96	223.26
DISCCART	682734.49	4260882.08	200.04	200.04
DISCCART	682734.49	4260382.08	179.27	214.81
DISCCART	682734.49	4259882.08	183.75	214.50
DISCCART	682734.49	4259382.08	181.19	213.71
DISCCART	682734.49	4258882.08	173.43	203.91
DISCCART	682734.49	4263882.08	192.18	203.31
DISCCART	682734.49	4264382.08	203.36	205.17
DISCCART	682734.49	4264882.08	166.76	196.79
DISCCART	682734.49	4265382.08	172.28	195.45
DISCCART	682734.49	4265882.08	189.38	189.38
DISCCART	682734.49	4266382.08	165.50	165.50
DISCCART	682734.49	4266882.08	162.45	168.25
DISCCART	682734.49	4267382.08	139.56	145.52
DISCCART	682734.49	4267882.08	140.44	147.16
DISCCART	682734.49	4268382.08	142.97	142.97
DISCCART	682734.49	4268882.08	140.51	145.37
DISCCART	682734.49	4269382.08	143.86	143.86
DISCCART	682734.49	4269882.08	144.06	144.06
DISCCART	682734.49	4270382.08	144.21	144.21
DISCCART	682734.49	4270882.08	147.15	186.99
DISCCART	682734.49	4271382.08	183.71	183.71
DISCCART	682734.49	4271882.08	183.75	183.75
DISCCART	682734.49	4272382.08	170.51	184.59
DISCCART	682734.49	4272882.08	161.41	189.50
DISCCART	682734.49	4273382.08	155.63	184.08
DISCCART	682734.49	4273882.08	164.59	164.59
DISCCART	682734.49	4274382.08	190.30	263.77
DISCCART	682734.49	4274882.08	236.88	263.77
DISCCART	682734.49	4275382.08	203.25	269.68
DISCCART	682734.49	4275882.08	222.07	269.68
DISCCART	682734.49	4276382.08	204.28	270.26
DISCCART	682734.49	4276882.08	256.50	256.50

DISCCART	682734.49	4277382.08	262.84	262.84
DISCCART	682734.49	4277882.08	233.91	263.23
DISCCART	682734.49	4278382.08	233.50	262.09
DISCCART	682734.49	4278882.08	201.50	258.16
DISCCART	682734.49	4279382.08	213.89	238.99
DISCCART	682734.49	4279882.08	179.02	182.85
DISCCART	682734.49	4280382.08	172.30	209.51
DISCCART	682234.49	4263382.08	205.49	205.49
DISCCART	682234.49	4262882.08	176.24	206.06
DISCCART	682234.49	4262382.08	175.97	214.83
DISCCART	682234.49	4261882.08	218.86	218.86
DISCCART	682234.49	4261382.08	227.08	227.08
DISCCART	682234.49	4260882.08	210.81	221.01
DISCCART	682234.49	4260382.08	201.86	227.13
DISCCART	682234.49	4259882.08	209.16	212.32
DISCCART	682234.49	4259382.08	206.06	213.98
DISCCART	682234.49	4258882.08	178.93	212.78
DISCCART	682234.49	4263882.08	180.87	207.90
DISCCART	682234.49	4264382.08	206.96	206.96
DISCCART	682234.49	4264882.08	176.44	214.80
DISCCART	682234.49	4265382.08	190.97	201.57
DISCCART	682234.49	4265882.08	193.54	207.70
DISCCART	682234.49	4266382.08	165.53	165.53
DISCCART	682234.49	4266882.08	172.29	187.15
DISCCART	682234.49	4267382.08	139.56	139.56
DISCCART	682234.49	4267882.08	143.87	143.87
DISCCART	682234.49	4268382.08	141.56	146.72
DISCCART	682234.49	4268882.08	144.26	144.26
DISCCART	682234.49	4269382.08	144.35	144.35
DISCCART	682234.49	4269882.08	142.86	142.86
DISCCART	682234.49	4270382.08	144.33	186.99
DISCCART	682234.49	4270882.08	176.98	183.35
DISCCART	682234.49	4271382.08	147.76	147.76
DISCCART	682234.49	4271882.08	173.99	184.43
DISCCART	682234.49	4272382.08	157.63	162.93
DISCCART	682234.49	4272882.08	181.79	189.66
DISCCART	682234.49	4273382.08	166.43	264.16
DISCCART	682234.49	4273882.08	169.75	264.16
DISCCART	682234.49	4274382.08	176.23	264.95
DISCCART	682234.49	4274882.08	189.72	270.28
DISCCART	682234.49	4275382.08	216.84	274.00
DISCCART	682234.49	4275882.08	240.71	270.96
DISCCART	682234.49	4276382.08	243.14	270.75
DISCCART	682234.49	4276882.08	237.40	268.47
DISCCART	682234.49	4277382.08	241.53	268.10
DISCCART	682234.49	4277882.08	254.68	254.68
DISCCART	682234.49	4278382.08	254.63	257.22
DISCCART	682234.49	4278882.08	210.55	262.31
DISCCART	682234.49	4279382.08	202.17	252.02
DISCCART	682234.49	4279882.08	187.51	251.12
DISCCART	682234.49	4280382.08	178.03	245.47
DISCCART	681734.49	4263382.08	167.59	194.72
DISCCART	681734.49	4262882.08	194.43	194.43
DISCCART	681734.49	4262382.08	185.55	219.99
DISCCART	681734.49	4261882.08	217.49	219.35
DISCCART	681734.49	4261382.08	197.82	214.17
DISCCART	681734.49	4260882.08	201.15	213.84
DISCCART	681734.49	4260382.08	215.05	238.31
DISCCART	681734.49	4259882.08	206.41	239.26
DISCCART	681734.49	4259382.08	190.07	229.16
DISCCART	681734.49	4258882.08	189.58	226.56
DISCCART	681734.49	4263882.08	174.30	183.52
DISCCART	681734.49	4264382.08	201.06	201.06
DISCCART	681734.49	4264882.08	209.52	209.52
DISCCART	681734.49	4265382.08	202.60	202.60
DISCCART	681734.49	4265882.08	173.98	202.63

DISCCART	681734.49	4266382.08	167.71	184.96
DISCCART	681734.49	4266882.08	177.83	207.21
DISCCART	681734.49	4267382.08	139.56	207.21
DISCCART	681734.49	4267882.08	144.92	144.92
DISCCART	681734.49	4268382.08	143.72	143.72
DISCCART	681734.49	4268882.08	144.06	144.06
DISCCART	681734.49	4269382.08	144.65	144.65
DISCCART	681734.49	4269882.08	143.78	143.78
DISCCART	681734.49	4270382.08	144.67	144.67
DISCCART	681734.49	4270882.08	173.79	178.14
DISCCART	681734.49	4271382.08	191.25	196.79
DISCCART	681734.49	4271882.08	154.24	154.24
DISCCART	681734.49	4272382.08	167.23	183.46
DISCCART	681734.49	4272882.08	185.31	193.71
DISCCART	681734.49	4273382.08	174.94	264.16
DISCCART	681734.49	4273882.08	211.26	264.16
DISCCART	681734.49	4274382.08	240.47	262.14
DISCCART	681734.49	4274882.08	204.13	274.71
DISCCART	681734.49	4275382.08	244.45	274.96
DISCCART	681734.49	4275882.08	271.78	271.78
DISCCART	681734.49	4276382.08	268.80	268.80
DISCCART	681734.49	4276882.08	262.54	268.76
DISCCART	681734.49	4277382.08	262.85	262.85
DISCCART	681734.49	4277882.08	263.33	263.33
DISCCART	681734.49	4278382.08	234.98	262.78
DISCCART	681734.49	4278882.08	250.15	259.69
DISCCART	681734.49	4279382.08	237.74	256.32
DISCCART	681734.49	4279882.08	186.57	256.32
DISCCART	681734.49	4280382.08	178.96	178.96
DISCCART	681234.49	4263382.08	190.46	208.00
DISCCART	681234.49	4262882.08	199.52	226.40
DISCCART	681234.49	4262382.08	220.56	220.56
DISCCART	681234.49	4261882.08	192.60	220.59
DISCCART	681234.49	4261382.08	190.32	198.33
DISCCART	681234.49	4260882.08	210.38	220.52
DISCCART	681234.49	4260382.08	217.93	238.54
DISCCART	681234.49	4259882.08	232.18	232.18
DISCCART	681234.49	4259382.08	217.71	226.88
DISCCART	681234.49	4258882.08	200.69	226.56
DISCCART	681234.49	4263882.08	170.60	208.00
DISCCART	681234.49	4264382.08	176.94	182.05
DISCCART	681234.49	4264882.08	206.56	207.44
DISCCART	681234.49	4265382.08	186.19	209.52
DISCCART	681234.49	4265882.08	187.41	203.43
DISCCART	681234.49	4266382.08	175.37	196.40
DISCCART	681234.49	4266882.08	166.46	207.21
DISCCART	681234.49	4267382.08	141.79	207.21
DISCCART	681234.49	4267882.08	143.19	143.19
DISCCART	681234.49	4268382.08	144.17	144.17
DISCCART	681234.49	4268882.08	144.19	144.19
DISCCART	681234.49	4269382.08	144.67	144.67
DISCCART	681234.49	4269882.08	144.47	144.47
DISCCART	681234.49	4270382.08	144.68	177.64
DISCCART	681234.49	4270882.08	185.95	189.00
DISCCART	681234.49	4271382.08	161.55	195.23
DISCCART	681234.49	4271882.08	161.79	165.00
DISCCART	681234.49	4272382.08	170.87	188.52
DISCCART	681234.49	4272882.08	180.93	183.01
DISCCART	681234.49	4273382.08	196.49	257.58
DISCCART	681234.49	4273882.08	255.87	255.87
DISCCART	681234.49	4274382.08	215.66	268.01
DISCCART	681234.49	4274882.08	262.50	262.76
DISCCART	681234.49	4275382.08	242.37	275.07
DISCCART	681234.49	4275882.08	271.29	271.29
DISCCART	681234.49	4276382.08	251.61	262.06
DISCCART	681234.49	4276882.08	261.73	261.73

DISCCART	681234.49	4277382.08	245.96	263.37
DISCCART	681234.49	4277882.08	241.88	257.92
DISCCART	681234.49	4278382.08	242.65	257.93
DISCCART	681234.49	4278882.08	218.11	258.53
DISCCART	681234.49	4279382.08	215.61	251.31
DISCCART	681234.49	4279882.08	178.68	256.32
DISCCART	681234.49	4280382.08	192.75	244.97
DISCCART	680734.49	4263382.08	208.10	208.10
DISCCART	680734.49	4262882.08	185.65	224.31
DISCCART	680734.49	4262382.08	205.80	206.25
DISCCART	680734.49	4261882.08	176.06	196.34
DISCCART	680734.49	4261382.08	187.99	207.40
DISCCART	680734.49	4260882.08	195.04	196.67
DISCCART	680734.49	4260382.08	215.66	226.07
DISCCART	680734.49	4259882.08	218.38	237.98
DISCCART	680734.49	4259382.08	218.62	218.62
DISCCART	680734.49	4258882.08	186.44	219.54
DISCCART	680734.49	4263882.08	190.33	190.33
DISCCART	680734.49	4264382.08	156.33	195.72
DISCCART	680734.49	4264882.08	158.42	208.69
DISCCART	680734.49	4265382.08	183.11	209.35
DISCCART	680734.49	4265882.08	189.48	195.98
DISCCART	680734.49	4266382.08	196.66	196.66
DISCCART	680734.49	4266882.08	175.94	207.68
DISCCART	680734.49	4267382.08	143.47	207.00
DISCCART	680734.49	4267882.08	144.67	144.67
DISCCART	680734.49	4268382.08	145.31	145.31
DISCCART	680734.49	4268882.08	145.57	145.57
DISCCART	680734.49	4269382.08	144.39	144.39
DISCCART	680734.49	4269882.08	145.22	145.22
DISCCART	680734.49	4270382.08	144.62	144.62
DISCCART	680734.49	4270882.08	167.29	189.89
DISCCART	680734.49	4271382.08	175.03	176.36
DISCCART	680734.49	4271882.08	160.61	171.14
DISCCART	680734.49	4272382.08	156.95	159.19
DISCCART	680734.49	4272882.08	175.68	245.58
DISCCART	680734.49	4273382.08	202.87	258.11
DISCCART	680734.49	4273882.08	251.12	257.88
DISCCART	680734.49	4274382.08	220.95	257.85
DISCCART	680734.49	4274882.08	256.52	256.52
DISCCART	680734.49	4275382.08	255.86	255.86
DISCCART	680734.49	4275882.08	249.34	258.33
DISCCART	680734.49	4276382.08	254.95	254.95
DISCCART	680734.49	4276882.08	233.52	262.97
DISCCART	680734.49	4277382.08	233.98	252.54
DISCCART	680734.49	4277882.08	230.03	250.34
DISCCART	680734.49	4278382.08	224.29	238.33
DISCCART	680734.49	4278882.08	225.61	233.12
DISCCART	680734.49	4279382.08	231.15	232.23
DISCCART	680734.49	4279882.08	180.78	244.97
DISCCART	680734.49	4280382.08	224.82	245.33
DISCCART	680234.49	4263382.08	183.46	183.46
DISCCART	680234.49	4262882.08	180.79	201.77
DISCCART	680234.49	4262382.08	180.49	203.30
DISCCART	680234.49	4261882.08	173.31	189.74
DISCCART	680234.49	4261382.08	190.61	194.48
DISCCART	680234.49	4260882.08	210.98	220.48
DISCCART	680234.49	4260382.08	199.78	224.62
DISCCART	680234.49	4259882.08	224.15	231.65
DISCCART	680234.49	4259382.08	188.92	236.65
DISCCART	680234.49	4258882.08	181.68	227.21
DISCCART	680234.49	4263882.08	188.62	195.62
DISCCART	680234.49	4264382.08	160.57	195.53
DISCCART	680234.49	4264882.08	161.11	188.28
DISCCART	680234.49	4265382.08	201.67	201.67
DISCCART	680234.49	4265882.08	178.05	178.05

DISCCART	680234.49	4266382.08	176.84	192.43
DISCCART	680234.49	4266882.08	188.76	202.98
DISCCART	680234.49	4267382.08	143.47	202.98
DISCCART	680234.49	4267882.08	145.95	145.95
DISCCART	680234.49	4268382.08	145.32	145.32
DISCCART	680234.49	4268882.08	145.02	145.02
DISCCART	680234.49	4269382.08	144.46	144.46
DISCCART	680234.49	4269882.08	145.29	145.29
DISCCART	680234.49	4270382.08	144.82	144.82
DISCCART	680234.49	4270882.08	165.29	187.57
DISCCART	680234.49	4271382.08	180.79	188.20
DISCCART	680234.49	4271882.08	171.89	171.89
DISCCART	680234.49	4272382.08	177.63	177.63
DISCCART	680234.49	4272882.08	169.03	251.43
DISCCART	680234.49	4273382.08	191.42	191.42
DISCCART	680234.49	4273882.08	197.30	258.11
DISCCART	680234.49	4274382.08	196.54	263.57
DISCCART	680234.49	4274882.08	255.30	258.93
DISCCART	680234.49	4275382.08	260.12	260.12
DISCCART	680234.49	4275882.08	246.44	250.37
DISCCART	680234.49	4276382.08	246.66	250.46
DISCCART	680234.49	4276882.08	249.71	249.71
DISCCART	680234.49	4277382.08	225.97	251.54
DISCCART	680234.49	4277882.08	226.77	251.84
DISCCART	680234.49	4278382.08	229.67	245.92
DISCCART	680234.49	4278882.08	224.30	239.73
DISCCART	680234.49	4279382.08	213.68	219.30
DISCCART	680234.49	4279882.08	188.45	251.13
DISCCART	680234.49	4280382.08	231.07	250.25
DISCCART	679734.49	4263382.08	167.32	201.73
DISCCART	679734.49	4262882.08	193.69	200.85
DISCCART	679734.49	4262382.08	164.49	201.16
DISCCART	679734.49	4261882.08	171.02	190.26
DISCCART	679734.49	4261382.08	179.58	196.96
DISCCART	679734.49	4260882.08	176.68	201.57
DISCCART	679734.49	4260382.08	188.40	213.41
DISCCART	679734.49	4259882.08	205.28	226.31
DISCCART	679734.49	4259382.08	201.94	227.80
DISCCART	679734.49	4258882.08	193.33	226.32
DISCCART	679734.49	4263882.08	169.44	169.44
DISCCART	679734.49	4264382.08	154.00	190.61
DISCCART	679734.49	4264882.08	164.25	164.25
DISCCART	679734.49	4265382.08	194.75	206.50
DISCCART	679734.49	4265882.08	181.56	181.56
DISCCART	679734.49	4266382.08	174.92	177.90
DISCCART	679734.49	4266882.08	190.73	202.74
DISCCART	679734.49	4267382.08	143.23	203.86
DISCCART	679734.49	4267882.08	145.86	145.86
DISCCART	679734.49	4268382.08	146.41	146.41
DISCCART	679734.49	4268882.08	143.84	143.84
DISCCART	679734.49	4269382.08	144.05	144.05
DISCCART	679734.49	4269882.08	145.23	145.23
DISCCART	679734.49	4270382.08	145.56	202.97
DISCCART	679734.49	4270882.08	169.62	202.97
DISCCART	679734.49	4271382.08	190.97	197.20
DISCCART	679734.49	4271882.08	179.96	189.33
DISCCART	679734.49	4272382.08	197.06	197.06
DISCCART	679734.49	4272882.08	182.26	264.00
DISCCART	679734.49	4273382.08	211.09	264.00
DISCCART	679734.49	4273882.08	241.27	250.65
DISCCART	679734.49	4274382.08	242.79	260.06
DISCCART	679734.49	4274882.08	258.28	258.28
DISCCART	679734.49	4275382.08	253.67	253.88
DISCCART	679734.49	4275882.08	252.46	252.46
DISCCART	679734.49	4276382.08	231.33	250.68
DISCCART	679734.49	4276882.08	233.63	251.06

DISCCART	679734.49	4277382.08	238.21	250.40
DISCCART	679734.49	4277882.08	244.40	250.76
DISCCART	679734.49	4278382.08	217.55	245.65
DISCCART	679734.49	4278882.08	208.73	245.05
DISCCART	679734.49	4279382.08	188.81	238.41
DISCCART	679734.49	4279882.08	213.04	246.26
DISCCART	679734.49	4280382.08	209.84	257.45
DISCCART	679234.49	4263382.08	189.53	190.41
DISCCART	679234.49	4262882.08	170.06	189.57
DISCCART	679234.49	4262382.08	158.79	181.86
DISCCART	679234.49	4261882.08	169.46	193.97
DISCCART	679234.49	4261382.08	166.47	196.04
DISCCART	679234.49	4260882.08	171.58	202.58
DISCCART	679234.49	4260382.08	201.95	201.95
DISCCART	679234.49	4259882.08	207.56	207.56
DISCCART	679234.49	4259382.08	183.66	196.51
DISCCART	679234.49	4258882.08	150.93	227.11
DISCCART	679234.49	4263882.08	174.25	180.00
DISCCART	679234.49	4264382.08	162.49	176.99
DISCCART	679234.49	4264882.08	160.66	160.66
DISCCART	679234.49	4265382.08	195.82	197.96
DISCCART	679234.49	4265882.08	165.37	165.37
DISCCART	679234.49	4266382.08	164.54	187.06
DISCCART	679234.49	4266882.08	197.55	197.55
DISCCART	679234.49	4267382.08	143.05	206.56
DISCCART	679234.49	4267882.08	145.54	148.36
DISCCART	679234.49	4268382.08	144.71	144.71
DISCCART	679234.49	4268882.08	145.03	145.03
DISCCART	679234.49	4269382.08	144.07	144.07
DISCCART	679234.49	4269882.08	144.66	144.66
DISCCART	679234.49	4270382.08	144.86	202.97
DISCCART	679234.49	4270882.08	168.50	202.97
DISCCART	679234.49	4271382.08	162.41	172.57
DISCCART	679234.49	4271882.08	171.73	171.73
DISCCART	679234.49	4272382.08	168.54	244.36
DISCCART	679234.49	4272882.08	226.25	234.78
DISCCART	679234.49	4273382.08	236.71	264.14
DISCCART	679234.49	4273882.08	259.71	259.71
DISCCART	679234.49	4274382.08	257.66	258.91
DISCCART	679234.49	4274882.08	211.40	260.60
DISCCART	679234.49	4275382.08	224.35	259.18
DISCCART	679234.49	4275882.08	252.78	252.78
DISCCART	679234.49	4276382.08	232.47	251.74
DISCCART	679234.49	4276882.08	216.24	250.99
DISCCART	679234.49	4277382.08	220.84	247.84
DISCCART	679234.49	4277882.08	232.95	245.06
DISCCART	679234.49	4278382.08	213.36	241.78
DISCCART	679234.49	4278882.08	202.46	238.48
DISCCART	679234.49	4279382.08	197.37	237.58
DISCCART	679234.49	4279882.08	210.74	251.69
DISCCART	679234.49	4280382.08	228.75	258.27
DISCCART	678734.49	4263382.08	153.82	153.82
DISCCART	678734.49	4262882.08	152.38	152.38
DISCCART	678734.49	4262382.08	160.16	177.85
DISCCART	678734.49	4261882.08	160.61	160.61
DISCCART	678734.49	4261382.08	158.12	177.32
DISCCART	678734.49	4260882.08	169.84	189.16
DISCCART	678734.49	4260382.08	180.98	202.28
DISCCART	678734.49	4259882.08	202.04	202.04
DISCCART	678734.49	4259382.08	147.74	202.97
DISCCART	678734.49	4258882.08	155.03	155.03
DISCCART	678734.49	4263882.08	158.24	158.24
DISCCART	678734.49	4264382.08	161.05	177.17
DISCCART	678734.49	4264882.08	155.43	155.43
DISCCART	678734.49	4265382.08	175.91	182.43
DISCCART	678734.49	4265882.08	163.53	190.14

DISCCART	678734.49	4266382.08	167.76	184.83
DISCCART	678734.49	4266882.08	176.21	199.05
DISCCART	678734.49	4267382.08	160.11	204.04
DISCCART	678734.49	4267882.08	143.13	201.43
DISCCART	678734.49	4268382.08	143.72	143.72
DISCCART	678734.49	4268882.08	144.47	144.47
DISCCART	678734.49	4269382.08	145.92	145.92
DISCCART	678734.49	4269882.08	145.61	145.61
DISCCART	678734.49	4270382.08	146.01	146.01
DISCCART	678734.49	4270882.08	147.65	186.56
DISCCART	678734.49	4271382.08	158.44	188.67
DISCCART	678734.49	4271882.08	166.38	176.74
DISCCART	678734.49	4272382.08	174.48	178.05
DISCCART	678734.49	4272882.08	173.86	264.14
DISCCART	678734.49	4273382.08	183.57	264.14
DISCCART	678734.49	4273882.08	217.54	261.68
DISCCART	678734.49	4274382.08	260.93	260.93
DISCCART	678734.49	4274882.08	254.48	257.67
DISCCART	678734.49	4275382.08	210.32	257.46
DISCCART	678734.49	4275882.08	248.68	253.46
DISCCART	678734.49	4276382.08	239.85	248.87
DISCCART	678734.49	4276882.08	244.84	247.17
DISCCART	678734.49	4277382.08	221.16	244.72
DISCCART	678734.49	4277882.08	210.59	210.59
DISCCART	678734.49	4278382.08	221.76	240.16
DISCCART	678734.49	4278882.08	228.96	238.83
DISCCART	678734.49	4279382.08	200.82	240.36
DISCCART	678734.49	4279882.08	221.88	247.01
DISCCART	678734.49	4280382.08	241.21	241.21
DISCCART	683734.49	4263382.08	206.97	220.42
DISCCART	683734.49	4262882.08	202.56	219.87
DISCCART	683734.49	4262382.08	190.00	190.00
DISCCART	683734.49	4261882.08	214.52	214.52
DISCCART	683734.49	4261382.08	219.20	219.20
DISCCART	683734.49	4260882.08	201.50	201.67
DISCCART	683734.49	4260382.08	179.18	198.63
DISCCART	683734.49	4259882.08	176.39	203.06
DISCCART	683734.49	4259382.08	193.49	201.68
DISCCART	683734.49	4258882.08	177.38	195.50
DISCCART	683734.49	4275882.08	188.16	256.94
DISCCART	683734.49	4276382.08	182.83	257.41
DISCCART	683734.49	4276882.08	213.27	257.02
DISCCART	683734.49	4277382.08	236.65	250.64
DISCCART	683734.49	4277882.08	229.80	258.19
DISCCART	683734.49	4278382.08	201.15	258.31
DISCCART	683734.49	4278882.08	234.12	239.53
DISCCART	683734.49	4279382.08	214.27	232.72
DISCCART	683734.49	4279882.08	209.54	226.94
DISCCART	683734.49	4280382.08	179.56	239.17
DISCCART	684234.49	4263382.08	190.07	213.79
DISCCART	684234.49	4262882.08	211.52	226.18
DISCCART	684234.49	4262382.08	210.40	225.99
DISCCART	684234.49	4261882.08	202.71	215.34
DISCCART	684234.49	4261382.08	211.96	219.42
DISCCART	684234.49	4260882.08	208.29	208.29
DISCCART	684234.49	4260382.08	206.89	206.89
DISCCART	684234.49	4259882.08	186.62	186.62
DISCCART	684234.49	4259382.08	175.56	202.74
DISCCART	684234.49	4258882.08	168.69	202.72
DISCCART	684234.49	4275882.08	223.10	223.10
DISCCART	684234.49	4276382.08	189.54	238.49
DISCCART	684234.49	4276882.08	183.25	257.02
DISCCART	684234.49	4277382.08	180.77	257.37
DISCCART	684234.49	4277882.08	211.37	257.48
DISCCART	684234.49	4278382.08	211.77	257.48
DISCCART	684234.49	4278882.08	188.36	251.34

DISCCART	684234.49	4279382.08	180.05	232.72
DISCCART	684234.49	4279882.08	200.66	233.64
DISCCART	684234.49	4280382.08	230.72	237.63
DISCCART	684734.49	4263382.08	204.46	204.77
DISCCART	684734.49	4262882.08	211.93	211.93
DISCCART	684734.49	4262382.08	216.77	216.77
DISCCART	684734.49	4261882.08	197.68	216.36
DISCCART	684734.49	4261382.08	218.07	218.07
DISCCART	684734.49	4260882.08	192.87	192.87
DISCCART	684734.49	4260382.08	184.95	184.95
DISCCART	684734.49	4259882.08	193.79	202.03
DISCCART	684734.49	4259382.08	201.51	201.51
DISCCART	684734.49	4258882.08	173.86	204.24
DISCCART	684734.49	4275882.08	185.76	251.63
DISCCART	684734.49	4276382.08	183.59	253.70
DISCCART	684734.49	4276882.08	169.57	253.83
DISCCART	684734.49	4277382.08	170.68	238.35
DISCCART	684734.49	4277882.08	192.00	251.38
DISCCART	684734.49	4278382.08	248.61	249.69
DISCCART	684734.49	4278882.08	242.70	250.96
DISCCART	684734.49	4279382.08	198.92	251.29
DISCCART	684734.49	4279882.08	173.09	238.89
DISCCART	684734.49	4280382.08	171.97	239.17
DISCCART	685234.49	4263382.08	173.89	188.85
DISCCART	685234.49	4262882.08	183.79	207.07
DISCCART	685234.49	4262382.08	188.78	195.42
DISCCART	685234.49	4261882.08	211.49	211.49
DISCCART	685234.49	4261382.08	202.60	202.60
DISCCART	685234.49	4260882.08	225.60	225.60
DISCCART	685234.49	4260382.08	213.13	213.13
DISCCART	685234.49	4259882.08	204.20	204.20
DISCCART	685234.49	4259382.08	183.98	203.55
DISCCART	685234.49	4258882.08	201.04	201.04
DISCCART	685234.49	4275882.08	224.08	248.99
DISCCART	685234.49	4276382.08	232.55	251.70
DISCCART	685234.49	4276882.08	214.71	253.83
DISCCART	685234.49	4277382.08	169.47	253.73
DISCCART	685234.49	4277882.08	187.02	251.38
DISCCART	685234.49	4278382.08	204.61	251.38
DISCCART	685234.49	4278882.08	199.66	251.99
DISCCART	685234.49	4279382.08	195.34	245.27
DISCCART	685234.49	4279882.08	222.61	238.89
DISCCART	685234.49	4280382.08	217.00	228.90
DISCCART	685734.49	4263382.08	163.70	203.03
DISCCART	685734.49	4262882.08	169.06	204.00
DISCCART	685734.49	4262382.08	173.78	203.81
DISCCART	685734.49	4261882.08	181.14	207.41
DISCCART	685734.49	4261382.08	192.01	209.03
DISCCART	685734.49	4260882.08	202.97	225.18
DISCCART	685734.49	4260382.08	215.07	231.52
DISCCART	685734.49	4259882.08	201.37	201.37
DISCCART	685734.49	4259382.08	203.41	203.41
DISCCART	685734.49	4258882.08	179.66	185.75
DISCCART	685734.49	4275882.08	250.61	260.06
DISCCART	685734.49	4276382.08	209.21	260.06
DISCCART	685734.49	4276882.08	181.59	259.22
DISCCART	685734.49	4277382.08	164.02	253.83
DISCCART	685734.49	4277882.08	173.39	251.38
DISCCART	685734.49	4278382.08	213.14	238.94
DISCCART	685734.49	4278882.08	205.68	226.19
DISCCART	685734.49	4279382.08	168.32	238.89
DISCCART	685734.49	4279882.08	220.20	234.03
DISCCART	685734.49	4280382.08	176.20	238.89
DISCCART	686234.49	4263382.08	193.80	194.44
DISCCART	686234.49	4262882.08	203.24	203.24
DISCCART	686234.49	4262382.08	205.39	205.39

DISCCART	686234.49	4261882.08	202.18	202.18
DISCCART	686234.49	4261382.08	211.35	213.78
DISCCART	686234.49	4260882.08	201.32	201.32
DISCCART	686234.49	4260382.08	228.05	231.63
DISCCART	686234.49	4259882.08	207.41	207.41
DISCCART	686234.49	4259382.08	206.74	206.74
DISCCART	686234.49	4258882.08	183.89	203.54
DISCCART	686234.49	4275882.08	200.46	262.35
DISCCART	686234.49	4276382.08	208.69	259.22
DISCCART	686234.49	4276882.08	227.00	240.15
DISCCART	686234.49	4277382.08	212.15	223.26
DISCCART	686234.49	4277882.08	157.23	223.26
DISCCART	686234.49	4278382.08	175.21	234.01
DISCCART	686234.49	4278882.08	200.27	205.09
DISCCART	686234.49	4279382.08	163.13	226.10
DISCCART	686234.49	4279882.08	188.14	226.10
DISCCART	686234.49	4280382.08	152.67	234.03
DISCCART	686734.49	4263382.08	184.71	210.81
DISCCART	686734.49	4262882.08	197.17	234.61
DISCCART	686734.49	4262382.08	206.01	219.87
DISCCART	686734.49	4261882.08	210.14	211.22
DISCCART	686734.49	4261382.08	201.07	221.58
DISCCART	686734.49	4260882.08	212.37	245.09
DISCCART	686734.49	4260382.08	223.56	247.70
DISCCART	686734.49	4259882.08	230.83	233.32
DISCCART	686734.49	4259382.08	216.32	216.32
DISCCART	686734.49	4258882.08	193.83	209.41
DISCCART	686734.49	4275882.08	194.16	254.20
DISCCART	686734.49	4276382.08	228.49	241.97
DISCCART	686734.49	4276882.08	205.07	256.82
DISCCART	686734.49	4277382.08	173.86	247.59
DISCCART	686734.49	4277882.08	169.34	203.13
DISCCART	686734.49	4278382.08	152.97	203.13
DISCCART	686734.49	4278882.08	168.58	208.17
DISCCART	686734.49	4279382.08	148.26	208.17
DISCCART	686734.49	4279882.08	153.87	242.07
DISCCART	686734.49	4280382.08	165.41	242.07
DISCCART	687234.49	4263382.08	189.63	207.58
DISCCART	687234.49	4262882.08	219.98	233.53
DISCCART	687234.49	4262382.08	207.78	232.44
DISCCART	687234.49	4261882.08	223.28	227.27
DISCCART	687234.49	4261382.08	232.00	232.00
DISCCART	687234.49	4260882.08	224.75	240.82
DISCCART	687234.49	4260382.08	221.78	239.98
DISCCART	687234.49	4259882.08	224.54	238.65
DISCCART	687234.49	4259382.08	224.00	224.00
DISCCART	687234.49	4258882.08	220.03	220.03
DISCCART	687234.49	4275882.08	188.54	251.91
DISCCART	687234.49	4276382.08	187.12	247.59
DISCCART	687234.49	4276882.08	238.98	238.98
DISCCART	687234.49	4277382.08	174.48	247.53
DISCCART	687234.49	4277882.08	164.84	203.13
DISCCART	687234.49	4278382.08	165.49	195.94
DISCCART	687234.49	4278882.08	147.65	186.37
DISCCART	687234.49	4279382.08	151.23	240.52
DISCCART	687234.49	4279882.08	165.79	242.07
DISCCART	687234.49	4280382.08	239.64	239.64
DISCCART	687734.49	4263382.08	189.74	196.28
DISCCART	687734.49	4262882.08	194.68	194.68
DISCCART	687734.49	4262382.08	205.93	213.95
DISCCART	687734.49	4261882.08	223.55	226.62
DISCCART	687734.49	4261382.08	213.26	238.65
DISCCART	687734.49	4260882.08	226.08	226.08
DISCCART	687734.49	4260382.08	220.42	227.73
DISCCART	687734.49	4259882.08	230.14	233.30
DISCCART	687734.49	4259382.08	219.96	232.19

DISCCART	687734.49	4258882.08	220.51	228.35
DISCCART	687734.49	4275882.08	236.62	240.37
DISCCART	687734.49	4276382.08	172.56	241.33
DISCCART	687734.49	4276882.08	192.84	241.45
DISCCART	687734.49	4277382.08	218.49	231.11
DISCCART	687734.49	4277882.08	162.08	231.11
DISCCART	687734.49	4278382.08	151.76	151.76
DISCCART	687734.49	4278882.08	153.04	232.34
DISCCART	687734.49	4279382.08	163.57	240.67
DISCCART	687734.49	4279882.08	194.15	241.75
DISCCART	687734.49	4280382.08	228.70	240.22
DISCCART	688234.49	4263382.08	170.28	170.28
DISCCART	688234.49	4262882.08	189.39	189.39
DISCCART	688234.49	4262382.08	179.48	179.48
DISCCART	688234.49	4261882.08	193.32	209.50
DISCCART	688234.49	4261382.08	216.44	216.44
DISCCART	688234.49	4260882.08	192.81	192.81
DISCCART	688234.49	4260382.08	207.62	213.78
DISCCART	688234.49	4259882.08	202.47	205.30
DISCCART	688234.49	4259382.08	213.49	213.49
DISCCART	688234.49	4258882.08	175.39	232.03
DISCCART	688234.49	4275882.08	187.32	256.98
DISCCART	688234.49	4276382.08	169.21	244.88
DISCCART	688234.49	4276882.08	190.09	226.67
DISCCART	688234.49	4277382.08	182.73	231.11
DISCCART	688234.49	4277882.08	149.34	231.11
DISCCART	688234.49	4278382.08	150.36	150.36
DISCCART	688234.49	4278882.08	176.02	201.86
DISCCART	688234.49	4279382.08	198.39	234.49
DISCCART	688234.49	4279882.08	219.39	240.90
DISCCART	688234.49	4280382.08	187.76	240.90
DISCCART	688734.49	4263382.08	174.75	185.72
DISCCART	688734.49	4262882.08	179.66	179.66
DISCCART	688734.49	4262382.08	182.73	197.41
DISCCART	688734.49	4261882.08	190.74	213.87
DISCCART	688734.49	4261382.08	206.97	214.50
DISCCART	688734.49	4260882.08	202.72	211.56
DISCCART	688734.49	4260382.08	190.41	194.63
DISCCART	688734.49	4259882.08	190.36	220.64
DISCCART	688734.49	4259382.08	205.84	214.19
DISCCART	688734.49	4258882.08	192.00	208.36
DISCCART	688734.49	4275882.08	207.10	210.00
DISCCART	688734.49	4276382.08	162.77	244.88
DISCCART	688734.49	4276882.08	187.24	226.67
DISCCART	688734.49	4277382.08	173.99	205.90
DISCCART	688734.49	4277882.08	146.26	183.50
DISCCART	688734.49	4278382.08	152.95	185.30
DISCCART	688734.49	4278882.08	159.86	235.86
DISCCART	688734.49	4279382.08	227.22	235.86
DISCCART	688734.49	4279882.08	228.06	228.06
DISCCART	688734.49	4280382.08	178.93	239.24
DISCCART	689234.49	4263382.08	184.85	202.38
DISCCART	689234.49	4262882.08	176.41	183.32
DISCCART	689234.49	4262382.08	174.43	174.43
DISCCART	689234.49	4261882.08	196.11	209.94
DISCCART	689234.49	4261382.08	211.70	213.53
DISCCART	689234.49	4260882.08	184.54	190.22
DISCCART	689234.49	4260382.08	183.08	191.66
DISCCART	689234.49	4259882.08	193.40	193.40
DISCCART	689234.49	4259382.08	187.23	214.98
DISCCART	689234.49	4258882.08	176.32	203.21
DISCCART	689234.49	4275882.08	181.75	240.31
DISCCART	689234.49	4276382.08	163.45	238.34
DISCCART	689234.49	4276882.08	170.24	170.98
DISCCART	689234.49	4277382.08	155.29	204.60
DISCCART	689234.49	4277882.08	143.75	197.62

DISCCART	689234.49	4278382.08	151.57	151.57
DISCCART	689234.49	4278882.08	175.63	195.95
DISCCART	689234.49	4279382.08	178.67	239.50
DISCCART	689234.49	4279882.08	175.05	239.50
DISCCART	689234.49	4280382.08	180.68	227.88
DISCCART	689734.49	4263382.08	201.69	201.69
DISCCART	689734.49	4262882.08	184.03	200.70
DISCCART	689734.49	4262382.08	193.04	195.71
DISCCART	689734.49	4261882.08	188.58	204.14
DISCCART	689734.49	4261382.08	193.79	193.79
DISCCART	689734.49	4260882.08	195.90	195.90
DISCCART	689734.49	4260382.08	172.94	172.94
DISCCART	689734.49	4259882.08	197.26	197.26
DISCCART	689734.49	4259382.08	183.75	183.75
DISCCART	689734.49	4258882.08	190.60	198.26
DISCCART	689734.49	4275882.08	225.50	236.87
DISCCART	689734.49	4276382.08	204.67	232.04
DISCCART	689734.49	4276882.08	172.90	232.27
DISCCART	689734.49	4277382.08	168.91	232.27
DISCCART	689734.49	4277882.08	179.46	225.84
DISCCART	689734.49	4278382.08	143.57	197.62
DISCCART	689734.49	4278882.08	150.21	239.28
DISCCART	689734.49	4279382.08	186.75	239.50
DISCCART	689734.49	4279882.08	209.24	239.50
DISCCART	689734.49	4280382.08	149.51	239.50
DISCCART	690234.49	4263382.08	188.91	272.01
DISCCART	690234.49	4262882.08	202.47	202.47
DISCCART	690234.49	4262382.08	199.32	200.72
DISCCART	690234.49	4261882.08	193.81	193.81
DISCCART	690234.49	4261382.08	197.56	197.56
DISCCART	690234.49	4260882.08	183.70	183.70
DISCCART	690234.49	4260382.08	176.39	176.39
DISCCART	690234.49	4259882.08	196.63	196.63
DISCCART	690234.49	4259382.08	164.03	178.05
DISCCART	690234.49	4258882.08	140.03	198.26
DISCCART	690234.49	4275882.08	203.69	229.27
DISCCART	690234.49	4276382.08	205.48	236.23
DISCCART	690234.49	4276882.08	214.93	229.80
DISCCART	690234.49	4277382.08	201.14	232.27
DISCCART	690234.49	4277882.08	160.22	228.52
DISCCART	690234.49	4278382.08	155.62	214.11
DISCCART	690234.49	4278882.08	153.26	153.26
DISCCART	690234.49	4279382.08	152.49	239.50
DISCCART	690234.49	4279882.08	143.96	239.50
DISCCART	690234.49	4280382.08	145.46	239.50
DISCCART	690734.49	4263382.08	237.89	272.01
DISCCART	690734.49	4262882.08	223.83	272.01
DISCCART	690734.49	4262382.08	191.74	270.80
DISCCART	690734.49	4261882.08	186.38	186.38
DISCCART	690734.49	4261382.08	182.12	190.62
DISCCART	690734.49	4260882.08	171.99	171.99
DISCCART	690734.49	4260382.08	181.85	181.85
DISCCART	690734.49	4259882.08	164.39	190.38
DISCCART	690734.49	4259382.08	139.64	184.86
DISCCART	690734.49	4258882.08	142.75	142.75
DISCCART	690734.49	4275882.08	207.90	226.68
DISCCART	690734.49	4276382.08	207.74	233.30
DISCCART	690734.49	4276882.08	186.03	215.79
DISCCART	690734.49	4277382.08	197.97	210.18
DISCCART	690734.49	4277882.08	174.36	220.02
DISCCART	690734.49	4278382.08	152.74	214.11
DISCCART	690734.49	4278882.08	146.05	146.05
DISCCART	690734.49	4279382.08	173.14	183.52
DISCCART	690734.49	4279882.08	171.26	217.29
DISCCART	690734.49	4280382.08	188.82	214.95
DISCCART	691234.49	4263382.08	262.32	262.32

DISCCART	691234.49	4262882.08	252.86	264.97
DISCCART	691234.49	4262382.08	184.84	271.86
DISCCART	691234.49	4261882.08	177.51	177.51
DISCCART	691234.49	4261382.08	185.54	189.30
DISCCART	691234.49	4260882.08	165.21	165.21
DISCCART	691234.49	4260382.08	178.73	189.43
DISCCART	691234.49	4259882.08	167.17	177.50
DISCCART	691234.49	4259382.08	139.43	139.43
DISCCART	691234.49	4258882.08	145.89	145.89
DISCCART	691234.49	4275882.08	170.24	226.68
DISCCART	691234.49	4276382.08	168.06	183.29
DISCCART	691234.49	4276882.08	190.25	198.20
DISCCART	691234.49	4277382.08	183.58	187.13
DISCCART	691234.49	4277882.08	188.86	199.24
DISCCART	691234.49	4278382.08	152.82	203.97
DISCCART	691234.49	4278882.08	146.92	146.92
DISCCART	691234.49	4279382.08	140.03	217.29
DISCCART	691234.49	4279882.08	183.44	217.29
DISCCART	691234.49	4280382.08	161.16	223.83
DISCCART	691734.49	4263382.08	258.06	258.28
DISCCART	691734.49	4262882.08	214.78	269.57
DISCCART	691734.49	4262382.08	184.46	266.32
DISCCART	691734.49	4261882.08	179.23	180.51
DISCCART	691734.49	4261382.08	170.89	170.89
DISCCART	691734.49	4260882.08	168.84	183.46
DISCCART	691734.49	4260382.08	159.91	183.85
DISCCART	691734.49	4259882.08	139.43	139.43
DISCCART	691734.49	4259382.08	139.57	173.10
DISCCART	691734.49	4258882.08	179.17	179.17
DISCCART	691734.49	4275882.08	158.24	158.24
DISCCART	691734.49	4276382.08	172.45	177.09
DISCCART	691734.49	4276882.08	193.26	196.82
DISCCART	691734.49	4277382.08	174.38	188.89
DISCCART	691734.49	4277882.08	173.96	203.97
DISCCART	691734.49	4278382.08	168.83	203.97
DISCCART	691734.49	4278882.08	156.33	179.74
DISCCART	691734.49	4279382.08	140.06	197.04
DISCCART	691734.49	4279882.08	145.56	207.82
DISCCART	691734.49	4280382.08	166.95	190.85
DISCCART	692234.49	4263382.08	260.23	265.44
DISCCART	692234.49	4262882.08	192.38	266.32
DISCCART	692234.49	4262382.08	190.38	190.38
DISCCART	692234.49	4261882.08	168.49	168.49
DISCCART	692234.49	4261382.08	169.38	169.38
DISCCART	692234.49	4260882.08	169.09	169.09
DISCCART	692234.49	4260382.08	143.06	183.17
DISCCART	692234.49	4259882.08	140.14	140.14
DISCCART	692234.49	4259382.08	146.17	146.17
DISCCART	692234.49	4258882.08	166.76	166.76
DISCCART	692234.49	4275882.08	142.02	173.58
DISCCART	692234.49	4276382.08	156.04	166.09
DISCCART	692234.49	4276882.08	166.20	202.10
DISCCART	692234.49	4277382.08	187.54	187.54
DISCCART	692234.49	4277882.08	156.10	156.10
DISCCART	692234.49	4278382.08	168.67	168.67
DISCCART	692234.49	4278882.08	153.16	201.54
DISCCART	692234.49	4279382.08	140.13	201.54
DISCCART	692234.49	4279882.08	148.83	177.40
DISCCART	692234.49	4280382.08	171.66	171.66
DISCCART	692734.49	4263382.08	210.68	266.15
DISCCART	692734.49	4262882.08	186.11	266.15
DISCCART	692734.49	4262382.08	177.01	177.01
DISCCART	692734.49	4261882.08	164.64	164.64
DISCCART	692734.49	4261382.08	153.76	153.76
DISCCART	692734.49	4260882.08	178.53	183.90
DISCCART	692734.49	4260382.08	139.43	185.99

DISCCART	692734.49	4259882.08	139.84	139.84
DISCCART	692734.49	4259382.08	149.73	149.73
DISCCART	692734.49	4258882.08	148.41	148.41
DISCCART	692734.49	4275882.08	141.01	141.01
DISCCART	692734.49	4276382.08	141.78	141.78
DISCCART	692734.49	4276882.08	142.11	162.82
DISCCART	692734.49	4277382.08	155.70	163.75
DISCCART	692734.49	4277882.08	159.42	159.42
DISCCART	692734.49	4278382.08	152.04	159.18
DISCCART	692734.49	4278882.08	179.69	201.54
DISCCART	692734.49	4279382.08	156.84	201.54
DISCCART	692734.49	4279882.08	141.19	172.48
DISCCART	692734.49	4280382.08	177.26	177.26
DISCCART	693234.49	4263382.08	260.42	260.42
DISCCART	693234.49	4262882.08	187.71	263.09
DISCCART	693234.49	4262382.08	168.81	263.09
DISCCART	693234.49	4261882.08	159.20	173.40
DISCCART	693234.49	4261382.08	153.63	153.63
DISCCART	693234.49	4260882.08	168.37	168.37
DISCCART	693234.49	4260382.08	153.14	185.01
DISCCART	693234.49	4259882.08	137.12	137.12
DISCCART	693234.49	4259382.08	139.52	139.52
DISCCART	693234.49	4258882.08	142.70	142.70
DISCCART	693234.49	4275882.08	142.37	142.37
DISCCART	693234.49	4276382.08	141.58	141.58
DISCCART	693234.49	4276882.08	140.88	140.88
DISCCART	693234.49	4277382.08	142.05	142.05
DISCCART	693234.49	4277882.08	141.29	164.70
DISCCART	693234.49	4278382.08	160.47	160.47
DISCCART	693234.49	4278882.08	165.34	165.34
DISCCART	693234.49	4279382.08	169.51	177.40
DISCCART	693234.49	4279882.08	146.04	146.04
DISCCART	693234.49	4280382.08	167.29	196.81
DISCCART	693734.49	4263382.08	194.57	263.09
DISCCART	693734.49	4262882.08	206.81	263.09
DISCCART	693734.49	4262382.08	179.50	263.09
DISCCART	693734.49	4261882.08	161.95	161.95
DISCCART	693734.49	4261382.08	148.12	148.12
DISCCART	693734.49	4260882.08	164.08	169.89
DISCCART	693734.49	4260382.08	160.76	181.46
DISCCART	693734.49	4259882.08	137.03	175.27
DISCCART	693734.49	4259382.08	140.32	140.32
DISCCART	693734.49	4258882.08	139.76	139.76
DISCCART	693734.49	4275882.08	143.63	143.63
DISCCART	693734.49	4276382.08	142.67	142.67
DISCCART	693734.49	4276882.08	142.61	142.61
DISCCART	693734.49	4277382.08	142.05	142.05
DISCCART	693734.49	4277882.08	142.54	142.54
DISCCART	693734.49	4278382.08	141.00	141.00
DISCCART	693734.49	4278882.08	141.96	141.96
DISCCART	693734.49	4279382.08	160.52	160.52
DISCCART	693734.49	4279882.08	140.84	161.70
DISCCART	693734.49	4280382.08	151.04	151.79
DISCCART	694234.49	4263382.08	227.42	251.64
DISCCART	694234.49	4262882.08	180.74	263.09
DISCCART	694234.49	4262382.08	180.55	222.68
DISCCART	694234.49	4261882.08	156.72	221.68
DISCCART	694234.49	4261382.08	148.45	148.45
DISCCART	694234.49	4260882.08	166.97	166.97
DISCCART	694234.49	4260382.08	173.94	173.94
DISCCART	694234.49	4259882.08	171.49	177.31
DISCCART	694234.49	4259382.08	137.03	176.73
DISCCART	694234.49	4258882.08	137.03	137.03
DISCCART	694234.49	4275882.08	140.98	140.98
DISCCART	694234.49	4276382.08	142.27	142.27
DISCCART	694234.49	4276882.08	142.38	142.38

DISCCART	694234.49	4277382.08	142.65	142.65
DISCCART	694234.49	4277882.08	142.28	142.28
DISCCART	694234.49	4278382.08	142.89	142.89
DISCCART	694234.49	4278882.08	142.12	142.12
DISCCART	694234.49	4279382.08	141.52	141.52
DISCCART	694234.49	4279882.08	141.25	143.60
DISCCART	694234.49	4280382.08	142.07	162.91
DISCCART	694734.49	4263382.08	183.87	251.64
DISCCART	694734.49	4262882.08	181.12	245.02
DISCCART	694734.49	4262382.08	216.60	221.97
DISCCART	694734.49	4261882.08	153.74	221.97
DISCCART	694734.49	4261382.08	151.58	151.58
DISCCART	694734.49	4260882.08	161.12	161.12
DISCCART	694734.49	4260382.08	158.42	158.42
DISCCART	694734.49	4259882.08	157.70	157.70
DISCCART	694734.49	4259382.08	162.82	162.82
DISCCART	694734.49	4258882.08	151.23	151.23
DISCCART	694734.49	4275882.08	142.30	271.42
DISCCART	694734.49	4276382.08	140.12	269.08
DISCCART	694734.49	4276882.08	141.40	141.40
DISCCART	694734.49	4277382.08	141.79	141.79
DISCCART	694734.49	4277882.08	141.25	141.25
DISCCART	694734.49	4278382.08	140.97	140.97
DISCCART	694734.49	4278882.08	142.53	142.53
DISCCART	694734.49	4279382.08	142.23	142.23
DISCCART	694734.49	4279882.08	142.71	142.71
DISCCART	694734.49	4280382.08	139.98	166.77
DISCCART	695234.49	4263382.08	216.06	246.16
DISCCART	695234.49	4262882.08	189.78	247.17
DISCCART	695234.49	4262382.08	152.41	221.97
DISCCART	695234.49	4261882.08	156.07	196.69
DISCCART	695234.49	4261382.08	146.73	154.34
DISCCART	695234.49	4260882.08	158.84	158.84
DISCCART	695234.49	4260382.08	145.44	145.44
DISCCART	695234.49	4259882.08	153.11	153.11
DISCCART	695234.49	4259382.08	152.72	152.72
DISCCART	695234.49	4258882.08	162.50	162.50
DISCCART	695234.49	4275882.08	137.05	271.42
DISCCART	695234.49	4276382.08	137.05	271.42
DISCCART	695234.49	4276882.08	142.34	269.08
DISCCART	695234.49	4277382.08	140.75	145.01
DISCCART	695234.49	4277882.08	141.03	141.03
DISCCART	695234.49	4278382.08	140.52	140.52
DISCCART	695234.49	4278882.08	141.15	141.15
DISCCART	695234.49	4279382.08	141.80	141.80
DISCCART	695234.49	4279882.08	141.39	141.39
DISCCART	695234.49	4280382.08	141.04	141.04
DISCCART	695734.49	4263382.08	206.63	247.17
DISCCART	695734.49	4262882.08	170.51	247.17
DISCCART	695734.49	4262382.08	173.66	219.87
DISCCART	695734.49	4261882.08	155.22	155.22
DISCCART	695734.49	4261382.08	150.61	168.81
DISCCART	695734.49	4260882.08	147.91	147.91
DISCCART	695734.49	4260382.08	143.47	143.47
DISCCART	695734.49	4259882.08	151.23	151.23
DISCCART	695734.49	4259382.08	145.30	145.30
DISCCART	695734.49	4258882.08	142.70	142.70
DISCCART	695734.49	4263882.08	218.17	243.06
DISCCART	695734.49	4264382.08	233.35	233.35
DISCCART	695734.49	4264882.08	192.82	235.27
DISCCART	695734.49	4265382.08	237.72	239.03
DISCCART	695734.49	4265882.08	211.34	247.72
DISCCART	695734.49	4266382.08	247.91	247.91
DISCCART	695734.49	4266882.08	230.00	251.86
DISCCART	695734.49	4267382.08	223.76	254.09
DISCCART	695734.49	4267882.08	212.52	250.96

DISCCART	695734.49	4268382.08	202.72	252.03
DISCCART	695734.49	4268882.08	249.86	249.86
DISCCART	695734.49	4269382.08	207.36	253.68
DISCCART	695734.49	4269882.08	214.15	250.96
DISCCART	695734.49	4270382.08	225.97	246.86
DISCCART	695734.49	4270882.08	223.94	227.31
DISCCART	695734.49	4271382.08	177.22	239.90
DISCCART	695734.49	4271882.08	181.50	239.90
DISCCART	695734.49	4272382.08	171.71	232.96
DISCCART	695734.49	4272882.08	163.38	218.12
DISCCART	695734.49	4273382.08	178.17	238.47
DISCCART	695734.49	4273882.08	199.01	252.62
DISCCART	695734.49	4274382.08	201.02	258.16
DISCCART	695734.49	4274882.08	206.76	271.42
DISCCART	695734.49	4275382.08	270.92	270.92
DISCCART	695734.49	4275882.08	240.36	269.08
DISCCART	695734.49	4276382.08	142.88	271.42
DISCCART	695734.49	4276882.08	140.29	269.08
DISCCART	695734.49	4277382.08	136.52	241.59
DISCCART	695734.49	4277882.08	136.55	241.52
DISCCART	695734.49	4278382.08	144.14	144.14
DISCCART	695734.49	4278882.08	140.33	140.33
DISCCART	695734.49	4279382.08	141.75	141.75
DISCCART	695734.49	4279882.08	141.64	141.64
DISCCART	695734.49	4280382.08	141.46	141.46
DISCCART	696234.49	4263382.08	182.61	243.06
DISCCART	696234.49	4262882.08	168.92	246.58
DISCCART	696234.49	4262382.08	169.31	229.43
DISCCART	696234.49	4261882.08	157.22	229.43
DISCCART	696234.49	4261382.08	146.52	146.52
DISCCART	696234.49	4260882.08	151.35	151.35
DISCCART	696234.49	4260382.08	142.61	142.61
DISCCART	696234.49	4259882.08	141.03	141.03
DISCCART	696234.49	4259382.08	142.56	142.56
DISCCART	696234.49	4258882.08	140.87	140.87
DISCCART	696234.49	4263882.08	232.05	232.05
DISCCART	696234.49	4264382.08	203.38	237.31
DISCCART	696234.49	4264882.08	178.51	234.52
DISCCART	696234.49	4265382.08	217.78	224.22
DISCCART	696234.49	4265882.08	232.55	232.55
DISCCART	696234.49	4266382.08	212.08	245.97
DISCCART	696234.49	4266882.08	229.27	250.26
DISCCART	696234.49	4267382.08	230.21	251.16
DISCCART	696234.49	4267882.08	216.31	251.02
DISCCART	696234.49	4268382.08	233.62	250.78
DISCCART	696234.49	4268882.08	230.57	240.26
DISCCART	696234.49	4269382.08	228.38	249.83
DISCCART	696234.49	4269882.08	196.59	250.96
DISCCART	696234.49	4270382.08	198.80	247.07
DISCCART	696234.49	4270882.08	172.63	246.62
DISCCART	696234.49	4271382.08	214.39	214.39
DISCCART	696234.49	4271882.08	201.03	208.11
DISCCART	696234.49	4272382.08	150.38	218.12
DISCCART	696234.49	4272882.08	181.20	218.12
DISCCART	696234.49	4273382.08	165.51	230.07
DISCCART	696234.49	4273882.08	195.86	223.05
DISCCART	696234.49	4274382.08	204.10	245.14
DISCCART	696234.49	4274882.08	198.38	271.42
DISCCART	696234.49	4275382.08	248.81	266.15
DISCCART	696234.49	4275882.08	229.97	269.08
DISCCART	696234.49	4276382.08	241.68	244.94
DISCCART	696234.49	4276882.08	182.24	251.53
DISCCART	696234.49	4277382.08	178.02	241.52
DISCCART	696234.49	4277882.08	140.83	241.52
DISCCART	696234.49	4278382.08	136.53	136.53
DISCCART	696234.49	4278882.08	136.53	136.53

DISCCART	696234.49	4279382.08	140.69	140.69
DISCCART	696234.49	4279882.08	141.28	141.28
DISCCART	696234.49	4280382.08	140.94	140.94
DISCCART	696734.49	4263382.08	197.53	230.17
DISCCART	696734.49	4262882.08	176.87	221.43
DISCCART	696734.49	4262382.08	200.77	229.43
DISCCART	696734.49	4261882.08	153.99	229.43
DISCCART	696734.49	4261382.08	142.49	142.49
DISCCART	696734.49	4260882.08	140.23	140.23
DISCCART	696734.49	4260382.08	140.20	140.20
DISCCART	696734.49	4259882.08	140.12	140.12
DISCCART	696734.49	4259382.08	139.48	139.48
DISCCART	696734.49	4258882.08	134.32	134.32
DISCCART	696734.49	4263882.08	228.22	234.84
DISCCART	696734.49	4264382.08	229.31	230.32
DISCCART	696734.49	4264882.08	173.04	232.59
DISCCART	696734.49	4265382.08	205.15	242.25
DISCCART	696734.49	4265882.08	214.22	242.61
DISCCART	696734.49	4266382.08	230.69	235.86
DISCCART	696734.49	4266882.08	229.25	246.32
DISCCART	696734.49	4267382.08	231.28	249.02
DISCCART	696734.49	4267882.08	227.90	247.92
DISCCART	696734.49	4268382.08	235.08	248.58
DISCCART	696734.49	4268882.08	209.40	238.98
DISCCART	696734.49	4269382.08	225.08	242.93
DISCCART	696734.49	4269882.08	204.32	239.08
DISCCART	696734.49	4270382.08	230.68	242.70
DISCCART	696734.49	4270882.08	214.54	215.32
DISCCART	696734.49	4271382.08	209.28	227.29
DISCCART	696734.49	4271882.08	155.56	229.13
DISCCART	696734.49	4272382.08	153.21	218.38
DISCCART	696734.49	4272882.08	170.65	238.52
DISCCART	696734.49	4273382.08	210.46	230.07
DISCCART	696734.49	4273882.08	194.59	242.66
DISCCART	696734.49	4274382.08	221.06	244.46
DISCCART	696734.49	4274882.08	244.46	247.86
DISCCART	696734.49	4275382.08	223.39	258.41
DISCCART	696734.49	4275882.08	260.11	261.06
DISCCART	696734.49	4276382.08	220.64	234.73
DISCCART	696734.49	4276882.08	193.80	241.59
DISCCART	696734.49	4277382.08	199.67	241.52
DISCCART	696734.49	4277882.08	154.07	241.52
DISCCART	696734.49	4278382.08	140.90	233.55
DISCCART	696734.49	4278882.08	136.53	142.55
DISCCART	696734.49	4279382.08	136.53	136.53
DISCCART	696734.49	4279882.08	141.27	141.27
DISCCART	696734.49	4280382.08	139.56	140.25
DISCCART	697234.49	4263382.08	227.86	232.12
DISCCART	697234.49	4262882.08	205.15	220.41
DISCCART	697234.49	4262382.08	154.09	229.43
DISCCART	697234.49	4261882.08	142.11	229.43
DISCCART	697234.49	4261382.08	138.06	138.06
DISCCART	697234.49	4260882.08	138.63	138.63
DISCCART	697234.49	4260382.08	139.52	139.52
DISCCART	697234.49	4259882.08	140.63	190.05
DISCCART	697234.49	4259382.08	137.20	211.82
DISCCART	697234.49	4258882.08	135.48	215.65
DISCCART	697234.49	4263882.08	201.86	235.16
DISCCART	697234.49	4264382.08	176.89	232.59
DISCCART	697234.49	4264882.08	176.10	232.59
DISCCART	697234.49	4265382.08	204.59	227.55
DISCCART	697234.49	4265882.08	222.31	239.09
DISCCART	697234.49	4266382.08	216.31	236.95
DISCCART	697234.49	4266882.08	205.41	241.63
DISCCART	697234.49	4267382.08	226.53	246.16
DISCCART	697234.49	4267882.08	212.06	247.45

DISCCART	697234.49	4268382.08	200.02	245.88
DISCCART	697234.49	4268882.08	222.25	232.78
DISCCART	697234.49	4269382.08	219.72	229.15
DISCCART	697234.49	4269882.08	231.16	241.69
DISCCART	697234.49	4270382.08	229.73	229.73
DISCCART	697234.49	4270882.08	182.63	230.87
DISCCART	697234.49	4271382.08	172.43	227.29
DISCCART	697234.49	4271882.08	153.66	214.90
DISCCART	697234.49	4272382.08	177.28	228.91
DISCCART	697234.49	4272882.08	183.71	238.52
DISCCART	697234.49	4273382.08	217.75	238.52
DISCCART	697234.49	4273882.08	222.11	242.66
DISCCART	697234.49	4274382.08	230.29	239.68
DISCCART	697234.49	4274882.08	195.43	251.55
DISCCART	697234.49	4275382.08	215.72	261.44
DISCCART	697234.49	4275882.08	250.14	261.23
DISCCART	697234.49	4276382.08	232.94	239.15
DISCCART	697234.49	4276882.08	192.56	243.91
DISCCART	697234.49	4277382.08	219.25	229.21
DISCCART	697234.49	4277882.08	202.73	233.55
DISCCART	697234.49	4278382.08	184.62	230.98
DISCCART	697234.49	4278882.08	140.20	179.84
DISCCART	697234.49	4279382.08	137.66	138.88
DISCCART	697234.49	4279882.08	142.45	142.45
DISCCART	697234.49	4280382.08	136.35	136.35
DISCCART	697734.49	4263382.08	185.35	236.99
DISCCART	697734.49	4262882.08	166.97	233.52
DISCCART	697734.49	4262382.08	212.83	226.95
DISCCART	697734.49	4261882.08	140.72	226.95
DISCCART	697734.49	4261382.08	133.53	133.53
DISCCART	697734.49	4260882.08	134.63	137.21
DISCCART	697734.49	4260382.08	141.16	141.16
DISCCART	697734.49	4259882.08	142.66	190.05
DISCCART	697734.49	4259382.08	179.51	186.29
DISCCART	697734.49	4258882.08	157.64	215.67
DISCCART	697734.49	4263882.08	213.21	236.99
DISCCART	697734.49	4264382.08	211.84	232.29
DISCCART	697734.49	4264882.08	173.42	234.95
DISCCART	697734.49	4265382.08	210.80	238.89
DISCCART	697734.49	4265882.08	225.85	235.20
DISCCART	697734.49	4266382.08	196.13	238.37
DISCCART	697734.49	4266882.08	221.32	242.57
DISCCART	697734.49	4267382.08	202.86	247.17
DISCCART	697734.49	4267882.08	228.83	229.41
DISCCART	697734.49	4268382.08	221.94	232.69
DISCCART	697734.49	4268882.08	214.47	233.66
DISCCART	697734.49	4269382.08	233.19	238.19
DISCCART	697734.49	4269882.08	185.58	241.45
DISCCART	697734.49	4270382.08	199.53	203.20
DISCCART	697734.49	4270882.08	207.44	207.97
DISCCART	697734.49	4271382.08	199.31	226.92
DISCCART	697734.49	4271882.08	200.53	213.85
DISCCART	697734.49	4272382.08	166.55	235.76
DISCCART	697734.49	4272882.08	202.08	232.43
DISCCART	697734.49	4273382.08	204.26	235.39
DISCCART	697734.49	4273882.08	185.71	242.66
DISCCART	697734.49	4274382.08	208.43	236.71
DISCCART	697734.49	4274882.08	224.35	231.81
DISCCART	697734.49	4275382.08	232.03	253.73
DISCCART	697734.49	4275882.08	198.71	261.44
DISCCART	697734.49	4276382.08	240.13	240.13
DISCCART	697734.49	4276882.08	183.58	241.37
DISCCART	697734.49	4277382.08	177.48	218.02
DISCCART	697734.49	4277882.08	192.75	218.26
DISCCART	697734.49	4278382.08	171.26	230.98
DISCCART	697734.49	4278882.08	172.54	176.14

DISCCART	697734.49	4279382.08	136.49	142.44
DISCCART	697734.49	4279882.08	140.59	140.59
DISCCART	697734.49	4280382.08	141.31	141.31
DISCCART	698234.49	4263382.08	177.30	236.57
DISCCART	698234.49	4262882.08	185.43	233.52
DISCCART	698234.49	4262382.08	204.41	204.41
DISCCART	698234.49	4261882.08	138.55	226.95
DISCCART	698234.49	4261382.08	134.02	134.02
DISCCART	698234.49	4260882.08	138.23	138.23
DISCCART	698234.49	4260382.08	135.81	135.81
DISCCART	698234.49	4259882.08	152.58	211.53
DISCCART	698234.49	4259382.08	198.94	211.58
DISCCART	698234.49	4258882.08	170.35	237.09
DISCCART	698234.49	4263882.08	223.92	236.07
DISCCART	698234.49	4264382.08	198.11	229.65
DISCCART	698234.49	4264882.08	168.37	235.24
DISCCART	698234.49	4265382.08	216.91	235.24
DISCCART	698234.49	4265882.08	202.79	232.50
DISCCART	698234.49	4266382.08	185.19	241.57
DISCCART	698234.49	4266882.08	200.86	241.65
DISCCART	698234.49	4267382.08	205.61	235.78
DISCCART	698234.49	4267882.08	203.12	236.41
DISCCART	698234.49	4268382.08	186.64	236.14
DISCCART	698234.49	4268882.08	214.46	230.04
DISCCART	698234.49	4269382.08	216.43	239.03
DISCCART	698234.49	4269882.08	235.35	235.35
DISCCART	698234.49	4270382.08	206.20	223.78
DISCCART	698234.49	4270882.08	168.43	224.64
DISCCART	698234.49	4271382.08	178.24	237.07
DISCCART	698234.49	4271882.08	198.14	237.19
DISCCART	698234.49	4272382.08	211.98	235.76
DISCCART	698234.49	4272882.08	200.11	232.24
DISCCART	698234.49	4273382.08	213.76	216.94
DISCCART	698234.49	4273882.08	199.20	220.32
DISCCART	698234.49	4274382.08	195.14	212.13
DISCCART	698234.49	4274882.08	197.00	227.81
DISCCART	698234.49	4275382.08	191.56	253.70
DISCCART	698234.49	4275882.08	217.34	229.85
DISCCART	698234.49	4276382.08	187.87	241.37
DISCCART	698234.49	4276882.08	185.22	216.93
DISCCART	698234.49	4277382.08	158.00	204.47
DISCCART	698234.49	4277882.08	175.05	220.84
DISCCART	698234.49	4278382.08	192.84	217.83
DISCCART	698234.49	4278882.08	184.56	197.12
DISCCART	698234.49	4279382.08	140.73	197.12
DISCCART	698234.49	4279882.08	141.53	141.53
DISCCART	698234.49	4280382.08	142.22	142.22
DISCCART	698734.49	4263382.08	180.51	238.82
DISCCART	698734.49	4262882.08	165.04	238.82
DISCCART	698734.49	4262382.08	145.89	210.83
DISCCART	698734.49	4261882.08	154.75	182.15
DISCCART	698734.49	4261382.08	132.52	132.52
DISCCART	698734.49	4260882.08	134.04	230.35
DISCCART	698734.49	4260382.08	134.03	236.96
DISCCART	698734.49	4259882.08	149.96	236.96
DISCCART	698734.49	4259382.08	154.05	236.96
DISCCART	698734.49	4258882.08	171.04	229.91
DISCCART	698734.49	4263882.08	217.54	236.57
DISCCART	698734.49	4264382.08	196.53	233.11
DISCCART	698734.49	4264882.08	169.29	233.44
DISCCART	698734.49	4265382.08	184.89	235.24
DISCCART	698734.49	4265882.08	186.56	230.41
DISCCART	698734.49	4266382.08	219.33	220.24
DISCCART	698734.49	4266882.08	174.35	236.14
DISCCART	698734.49	4267382.08	172.26	245.73
DISCCART	698734.49	4267882.08	191.41	245.73

DISCCART	698734.49	4268382.08	188.59	236.14
DISCCART	698734.49	4268882.08	227.37	238.94
DISCCART	698734.49	4269382.08	237.08	238.86
DISCCART	698734.49	4269882.08	228.43	238.86
DISCCART	698734.49	4270382.08	196.22	230.30
DISCCART	698734.49	4270882.08	201.48	201.48
DISCCART	698734.49	4271382.08	207.32	242.50
DISCCART	698734.49	4271882.08	218.94	245.00
DISCCART	698734.49	4272382.08	210.97	233.95
DISCCART	698734.49	4272882.08	194.27	217.68
DISCCART	698734.49	4273382.08	179.63	240.21
DISCCART	698734.49	4273882.08	187.27	229.58
DISCCART	698734.49	4274382.08	165.77	220.79
DISCCART	698734.49	4274882.08	163.15	232.42
DISCCART	698734.49	4275382.08	170.75	215.37
DISCCART	698734.49	4275882.08	158.39	229.85
DISCCART	698734.49	4276382.08	176.85	190.85
DISCCART	698734.49	4276882.08	155.48	218.44
DISCCART	698734.49	4277382.08	154.22	200.10
DISCCART	698734.49	4277882.08	157.95	212.14
DISCCART	698734.49	4278382.08	193.64	208.59
DISCCART	698734.49	4278882.08	185.83	200.31
DISCCART	698734.49	4279382.08	144.44	201.04
DISCCART	698734.49	4279882.08	142.09	142.09
DISCCART	698734.49	4280382.08	141.25	141.25
DISCCART	699234.49	4263382.08	193.88	238.82
DISCCART	699234.49	4262882.08	192.82	231.00
DISCCART	699234.49	4262382.08	171.46	210.83
DISCCART	699234.49	4261882.08	144.58	144.58
DISCCART	699234.49	4261382.08	133.67	138.52
DISCCART	699234.49	4260882.08	134.02	236.96
DISCCART	699234.49	4260382.08	133.96	236.96
DISCCART	699234.49	4259882.08	221.24	236.96
DISCCART	699234.49	4259382.08	199.65	235.22
DISCCART	699234.49	4258882.08	209.61	227.20
DISCCART	699234.49	4263882.08	204.62	233.53
DISCCART	699234.49	4264382.08	182.47	196.39
DISCCART	699234.49	4264882.08	162.10	233.41
DISCCART	699234.49	4265382.08	155.41	233.44
DISCCART	699234.49	4265882.08	160.62	233.09
DISCCART	699234.49	4266382.08	186.41	226.29
DISCCART	699234.49	4266882.08	187.87	235.36
DISCCART	699234.49	4267382.08	215.71	246.04
DISCCART	699234.49	4267882.08	204.16	247.16
DISCCART	699234.49	4268382.08	234.11	234.11
DISCCART	699234.49	4268882.08	189.47	246.34
DISCCART	699234.49	4269382.08	235.48	241.49
DISCCART	699234.49	4269882.08	201.61	236.32
DISCCART	699234.49	4270382.08	189.46	235.96
DISCCART	699234.49	4270882.08	193.94	230.36
DISCCART	699234.49	4271382.08	207.87	241.44
DISCCART	699234.49	4271882.08	216.19	245.47
DISCCART	699234.49	4272382.08	214.13	238.01
DISCCART	699234.49	4272882.08	191.13	240.21
DISCCART	699234.49	4273382.08	207.02	240.21
DISCCART	699234.49	4273882.08	201.12	223.82
DISCCART	699234.49	4274382.08	190.01	232.98
DISCCART	699234.49	4274882.08	221.50	232.42
DISCCART	699234.49	4275382.08	172.28	232.42
DISCCART	699234.49	4275882.08	162.77	235.10
DISCCART	699234.49	4276382.08	164.93	236.23
DISCCART	699234.49	4276882.08	198.40	215.63
DISCCART	699234.49	4277382.08	148.74	236.23
DISCCART	699234.49	4277882.08	155.28	217.80
DISCCART	699234.49	4278382.08	184.37	200.39
DISCCART	699234.49	4278882.08	169.45	201.04

DISCCART	699234.49	4279382.08	178.58	195.49
DISCCART	699234.49	4279882.08	135.61	142.43
DISCCART	699234.49	4280382.08	139.88	139.88
DISCCART	699734.49	4263382.08	175.82	231.00
DISCCART	699734.49	4262882.08	199.73	231.00
DISCCART	699734.49	4262382.08	156.37	231.00
DISCCART	699734.49	4261882.08	150.98	150.98
DISCCART	699734.49	4261382.08	133.93	133.93
DISCCART	699734.49	4260882.08	134.62	236.91
DISCCART	699734.49	4260382.08	133.73	236.96
DISCCART	699734.49	4259882.08	195.84	230.90
DISCCART	699734.49	4259382.08	175.73	235.22
DISCCART	699734.49	4258882.08	169.15	227.20
DISCCART	699734.49	4263882.08	167.38	233.05
DISCCART	699734.49	4264382.08	158.95	229.85
DISCCART	699734.49	4264882.08	198.92	230.97
DISCCART	699734.49	4265382.08	198.50	233.06
DISCCART	699734.49	4265882.08	213.78	233.09
DISCCART	699734.49	4266382.08	218.04	235.40
DISCCART	699734.49	4266882.08	216.60	241.23
DISCCART	699734.49	4267382.08	195.87	251.34
DISCCART	699734.49	4267882.08	221.37	251.61
DISCCART	699734.49	4268382.08	209.12	250.68
DISCCART	699734.49	4268882.08	221.81	246.24
DISCCART	699734.49	4269382.08	203.71	244.48
DISCCART	699734.49	4269882.08	212.61	241.79
DISCCART	699734.49	4270382.08	206.59	248.54
DISCCART	699734.49	4270882.08	207.75	251.02
DISCCART	699734.49	4271382.08	213.02	246.35
DISCCART	699734.49	4271882.08	234.07	245.34
DISCCART	699734.49	4272382.08	196.98	245.27
DISCCART	699734.49	4272882.08	211.67	245.85
DISCCART	699734.49	4273382.08	212.03	244.63
DISCCART	699734.49	4273882.08	178.10	239.76
DISCCART	699734.49	4274382.08	218.64	229.59
DISCCART	699734.49	4274882.08	182.01	232.98
DISCCART	699734.49	4275382.08	200.04	202.22
DISCCART	699734.49	4275882.08	176.14	235.10
DISCCART	699734.49	4276382.08	224.18	235.10
DISCCART	699734.49	4276882.08	228.40	234.76
DISCCART	699734.49	4277382.08	182.94	232.38
DISCCART	699734.49	4277882.08	182.63	214.15
DISCCART	699734.49	4278382.08	144.03	212.11
DISCCART	699734.49	4278882.08	154.67	163.28
DISCCART	699734.49	4279382.08	163.83	192.40
DISCCART	699734.49	4279882.08	140.61	176.32
DISCCART	699734.49	4280382.08	135.99	135.99
DISCCART	700234.49	4263382.08	169.45	226.60
DISCCART	700234.49	4262882.08	156.78	231.00
DISCCART	700234.49	4262382.08	142.39	142.39
DISCCART	700234.49	4261882.08	140.71	140.71
DISCCART	700234.49	4261382.08	135.93	135.93
DISCCART	700234.49	4260882.08	134.36	220.17
DISCCART	700234.49	4260382.08	153.53	230.90
DISCCART	700234.49	4259882.08	158.49	230.90
DISCCART	700234.49	4259382.08	191.28	203.58
DISCCART	700234.49	4258882.08	146.29	229.42
DISCCART	700234.49	4263882.08	174.06	223.10
DISCCART	700234.49	4264382.08	176.57	215.27
DISCCART	700234.49	4264882.08	206.70	218.55
DISCCART	700234.49	4265382.08	223.86	237.93
DISCCART	700234.49	4265882.08	200.08	238.58
DISCCART	700234.49	4266382.08	200.12	244.62
DISCCART	700234.49	4266882.08	216.69	253.69
DISCCART	700234.49	4267382.08	231.08	250.50
DISCCART	700234.49	4267882.08	242.52	253.68

DISCCART	700234.49	4268382.08	230.23	256.18
DISCCART	700234.49	4268882.08	230.75	247.15
DISCCART	700234.49	4269382.08	204.20	244.65
DISCCART	700234.49	4269882.08	229.17	247.53
DISCCART	700234.49	4270382.08	214.70	254.13
DISCCART	700234.49	4270882.08	245.42	249.56
DISCCART	700234.49	4271382.08	227.01	246.05
DISCCART	700234.49	4271882.08	225.75	236.48
DISCCART	700234.49	4272382.08	225.73	235.16
DISCCART	700234.49	4272882.08	219.65	247.28
DISCCART	700234.49	4273382.08	238.55	242.79
DISCCART	700234.49	4273882.08	197.62	241.36
DISCCART	700234.49	4274382.08	223.29	232.92
DISCCART	700234.49	4274882.08	223.61	232.32
DISCCART	700234.49	4275382.08	184.22	239.55
DISCCART	700234.49	4275882.08	191.45	232.23
DISCCART	700234.49	4276382.08	186.37	234.71
DISCCART	700234.49	4276882.08	171.21	236.23
DISCCART	700234.49	4277382.08	170.60	232.38
DISCCART	700234.49	4277882.08	170.42	210.52
DISCCART	700234.49	4278382.08	146.89	210.52
DISCCART	700234.49	4278882.08	162.53	190.71
DISCCART	700234.49	4279382.08	145.38	201.14
DISCCART	700234.49	4279882.08	142.00	207.19
DISCCART	700234.49	4280382.08	140.01	140.01
DISCCART	678234.49	4258882.08	151.00	169.23
DISCCART	678234.49	4257882.08	156.69	156.69
DISCCART	678234.49	4256882.08	153.70	153.70
DISCCART	678234.49	4255882.08	178.47	178.47
DISCCART	678234.49	4254882.08	171.22	171.22
DISCCART	678234.49	4253882.08	185.37	185.37
DISCCART	678234.49	4252882.08	171.01	171.01
DISCCART	678234.49	4251882.08	202.32	202.32
DISCCART	678234.49	4250882.08	205.72	207.39
DISCCART	678234.49	4249882.08	196.53	216.30
DISCCART	678234.49	4248882.08	226.29	226.29
DISCCART	678234.49	4247882.08	212.13	239.76
DISCCART	678234.49	4246882.08	215.00	215.00
DISCCART	678234.49	4245882.08	184.15	207.66
DISCCART	678234.49	4244882.08	219.92	219.92
DISCCART	678234.49	4243882.08	211.35	223.03
DISCCART	678234.49	4242882.08	217.11	219.54
DISCCART	678234.49	4241882.08	162.98	213.05
DISCCART	678234.49	4240882.08	163.29	226.07
DISCCART	678234.49	4239882.08	160.76	160.76
DISCCART	678234.49	4238882.08	174.36	232.10
DISCCART	678234.49	4237882.08	228.52	237.75
DISCCART	678234.49	4236882.08	220.62	220.62
DISCCART	678234.49	4235882.08	204.71	221.24
DISCCART	678234.49	4234882.08	214.13	225.77
DISCCART	678234.49	4233882.08	172.43	208.74
DISCCART	678234.49	4232882.08	174.01	221.20
DISCCART	678234.49	4231882.08	192.04	227.44
DISCCART	678234.49	4230882.08	228.50	239.44
DISCCART	678234.49	4229882.08	257.55	257.55
DISCCART	678234.49	4228882.08	257.01	257.01
DISCCART	678234.49	4227882.08	190.87	270.39
DISCCART	678234.49	4226882.08	235.99	274.79
DISCCART	678234.49	4225882.08	240.62	269.63
DISCCART	678234.49	4224882.08	270.39	274.14
DISCCART	678234.49	4223882.08	255.09	292.99
DISCCART	678234.49	4222882.08	250.13	250.13
DISCCART	678234.49	4221882.08	199.64	292.80
DISCCART	678234.49	4220882.08	201.95	251.12
DISCCART	678234.49	4259882.08	189.80	209.17
DISCCART	678234.49	4259882.08	189.80	209.17

DISCCART	678234.49	4260882.08	173.75	173.75
DISCCART	678234.49	4261882.08	184.43	184.43
DISCCART	678234.49	4262882.08	179.54	183.98
DISCCART	678234.49	4263882.08	172.63	187.88
DISCCART	678234.49	4264882.08	168.28	178.81
DISCCART	678234.49	4265882.08	149.48	160.52
DISCCART	678234.49	4266882.08	166.23	166.23
DISCCART	678234.49	4267882.08	143.20	201.43
DISCCART	678234.49	4268882.08	143.19	143.19
DISCCART	678234.49	4269882.08	144.63	144.63
DISCCART	678234.49	4270882.08	147.99	185.51
DISCCART	678234.49	4271882.08	164.45	164.45
DISCCART	678234.49	4272882.08	179.32	185.20
DISCCART	678234.49	4273882.08	241.69	261.13
DISCCART	678234.49	4274882.08	195.71	261.12
DISCCART	678234.49	4275882.08	233.29	254.50
DISCCART	678234.49	4276882.08	243.47	245.82
DISCCART	678234.49	4277882.08	240.24	240.24
DISCCART	678234.49	4278882.08	233.75	240.33
DISCCART	678234.49	4279882.08	234.07	237.01
DISCCART	678234.49	4280882.08	223.63	235.57
DISCCART	678234.49	4281882.08	242.95	242.95
DISCCART	678234.49	4282882.08	256.99	256.99
DISCCART	678234.49	4283882.08	245.25	245.25
DISCCART	678234.49	4284882.08	242.16	242.16
DISCCART	678234.49	4285882.08	238.14	238.14
DISCCART	678234.49	4286882.08	248.31	248.56
DISCCART	678234.49	4287882.08	252.32	252.32
DISCCART	678234.49	4288882.08	223.78	234.56
DISCCART	678234.49	4289882.08	246.71	246.71
DISCCART	678234.49	4290882.08	241.17	241.17
DISCCART	678234.49	4291882.08	216.71	216.71
DISCCART	678234.49	4292882.08	226.74	226.74
DISCCART	678234.49	4293882.08	227.25	227.25
DISCCART	678234.49	4294882.08	217.80	218.17
DISCCART	678234.49	4295882.08	196.57	218.62
DISCCART	678234.49	4296882.08	189.94	201.30
DISCCART	678234.49	4297882.08	211.69	213.52
DISCCART	678234.49	4298882.08	213.59	213.59
DISCCART	678234.49	4299882.08	198.44	198.44
DISCCART	678234.49	4300882.08	180.22	180.22
DISCCART	678234.49	4301882.08	183.75	201.05
DISCCART	678234.49	4302882.08	166.26	186.07
DISCCART	678234.49	4303882.08	147.42	179.68
DISCCART	678234.49	4304882.08	180.11	180.11
DISCCART	678234.49	4305882.08	166.82	166.82
DISCCART	678234.49	4306882.08	143.84	143.84
DISCCART	678234.49	4307882.08	152.28	152.28
DISCCART	678234.49	4308882.08	164.41	165.65
DISCCART	678234.49	4309882.08	166.91	166.91
DISCCART	678234.49	4310882.08	156.75	156.75
DISCCART	678234.49	4311882.08	146.89	146.89
DISCCART	678234.49	4312882.08	164.39	164.39
DISCCART	678234.49	4313882.08	164.56	164.56
DISCCART	678234.49	4314882.08	139.42	155.40
DISCCART	678234.49	4315882.08	149.34	149.34
DISCCART	678234.49	4316882.08	139.16	139.16
DISCCART	678234.49	4317882.08	139.93	139.93
DISCCART	678234.49	4318882.08	158.30	158.30
DISCCART	678234.49	4319882.08	157.15	164.98
DISCCART	677234.49	4258882.08	150.12	184.91
DISCCART	677234.49	4257882.08	164.62	164.62
DISCCART	677234.49	4256882.08	150.21	191.05
DISCCART	677234.49	4255882.08	180.58	180.58
DISCCART	677234.49	4254882.08	170.46	170.46
DISCCART	677234.49	4253882.08	204.74	204.74

DISCCART	677234.49	4252882.08	186.39	186.39
DISCCART	677234.49	4251882.08	184.81	194.99
DISCCART	677234.49	4250882.08	183.72	201.48
DISCCART	677234.49	4249882.08	194.54	194.54
DISCCART	677234.49	4248882.08	207.31	207.31
DISCCART	677234.49	4247882.08	213.47	213.47
DISCCART	677234.49	4246882.08	216.29	216.29
DISCCART	677234.49	4245882.08	214.94	214.94
DISCCART	677234.49	4244882.08	213.68	213.68
DISCCART	677234.49	4243882.08	221.25	222.01
DISCCART	677234.49	4242882.08	189.33	214.29
DISCCART	677234.49	4241882.08	182.83	213.53
DISCCART	677234.49	4240882.08	183.72	208.56
DISCCART	677234.49	4239882.08	190.35	190.35
DISCCART	677234.49	4238882.08	182.93	202.89
DISCCART	677234.49	4237882.08	195.68	195.68
DISCCART	677234.49	4236882.08	200.15	208.29
DISCCART	677234.49	4235882.08	233.25	238.97
DISCCART	677234.49	4234882.08	204.55	232.81
DISCCART	677234.49	4233882.08	211.29	239.48
DISCCART	677234.49	4232882.08	238.57	238.57
DISCCART	677234.49	4231882.08	170.58	170.58
DISCCART	677234.49	4230882.08	194.85	233.72
DISCCART	677234.49	4229882.08	194.23	245.84
DISCCART	677234.49	4228882.08	194.06	246.05
DISCCART	677234.49	4227882.08	206.99	260.17
DISCCART	677234.49	4226882.08	253.00	253.00
DISCCART	677234.49	4225882.08	249.32	268.86
DISCCART	677234.49	4224882.08	245.20	250.31
DISCCART	677234.49	4223882.08	263.45	263.45
DISCCART	677234.49	4222882.08	209.31	270.05
DISCCART	677234.49	4221882.08	248.57	263.09
DISCCART	677234.49	4220882.08	245.99	281.56
DISCCART	677234.49	4259882.08	201.70	201.70
DISCCART	677234.49	4259882.08	201.70	201.70
DISCCART	677234.49	4260882.08	206.27	206.27
DISCCART	677234.49	4261882.08	191.80	194.58
DISCCART	677234.49	4262882.08	197.86	208.91
DISCCART	677234.49	4263882.08	174.69	201.72
DISCCART	677234.49	4264882.08	157.78	158.84
DISCCART	677234.49	4265882.08	182.44	185.35
DISCCART	677234.49	4266882.08	149.27	177.16
DISCCART	677234.49	4267882.08	143.73	188.58
DISCCART	677234.49	4268882.08	144.38	145.42
DISCCART	677234.49	4269882.08	145.49	145.49
DISCCART	677234.49	4270882.08	146.51	200.81
DISCCART	677234.49	4271882.08	185.25	190.27
DISCCART	677234.49	4272882.08	175.34	247.86
DISCCART	677234.49	4273882.08	201.38	259.42
DISCCART	677234.49	4274882.08	200.87	260.59
DISCCART	677234.49	4275882.08	178.21	247.10
DISCCART	677234.49	4276882.08	218.34	239.42
DISCCART	677234.49	4277882.08	179.88	242.34
DISCCART	677234.49	4278882.08	224.76	241.05
DISCCART	677234.49	4279882.08	231.18	236.55
DISCCART	677234.49	4280882.08	239.25	239.25
DISCCART	677234.49	4281882.08	235.06	242.31
DISCCART	677234.49	4282882.08	252.99	252.99
DISCCART	677234.49	4283882.08	252.07	252.07
DISCCART	677234.49	4284882.08	242.49	242.49
DISCCART	677234.49	4285882.08	235.77	235.77
DISCCART	677234.49	4286882.08	252.15	252.15
DISCCART	677234.49	4287882.08	260.26	260.26
DISCCART	677234.49	4288882.08	246.99	246.99
DISCCART	677234.49	4289882.08	245.59	245.59
DISCCART	677234.49	4290882.08	234.91	242.42

DISCCART	677234.49	4291882.08	236.90	236.90
DISCCART	677234.49	4292882.08	237.29	237.29
DISCCART	677234.49	4293882.08	220.66	220.66
DISCCART	677234.49	4294882.08	228.80	228.80
DISCCART	677234.49	4295882.08	222.13	222.13
DISCCART	677234.49	4296882.08	206.99	210.00
DISCCART	677234.49	4297882.08	213.64	213.64
DISCCART	677234.49	4298882.08	209.93	209.93
DISCCART	677234.49	4299882.08	196.39	196.39
DISCCART	677234.49	4300882.08	200.84	200.84
DISCCART	677234.49	4301882.08	196.63	204.26
DISCCART	677234.49	4302882.08	180.17	180.17
DISCCART	677234.49	4303882.08	157.75	180.61
DISCCART	677234.49	4304882.08	175.39	175.39
DISCCART	677234.49	4305882.08	158.28	166.14
DISCCART	677234.49	4306882.08	143.02	143.02
DISCCART	677234.49	4307882.08	164.71	164.71
DISCCART	677234.49	4308882.08	171.40	171.40
DISCCART	677234.49	4309882.08	175.59	175.59
DISCCART	677234.49	4310882.08	172.64	172.64
DISCCART	677234.49	4311882.08	168.46	168.46
DISCCART	677234.49	4312882.08	153.63	153.63
DISCCART	677234.49	4313882.08	157.19	157.19
DISCCART	677234.49	4314882.08	152.28	152.28
DISCCART	677234.49	4315882.08	150.23	151.02
DISCCART	677234.49	4316882.08	146.39	146.39
DISCCART	677234.49	4317882.08	143.88	143.88
DISCCART	677234.49	4318882.08	141.59	141.59
DISCCART	677234.49	4319882.08	140.32	140.32
DISCCART	678234.49	4258882.08	151.00	169.23
DISCCART	678234.49	4257882.08	156.69	156.69
DISCCART	678234.49	4256882.08	153.70	153.70
DISCCART	678234.49	4255882.08	178.47	178.47
DISCCART	678234.49	4254882.08	171.22	171.22
DISCCART	678234.49	4253882.08	185.37	185.37
DISCCART	678234.49	4252882.08	171.01	171.01
DISCCART	678234.49	4251882.08	202.32	202.32
DISCCART	678234.49	4250882.08	205.72	207.39
DISCCART	678234.49	4249882.08	196.53	216.30
DISCCART	678234.49	4248882.08	226.29	226.29
DISCCART	678234.49	4247882.08	212.13	239.76
DISCCART	678234.49	4246882.08	215.00	215.00
DISCCART	678234.49	4245882.08	184.15	207.66
DISCCART	678234.49	4244882.08	219.92	219.92
DISCCART	678234.49	4243882.08	211.35	223.03
DISCCART	678234.49	4242882.08	217.11	219.54
DISCCART	678234.49	4241882.08	162.98	213.05
DISCCART	678234.49	4240882.08	163.29	226.07
DISCCART	678234.49	4239882.08	160.76	160.76
DISCCART	678234.49	4238882.08	174.36	232.10
DISCCART	678234.49	4237882.08	228.52	237.75
DISCCART	678234.49	4236882.08	220.62	220.62
DISCCART	678234.49	4235882.08	204.71	221.24
DISCCART	678234.49	4234882.08	214.13	225.77
DISCCART	678234.49	4233882.08	172.43	208.74
DISCCART	678234.49	4232882.08	174.01	221.20
DISCCART	678234.49	4231882.08	192.04	227.44
DISCCART	678234.49	4230882.08	228.50	239.44
DISCCART	678234.49	4229882.08	257.55	257.55
DISCCART	678234.49	4228882.08	257.01	257.01
DISCCART	678234.49	4227882.08	190.87	270.39
DISCCART	678234.49	4226882.08	235.99	274.79
DISCCART	678234.49	4225882.08	240.62	269.63
DISCCART	678234.49	4224882.08	270.39	274.14
DISCCART	678234.49	4223882.08	255.09	292.99
DISCCART	678234.49	4222882.08	250.13	250.13

DISCCART	678234.49	4221882.08	199.64	292.80
DISCCART	678234.49	4220882.08	201.95	251.12
DISCCART	678234.49	4259882.08	189.80	209.17
DISCCART	678234.49	4259882.08	189.80	209.17
DISCCART	678234.49	4260882.08	173.75	173.75
DISCCART	678234.49	4261882.08	184.43	184.43
DISCCART	678234.49	4262882.08	179.54	183.98
DISCCART	678234.49	4263882.08	172.63	187.88
DISCCART	678234.49	4264882.08	168.28	178.81
DISCCART	678234.49	4265882.08	149.48	160.52
DISCCART	678234.49	4266882.08	166.23	166.23
DISCCART	678234.49	4267882.08	143.20	201.43
DISCCART	678234.49	4268882.08	143.19	143.19
DISCCART	678234.49	4269882.08	144.63	144.63
DISCCART	678234.49	4270882.08	147.99	185.51
DISCCART	678234.49	4271882.08	164.45	164.45
DISCCART	678234.49	4272882.08	179.32	185.20
DISCCART	678234.49	4273882.08	241.69	261.13
DISCCART	678234.49	4274882.08	195.71	261.12
DISCCART	678234.49	4275882.08	233.29	254.50
DISCCART	678234.49	4276882.08	243.47	245.82
DISCCART	678234.49	4277882.08	240.24	240.24
DISCCART	678234.49	4278882.08	233.75	240.33
DISCCART	678234.49	4279882.08	234.07	237.01
DISCCART	678234.49	4280882.08	223.63	235.57
DISCCART	678234.49	4281882.08	242.95	242.95
DISCCART	678234.49	4282882.08	256.99	256.99
DISCCART	678234.49	4283882.08	245.25	245.25
DISCCART	678234.49	4284882.08	242.16	242.16
DISCCART	678234.49	4285882.08	238.14	238.14
DISCCART	678234.49	4286882.08	248.31	248.56
DISCCART	678234.49	4287882.08	252.32	252.32
DISCCART	678234.49	4288882.08	223.78	234.56
DISCCART	678234.49	4289882.08	246.71	246.71
DISCCART	678234.49	4290882.08	241.17	241.17
DISCCART	678234.49	4291882.08	216.71	216.71
DISCCART	678234.49	4292882.08	226.74	226.74
DISCCART	678234.49	4293882.08	227.25	227.25
DISCCART	678234.49	4294882.08	217.80	218.17
DISCCART	678234.49	4295882.08	196.57	218.62
DISCCART	678234.49	4296882.08	189.94	201.30
DISCCART	678234.49	4297882.08	211.69	213.52
DISCCART	678234.49	4298882.08	213.59	213.59
DISCCART	678234.49	4299882.08	198.44	198.44
DISCCART	678234.49	4300882.08	180.22	180.22
DISCCART	678234.49	4301882.08	183.75	201.05
DISCCART	678234.49	4302882.08	166.26	186.07
DISCCART	678234.49	4303882.08	147.42	179.68
DISCCART	678234.49	4304882.08	180.11	180.11
DISCCART	678234.49	4305882.08	166.82	166.82
DISCCART	678234.49	4306882.08	143.84	143.84
DISCCART	678234.49	4307882.08	152.28	152.28
DISCCART	678234.49	4308882.08	164.41	165.65
DISCCART	678234.49	4309882.08	166.91	166.91
DISCCART	678234.49	4310882.08	156.75	156.75
DISCCART	678234.49	4311882.08	146.89	146.89
DISCCART	678234.49	4312882.08	164.39	164.39
DISCCART	678234.49	4313882.08	164.56	164.56
DISCCART	678234.49	4314882.08	139.42	155.40
DISCCART	678234.49	4315882.08	149.34	149.34
DISCCART	678234.49	4316882.08	139.16	139.16
DISCCART	678234.49	4317882.08	139.93	139.93
DISCCART	678234.49	4318882.08	158.30	158.30
DISCCART	678234.49	4319882.08	157.15	164.98
DISCCART	677234.49	4258882.08	150.12	184.91
DISCCART	677234.49	4257882.08	164.62	164.62

DISCCART	677234.49	4256882.08	150.21	191.05
DISCCART	677234.49	4255882.08	180.58	180.58
DISCCART	677234.49	4254882.08	170.46	170.46
DISCCART	677234.49	4253882.08	204.74	204.74
DISCCART	677234.49	4252882.08	186.39	186.39
DISCCART	677234.49	4251882.08	184.81	194.99
DISCCART	677234.49	4250882.08	183.72	201.48
DISCCART	677234.49	4249882.08	194.54	194.54
DISCCART	677234.49	4248882.08	207.31	207.31
DISCCART	677234.49	4247882.08	213.47	213.47
DISCCART	677234.49	4246882.08	216.29	216.29
DISCCART	677234.49	4245882.08	214.94	214.94
DISCCART	677234.49	4244882.08	213.68	213.68
DISCCART	677234.49	4243882.08	221.25	222.01
DISCCART	677234.49	4242882.08	189.33	214.29
DISCCART	677234.49	4241882.08	182.83	213.53
DISCCART	677234.49	4240882.08	183.72	208.56
DISCCART	677234.49	4239882.08	190.35	190.35
DISCCART	677234.49	4238882.08	182.93	202.89
DISCCART	677234.49	4237882.08	195.68	195.68
DISCCART	677234.49	4236882.08	200.15	208.29
DISCCART	677234.49	4235882.08	233.25	238.97
DISCCART	677234.49	4234882.08	204.55	232.81
DISCCART	677234.49	4233882.08	211.29	239.48
DISCCART	677234.49	4232882.08	238.57	238.57
DISCCART	677234.49	4231882.08	170.58	170.58
DISCCART	677234.49	4230882.08	194.85	233.72
DISCCART	677234.49	4229882.08	194.23	245.84
DISCCART	677234.49	4228882.08	194.06	246.05
DISCCART	677234.49	4227882.08	206.99	260.17
DISCCART	677234.49	4226882.08	253.00	253.00
DISCCART	677234.49	4225882.08	249.32	268.86
DISCCART	677234.49	4224882.08	245.20	250.31
DISCCART	677234.49	4223882.08	263.45	263.45
DISCCART	677234.49	4222882.08	209.31	270.05
DISCCART	677234.49	4221882.08	248.57	263.09
DISCCART	677234.49	4220882.08	245.99	281.56
DISCCART	677234.49	4259882.08	201.70	201.70
DISCCART	677234.49	4259882.08	201.70	201.70
DISCCART	677234.49	4260882.08	206.27	206.27
DISCCART	677234.49	4261882.08	191.80	194.58
DISCCART	677234.49	4262882.08	197.86	208.91
DISCCART	677234.49	4263882.08	174.69	201.72
DISCCART	677234.49	4264882.08	157.78	158.84
DISCCART	677234.49	4265882.08	182.44	185.35
DISCCART	677234.49	4266882.08	149.27	177.16
DISCCART	677234.49	4267882.08	143.73	188.58
DISCCART	677234.49	4268882.08	144.38	145.42
DISCCART	677234.49	4269882.08	145.49	145.49
DISCCART	677234.49	4270882.08	146.51	200.81
DISCCART	677234.49	4271882.08	185.25	190.27
DISCCART	677234.49	4272882.08	175.34	247.86
DISCCART	677234.49	4273882.08	201.38	259.42
DISCCART	677234.49	4274882.08	200.87	260.59
DISCCART	677234.49	4275882.08	178.21	247.10
DISCCART	677234.49	4276882.08	218.34	239.42
DISCCART	677234.49	4277882.08	179.88	242.34
DISCCART	677234.49	4278882.08	224.76	241.05
DISCCART	677234.49	4279882.08	231.18	236.55
DISCCART	677234.49	4280882.08	239.25	239.25
DISCCART	677234.49	4281882.08	235.06	242.31
DISCCART	677234.49	4282882.08	252.99	252.99
DISCCART	677234.49	4283882.08	252.07	252.07
DISCCART	677234.49	4284882.08	242.49	242.49
DISCCART	677234.49	4285882.08	235.77	235.77
DISCCART	677234.49	4286882.08	252.15	252.15

DISCCART	677234.49	4287882.08	260.26	260.26
DISCCART	677234.49	4288882.08	246.99	246.99
DISCCART	677234.49	4289882.08	245.59	245.59
DISCCART	677234.49	4290882.08	234.91	242.42
DISCCART	677234.49	4291882.08	236.90	236.90
DISCCART	677234.49	4292882.08	237.29	237.29
DISCCART	677234.49	4293882.08	220.66	220.66
DISCCART	677234.49	4294882.08	228.80	228.80
DISCCART	677234.49	4295882.08	222.13	222.13
DISCCART	677234.49	4296882.08	206.99	210.00
DISCCART	677234.49	4297882.08	213.64	213.64
DISCCART	677234.49	4298882.08	209.93	209.93
DISCCART	677234.49	4299882.08	196.39	196.39
DISCCART	677234.49	4300882.08	200.84	200.84
DISCCART	677234.49	4301882.08	196.63	204.26
DISCCART	677234.49	4302882.08	180.17	180.17
DISCCART	677234.49	4303882.08	157.75	180.61
DISCCART	677234.49	4304882.08	175.39	175.39
DISCCART	677234.49	4305882.08	158.28	166.14
DISCCART	677234.49	4306882.08	143.02	143.02
DISCCART	677234.49	4307882.08	164.71	164.71
DISCCART	677234.49	4308882.08	171.40	171.40
DISCCART	677234.49	4309882.08	175.59	175.59
DISCCART	677234.49	4310882.08	172.64	172.64
DISCCART	677234.49	4311882.08	168.46	168.46
DISCCART	677234.49	4312882.08	153.63	153.63
DISCCART	677234.49	4313882.08	157.19	157.19
DISCCART	677234.49	4314882.08	152.28	152.28
DISCCART	677234.49	4315882.08	150.23	151.02
DISCCART	677234.49	4316882.08	146.39	146.39
DISCCART	677234.49	4317882.08	143.88	143.88
DISCCART	677234.49	4318882.08	141.59	141.59
DISCCART	677234.49	4319882.08	140.32	140.32
DISCCART	676234.49	4258882.08	172.04	209.84
DISCCART	676234.49	4257882.08	194.04	194.04
DISCCART	676234.49	4256882.08	155.20	179.00
DISCCART	676234.49	4255882.08	186.79	195.86
DISCCART	676234.49	4254882.08	196.14	196.14
DISCCART	676234.49	4253882.08	214.73	214.73
DISCCART	676234.49	4252882.08	201.13	201.13
DISCCART	676234.49	4251882.08	209.53	209.53
DISCCART	676234.49	4250882.08	213.32	213.32
DISCCART	676234.49	4249882.08	213.26	221.11
DISCCART	676234.49	4248882.08	221.69	231.87
DISCCART	676234.49	4247882.08	217.63	217.63
DISCCART	676234.49	4246882.08	223.48	223.48
DISCCART	676234.49	4245882.08	234.18	234.18
DISCCART	676234.49	4244882.08	218.79	233.34
DISCCART	676234.49	4243882.08	190.18	207.61
DISCCART	676234.49	4242882.08	208.39	208.39
DISCCART	676234.49	4241882.08	215.37	215.37
DISCCART	676234.49	4240882.08	173.92	219.21
DISCCART	676234.49	4239882.08	186.30	220.36
DISCCART	676234.49	4238882.08	176.81	176.81
DISCCART	676234.49	4237882.08	188.33	219.71
DISCCART	676234.49	4236882.08	220.83	220.83
DISCCART	676234.49	4235882.08	216.98	226.34
DISCCART	676234.49	4234882.08	236.87	245.33
DISCCART	676234.49	4233882.08	236.75	237.59
DISCCART	676234.49	4232882.08	217.96	238.08
DISCCART	676234.49	4231882.08	215.48	232.31
DISCCART	676234.49	4230882.08	233.40	233.40
DISCCART	676234.49	4229882.08	236.70	236.70
DISCCART	676234.49	4228882.08	233.85	244.33
DISCCART	676234.49	4227882.08	225.37	250.27
DISCCART	676234.49	4226882.08	194.15	257.66

DISCCART	676234.49	4225882.08	185.99	240.04
DISCCART	676234.49	4224882.08	229.20	229.20
DISCCART	676234.49	4223882.08	204.73	275.51
DISCCART	676234.49	4222882.08	212.09	281.38
DISCCART	676234.49	4221882.08	261.15	267.91
DISCCART	676234.49	4220882.08	281.46	281.46
DISCCART	676234.49	4259882.08	174.47	202.02
DISCCART	676234.49	4259882.08	174.47	202.02
DISCCART	676234.49	4260882.08	192.38	202.67
DISCCART	676234.49	4261882.08	204.67	204.67
DISCCART	676234.49	4262882.08	189.66	189.66
DISCCART	676234.49	4263882.08	153.67	185.48
DISCCART	676234.49	4264882.08	178.52	187.96
DISCCART	676234.49	4265882.08	175.57	180.39
DISCCART	676234.49	4266882.08	168.23	186.78
DISCCART	676234.49	4267882.08	150.09	161.93
DISCCART	676234.49	4268882.08	144.28	144.28
DISCCART	676234.49	4269882.08	145.97	145.97
DISCCART	676234.49	4270882.08	145.21	145.21
DISCCART	676234.49	4271882.08	146.68	195.02
DISCCART	676234.49	4272882.08	178.48	196.84
DISCCART	676234.49	4273882.08	178.23	187.28
DISCCART	676234.49	4274882.08	194.84	232.79
DISCCART	676234.49	4275882.08	192.92	214.23
DISCCART	676234.49	4276882.08	160.16	227.58
DISCCART	676234.49	4277882.08	190.27	238.33
DISCCART	676234.49	4278882.08	219.35	234.01
DISCCART	676234.49	4279882.08	191.85	239.98
DISCCART	676234.49	4280882.08	227.48	242.82
DISCCART	676234.49	4281882.08	206.45	254.10
DISCCART	676234.49	4282882.08	234.81	250.47
DISCCART	676234.49	4283882.08	247.96	247.96
DISCCART	676234.49	4284882.08	247.71	247.71
DISCCART	676234.49	4285882.08	248.35	248.35
DISCCART	676234.49	4286882.08	251.81	251.81
DISCCART	676234.49	4287882.08	260.61	260.61
DISCCART	676234.49	4288882.08	258.52	258.52
DISCCART	676234.49	4289882.08	241.89	241.89
DISCCART	676234.49	4290882.08	250.41	255.64
DISCCART	676234.49	4291882.08	241.40	242.94
DISCCART	676234.49	4292882.08	235.44	235.44
DISCCART	676234.49	4293882.08	237.38	237.38
DISCCART	676234.49	4294882.08	228.66	228.66
DISCCART	676234.49	4295882.08	206.64	206.64
DISCCART	676234.49	4296882.08	212.41	212.41
DISCCART	676234.49	4297882.08	197.45	197.45
DISCCART	676234.49	4298882.08	207.09	209.65
DISCCART	676234.49	4299882.08	212.06	212.94
DISCCART	676234.49	4300882.08	204.85	204.85
DISCCART	676234.49	4301882.08	204.76	204.76
DISCCART	676234.49	4302882.08	167.68	187.29
DISCCART	676234.49	4303882.08	181.60	181.60
DISCCART	676234.49	4304882.08	172.30	183.52
DISCCART	676234.49	4305882.08	168.82	168.82
DISCCART	676234.49	4306882.08	146.68	146.68
DISCCART	676234.49	4307882.08	177.55	177.55
DISCCART	676234.49	4308882.08	165.10	165.10
DISCCART	676234.49	4309882.08	188.35	188.35
DISCCART	676234.49	4310882.08	189.61	189.61
DISCCART	676234.49	4311882.08	169.07	172.39
DISCCART	676234.49	4312882.08	156.86	156.86
DISCCART	676234.49	4313882.08	169.61	169.61
DISCCART	676234.49	4314882.08	167.17	167.17
DISCCART	676234.49	4315882.08	155.45	155.45
DISCCART	676234.49	4316882.08	154.98	162.15
DISCCART	676234.49	4317882.08	146.18	146.18

DISCCART	676234.49	4318882.08	157.95	157.95
DISCCART	676234.49	4319882.08	153.06	172.45
DISCCART	675234.49	4258882.08	203.35	214.67
DISCCART	675234.49	4257882.08	168.63	207.94
DISCCART	675234.49	4256882.08	158.11	158.11
DISCCART	675234.49	4255882.08	183.46	183.46
DISCCART	675234.49	4254882.08	183.97	202.96
DISCCART	675234.49	4253882.08	152.35	226.66
DISCCART	675234.49	4252882.08	162.29	194.98
DISCCART	675234.49	4251882.08	215.15	218.84
DISCCART	675234.49	4250882.08	181.57	209.07
DISCCART	675234.49	4249882.08	195.82	195.82
DISCCART	675234.49	4248882.08	188.51	213.88
DISCCART	675234.49	4247882.08	212.62	212.62
DISCCART	675234.49	4246882.08	210.70	214.04
DISCCART	675234.49	4245882.08	230.91	230.91
DISCCART	675234.49	4244882.08	225.64	225.66
DISCCART	675234.49	4243882.08	216.37	219.22
DISCCART	675234.49	4242882.08	202.70	220.35
DISCCART	675234.49	4241882.08	188.68	199.04
DISCCART	675234.49	4240882.08	224.22	224.22
DISCCART	675234.49	4239882.08	189.11	221.57
DISCCART	675234.49	4238882.08	164.80	164.80
DISCCART	675234.49	4237882.08	215.05	231.64
DISCCART	675234.49	4236882.08	199.31	226.74
DISCCART	675234.49	4235882.08	227.00	227.00
DISCCART	675234.49	4234882.08	245.47	245.47
DISCCART	675234.49	4233882.08	263.41	263.41
DISCCART	675234.49	4232882.08	250.79	250.79
DISCCART	675234.49	4231882.08	208.48	263.10
DISCCART	675234.49	4230882.08	246.87	257.22
DISCCART	675234.49	4229882.08	251.89	261.96
DISCCART	675234.49	4228882.08	237.11	237.85
DISCCART	675234.49	4227882.08	200.27	258.17
DISCCART	675234.49	4226882.08	246.86	269.16
DISCCART	675234.49	4225882.08	197.08	250.33
DISCCART	675234.49	4224882.08	210.58	270.27
DISCCART	675234.49	4223882.08	195.17	275.51
DISCCART	675234.49	4222882.08	239.48	262.49
DISCCART	675234.49	4221882.08	243.17	270.04
DISCCART	675234.49	4220882.08	247.64	282.50
DISCCART	675234.49	4259882.08	215.78	221.40
DISCCART	675234.49	4259882.08	215.78	221.40
DISCCART	675234.49	4260882.08	232.73	232.73
DISCCART	675234.49	4261882.08	214.90	214.90
DISCCART	675234.49	4262882.08	176.26	187.39
DISCCART	675234.49	4263882.08	162.06	164.27
DISCCART	675234.49	4264882.08	200.48	200.48
DISCCART	675234.49	4265882.08	153.57	186.88
DISCCART	675234.49	4266882.08	158.72	184.63
DISCCART	675234.49	4267882.08	149.20	169.12
DISCCART	675234.49	4268882.08	146.11	184.32
DISCCART	675234.49	4269882.08	144.95	144.95
DISCCART	675234.49	4270882.08	145.34	145.34
DISCCART	675234.49	4271882.08	146.25	146.25
DISCCART	675234.49	4272882.08	146.11	198.60
DISCCART	675234.49	4273882.08	165.48	186.58
DISCCART	675234.49	4274882.08	153.85	165.35
DISCCART	675234.49	4275882.08	169.57	206.23
DISCCART	675234.49	4276882.08	174.97	235.57
DISCCART	675234.49	4277882.08	205.48	237.85
DISCCART	675234.49	4278882.08	234.71	234.71
DISCCART	675234.49	4279882.08	216.67	236.49
DISCCART	675234.49	4280882.08	184.34	234.15
DISCCART	675234.49	4281882.08	196.04	237.15
DISCCART	675234.49	4282882.08	244.32	246.89

DISCCART	675234.49	4283882.08	249.65	249.65
DISCCART	675234.49	4284882.08	240.93	245.95
DISCCART	675234.49	4285882.08	239.15	242.73
DISCCART	675234.49	4286882.08	236.16	250.36
DISCCART	675234.49	4287882.08	257.69	262.59
DISCCART	675234.49	4288882.08	254.42	255.49
DISCCART	675234.49	4289882.08	255.78	255.78
DISCCART	675234.49	4290882.08	248.20	248.20
DISCCART	675234.49	4291882.08	247.28	248.66
DISCCART	675234.49	4292882.08	237.91	237.91
DISCCART	675234.49	4293882.08	233.90	233.90
DISCCART	675234.49	4294882.08	225.06	225.06
DISCCART	675234.49	4295882.08	226.60	226.60
DISCCART	675234.49	4296882.08	221.28	221.28
DISCCART	675234.49	4297882.08	200.79	200.79
DISCCART	675234.49	4298882.08	218.83	218.83
DISCCART	675234.49	4299882.08	209.18	215.70
DISCCART	675234.49	4300882.08	205.99	207.14
DISCCART	675234.49	4301882.08	198.70	199.49
DISCCART	675234.49	4302882.08	182.80	187.59
DISCCART	675234.49	4303882.08	174.71	190.54
DISCCART	675234.49	4304882.08	166.66	181.45
DISCCART	675234.49	4305882.08	154.39	177.81
DISCCART	675234.49	4306882.08	148.36	148.36
DISCCART	675234.49	4307882.08	187.16	188.29
DISCCART	675234.49	4308882.08	175.22	175.22
DISCCART	675234.49	4309882.08	174.72	174.72
DISCCART	675234.49	4310882.08	173.05	175.46
DISCCART	675234.49	4311882.08	163.79	163.79
DISCCART	675234.49	4312882.08	171.08	171.08
DISCCART	675234.49	4313882.08	174.58	174.58
DISCCART	675234.49	4314882.08	177.84	177.84
DISCCART	675234.49	4315882.08	175.66	175.66
DISCCART	675234.49	4316882.08	171.74	171.74
DISCCART	675234.49	4317882.08	167.41	170.25
DISCCART	675234.49	4318882.08	158.51	158.51
DISCCART	675234.49	4319882.08	142.72	142.72
DISCCART	674234.49	4258882.08	167.86	191.39
DISCCART	674234.49	4257882.08	165.69	165.69
DISCCART	674234.49	4256882.08	169.41	174.39
DISCCART	674234.49	4255882.08	153.93	188.12
DISCCART	674234.49	4254882.08	185.21	185.21
DISCCART	674234.49	4253882.08	182.58	182.58
DISCCART	674234.49	4252882.08	155.58	155.58
DISCCART	674234.49	4251882.08	189.84	195.66
DISCCART	674234.49	4250882.08	187.06	187.06
DISCCART	674234.49	4249882.08	191.26	201.72
DISCCART	674234.49	4248882.08	209.34	209.34
DISCCART	674234.49	4247882.08	206.97	223.43
DISCCART	674234.49	4246882.08	215.70	232.29
DISCCART	674234.49	4245882.08	236.84	236.84
DISCCART	674234.49	4244882.08	235.15	235.15
DISCCART	674234.49	4243882.08	226.37	226.37
DISCCART	674234.49	4242882.08	210.37	220.79
DISCCART	674234.49	4241882.08	193.37	238.21
DISCCART	674234.49	4240882.08	214.54	232.88
DISCCART	674234.49	4239882.08	226.53	226.53
DISCCART	674234.49	4238882.08	181.31	228.89
DISCCART	674234.49	4237882.08	172.21	214.89
DISCCART	674234.49	4236882.08	164.59	233.49
DISCCART	674234.49	4235882.08	180.10	243.75
DISCCART	674234.49	4234882.08	237.34	238.40
DISCCART	674234.49	4233882.08	222.08	245.85
DISCCART	674234.49	4232882.08	218.28	262.28
DISCCART	674234.49	4231882.08	242.19	269.46
DISCCART	674234.49	4230882.08	260.65	269.82

DISCCART	674234.49	4229882.08	246.19	276.24
DISCCART	674234.49	4228882.08	233.97	270.17
DISCCART	674234.49	4227882.08	215.43	269.07
DISCCART	674234.49	4226882.08	257.44	263.92
DISCCART	674234.49	4225882.08	221.76	232.17
DISCCART	674234.49	4224882.08	262.96	269.81
DISCCART	674234.49	4223882.08	261.11	263.90
DISCCART	674234.49	4222882.08	252.16	263.53
DISCCART	674234.49	4221882.08	241.51	257.48
DISCCART	674234.49	4220882.08	254.35	288.51
DISCCART	674234.49	4259882.08	188.00	188.00
DISCCART	674234.49	4259882.08	188.00	188.00
DISCCART	674234.49	4260882.08	210.81	222.56
DISCCART	674234.49	4261882.08	192.30	215.93
DISCCART	674234.49	4262882.08	168.65	201.61
DISCCART	674234.49	4263882.08	203.46	203.46
DISCCART	674234.49	4264882.08	194.72	200.06
DISCCART	674234.49	4265882.08	193.42	194.21
DISCCART	674234.49	4266882.08	161.40	174.77
DISCCART	674234.49	4267882.08	162.63	184.31
DISCCART	674234.49	4268882.08	169.35	169.35
DISCCART	674234.49	4269882.08	144.61	144.61
DISCCART	674234.49	4270882.08	147.34	147.34
DISCCART	674234.49	4271882.08	146.45	146.45
DISCCART	674234.49	4272882.08	146.32	146.32
DISCCART	674234.49	4273882.08	147.95	147.95
DISCCART	674234.49	4274882.08	147.76	147.76
DISCCART	674234.49	4275882.08	158.01	223.21
DISCCART	674234.49	4276882.08	171.58	235.07
DISCCART	674234.49	4277882.08	202.32	237.74
DISCCART	674234.49	4278882.08	205.09	214.48
DISCCART	674234.49	4279882.08	184.66	239.31
DISCCART	674234.49	4280882.08	210.79	227.30
DISCCART	674234.49	4281882.08	192.25	255.94
DISCCART	674234.49	4282882.08	247.26	255.67
DISCCART	674234.49	4283882.08	247.99	247.99
DISCCART	674234.49	4284882.08	246.74	246.74
DISCCART	674234.49	4285882.08	212.81	242.98
DISCCART	674234.49	4286882.08	231.17	248.62
DISCCART	674234.49	4287882.08	253.99	253.99
DISCCART	674234.49	4288882.08	259.74	259.74
DISCCART	674234.49	4289882.08	251.11	251.11
DISCCART	674234.49	4290882.08	245.79	245.79
DISCCART	674234.49	4291882.08	251.24	251.24
DISCCART	674234.49	4292882.08	249.46	249.46
DISCCART	674234.49	4293882.08	246.16	246.16
DISCCART	674234.49	4294882.08	230.11	230.11
DISCCART	674234.49	4295882.08	232.52	232.52
DISCCART	674234.49	4296882.08	225.23	225.23
DISCCART	674234.49	4297882.08	201.22	201.22
DISCCART	674234.49	4298882.08	219.49	219.49
DISCCART	674234.49	4299882.08	221.51	221.51
DISCCART	674234.49	4300882.08	204.87	204.87
DISCCART	674234.49	4301882.08	198.50	200.15
DISCCART	674234.49	4302882.08	176.78	199.75
DISCCART	674234.49	4303882.08	173.57	182.75
DISCCART	674234.49	4304882.08	178.96	178.96
DISCCART	674234.49	4305882.08	175.91	190.40
DISCCART	674234.49	4306882.08	175.92	175.92
DISCCART	674234.49	4307882.08	149.08	149.08
DISCCART	674234.49	4308882.08	167.20	177.95
DISCCART	674234.49	4309882.08	190.04	190.04
DISCCART	674234.49	4310882.08	184.92	184.92
DISCCART	674234.49	4311882.08	163.64	163.64
DISCCART	674234.49	4312882.08	183.88	183.88
DISCCART	674234.49	4313882.08	183.27	183.27

DISCCART	674234.49	4314882.08	181.55	181.55
DISCCART	674234.49	4315882.08	185.09	187.10
DISCCART	674234.49	4316882.08	181.52	181.52
DISCCART	674234.49	4317882.08	189.91	189.91
DISCCART	674234.49	4318882.08	171.54	171.54
DISCCART	674234.49	4319882.08	143.25	143.25
DISCCART	673234.49	4258882.08	203.16	213.81
DISCCART	673234.49	4257882.08	167.83	167.83
DISCCART	673234.49	4256882.08	186.02	186.02
DISCCART	673234.49	4255882.08	205.41	205.41
DISCCART	673234.49	4254882.08	153.26	210.80
DISCCART	673234.49	4253882.08	173.51	173.51
DISCCART	673234.49	4252882.08	165.04	192.66
DISCCART	673234.49	4251882.08	192.92	198.28
DISCCART	673234.49	4250882.08	158.05	212.04
DISCCART	673234.49	4249882.08	187.22	198.40
DISCCART	673234.49	4248882.08	188.95	220.04
DISCCART	673234.49	4247882.08	207.03	220.91
DISCCART	673234.49	4246882.08	224.35	232.91
DISCCART	673234.49	4245882.08	234.22	234.22
DISCCART	673234.49	4244882.08	257.35	263.58
DISCCART	673234.49	4243882.08	237.56	237.56
DISCCART	673234.49	4242882.08	235.82	236.75
DISCCART	673234.49	4241882.08	238.66	238.66
DISCCART	673234.49	4240882.08	238.68	238.68
DISCCART	673234.49	4239882.08	230.41	242.51
DISCCART	673234.49	4238882.08	200.97	226.55
DISCCART	673234.49	4237882.08	211.38	231.23
DISCCART	673234.49	4236882.08	173.23	226.43
DISCCART	673234.49	4235882.08	221.57	225.67
DISCCART	673234.49	4234882.08	175.58	239.93
DISCCART	673234.49	4233882.08	214.28	239.65
DISCCART	673234.49	4232882.08	231.96	245.92
DISCCART	673234.49	4231882.08	223.40	250.68
DISCCART	673234.49	4230882.08	245.64	270.01
DISCCART	673234.49	4229882.08	257.54	280.84
DISCCART	673234.49	4228882.08	246.04	270.14
DISCCART	673234.49	4227882.08	270.87	271.83
DISCCART	673234.49	4226882.08	282.00	282.00
DISCCART	673234.49	4225882.08	222.09	257.75
DISCCART	673234.49	4224882.08	257.00	274.86
DISCCART	673234.49	4223882.08	259.68	294.88
DISCCART	673234.49	4222882.08	256.49	256.49
DISCCART	673234.49	4221882.08	245.87	269.78
DISCCART	673234.49	4220882.08	293.87	300.36
DISCCART	673234.49	4259882.08	205.89	214.45
DISCCART	673234.49	4259882.08	205.89	214.45
DISCCART	673234.49	4260882.08	228.98	228.98
DISCCART	673234.49	4261882.08	206.93	206.93
DISCCART	673234.49	4262882.08	204.31	204.31
DISCCART	673234.49	4263882.08	200.31	200.31
DISCCART	673234.49	4264882.08	190.54	190.54
DISCCART	673234.49	4265882.08	157.64	201.32
DISCCART	673234.49	4266882.08	167.07	170.34
DISCCART	673234.49	4267882.08	176.34	176.34
DISCCART	673234.49	4268882.08	160.43	171.80
DISCCART	673234.49	4269882.08	159.33	159.33
DISCCART	673234.49	4270882.08	145.40	145.40
DISCCART	673234.49	4271882.08	145.42	145.42
DISCCART	673234.49	4272882.08	146.32	146.32
DISCCART	673234.49	4273882.08	146.00	146.00
DISCCART	673234.49	4274882.08	147.45	147.45
DISCCART	673234.49	4275882.08	156.85	214.93
DISCCART	673234.49	4276882.08	224.27	234.98
DISCCART	673234.49	4277882.08	163.69	240.47
DISCCART	673234.49	4278882.08	169.68	239.07

DISCCART	673234.49	4279882.08	154.03	231.95
DISCCART	673234.49	4280882.08	179.68	233.10
DISCCART	673234.49	4281882.08	178.87	246.79
DISCCART	673234.49	4282882.08	199.17	250.38
DISCCART	673234.49	4283882.08	240.56	253.95
DISCCART	673234.49	4284882.08	203.52	249.55
DISCCART	673234.49	4285882.08	207.63	248.38
DISCCART	673234.49	4286882.08	235.42	238.06
DISCCART	673234.49	4287882.08	253.80	258.86
DISCCART	673234.49	4288882.08	260.74	260.74
DISCCART	673234.49	4289882.08	257.91	257.91
DISCCART	673234.49	4290882.08	247.76	247.76
DISCCART	673234.49	4291882.08	222.14	230.43
DISCCART	673234.49	4292882.08	248.26	248.26
DISCCART	673234.49	4293882.08	251.09	251.09
DISCCART	673234.49	4294882.08	239.86	239.86
DISCCART	673234.49	4295882.08	239.11	239.11
DISCCART	673234.49	4296882.08	233.23	233.23
DISCCART	673234.49	4297882.08	213.40	213.40
DISCCART	673234.49	4298882.08	212.70	212.70
DISCCART	673234.49	4299882.08	211.53	216.67
DISCCART	673234.49	4300882.08	196.10	213.72
DISCCART	673234.49	4301882.08	195.57	198.46
DISCCART	673234.49	4302882.08	162.59	162.59
DISCCART	673234.49	4303882.08	178.74	195.74
DISCCART	673234.49	4304882.08	197.52	202.98
DISCCART	673234.49	4305882.08	200.79	200.79
DISCCART	673234.49	4306882.08	196.73	196.73
DISCCART	673234.49	4307882.08	177.12	177.12
DISCCART	673234.49	4308882.08	183.76	183.76
DISCCART	673234.49	4309882.08	171.91	189.24
DISCCART	673234.49	4310882.08	195.00	195.00
DISCCART	673234.49	4311882.08	176.18	178.95
DISCCART	673234.49	4312882.08	179.62	181.49
DISCCART	673234.49	4313882.08	187.98	187.98
DISCCART	673234.49	4314882.08	196.14	196.14
DISCCART	673234.49	4315882.08	194.62	194.62
DISCCART	673234.49	4316882.08	203.46	203.46
DISCCART	673234.49	4317882.08	183.82	183.82
DISCCART	673234.49	4318882.08	181.39	181.39
DISCCART	673234.49	4319882.08	150.84	150.84
DISCCART	672234.49	4258882.08	186.51	186.51
DISCCART	672234.49	4257882.08	183.29	183.29
DISCCART	672234.49	4256882.08	195.00	223.61
DISCCART	672234.49	4255882.08	181.55	220.47
DISCCART	672234.49	4254882.08	159.14	188.83
DISCCART	672234.49	4253882.08	170.25	196.70
DISCCART	672234.49	4252882.08	173.74	218.26
DISCCART	672234.49	4251882.08	212.68	212.68
DISCCART	672234.49	4250882.08	168.92	198.48
DISCCART	672234.49	4249882.08	194.65	199.62
DISCCART	672234.49	4248882.08	175.71	209.19
DISCCART	672234.49	4247882.08	202.07	225.90
DISCCART	672234.49	4246882.08	199.06	233.24
DISCCART	672234.49	4245882.08	236.79	251.79
DISCCART	672234.49	4244882.08	222.79	251.42
DISCCART	672234.49	4243882.08	240.45	249.72
DISCCART	672234.49	4242882.08	235.48	251.19
DISCCART	672234.49	4241882.08	224.63	250.76
DISCCART	672234.49	4240882.08	239.63	239.63
DISCCART	672234.49	4239882.08	208.25	238.30
DISCCART	672234.49	4238882.08	232.66	238.60
DISCCART	672234.49	4237882.08	163.54	233.40
DISCCART	672234.49	4236882.08	174.56	220.56
DISCCART	672234.49	4235882.08	195.23	219.33
DISCCART	672234.49	4234882.08	211.16	244.93

DISCCART	672234.49	4233882.08	227.97	245.89
DISCCART	672234.49	4232882.08	219.23	259.74
DISCCART	672234.49	4231882.08	243.09	269.86
DISCCART	672234.49	4230882.08	252.48	275.07
DISCCART	672234.49	4229882.08	285.67	285.67
DISCCART	672234.49	4228882.08	273.38	281.83
DISCCART	672234.49	4227882.08	268.49	281.49
DISCCART	672234.49	4226882.08	274.79	280.60
DISCCART	672234.49	4225882.08	243.01	264.35
DISCCART	672234.49	4224882.08	264.74	282.60
DISCCART	672234.49	4223882.08	277.99	280.83
DISCCART	672234.49	4222882.08	278.86	294.89
DISCCART	672234.49	4221882.08	262.12	276.43
DISCCART	672234.49	4220882.08	294.83	306.53
DISCCART	672234.49	4259882.08	197.06	197.06
DISCCART	672234.49	4259882.08	197.06	197.06
DISCCART	672234.49	4260882.08	223.74	223.74
DISCCART	672234.49	4261882.08	199.70	199.70
DISCCART	672234.49	4262882.08	207.09	210.42
DISCCART	672234.49	4263882.08	174.56	209.79
DISCCART	672234.49	4264882.08	189.96	193.51
DISCCART	672234.49	4265882.08	199.43	210.62
DISCCART	672234.49	4266882.08	174.95	187.86
DISCCART	672234.49	4267882.08	173.18	173.18
DISCCART	672234.49	4268882.08	169.85	184.58
DISCCART	672234.49	4269882.08	177.75	177.99
DISCCART	672234.49	4270882.08	145.00	145.00
DISCCART	672234.49	4271882.08	145.34	145.34
DISCCART	672234.49	4272882.08	147.14	147.14
DISCCART	672234.49	4273882.08	146.83	146.83
DISCCART	672234.49	4274882.08	145.99	145.99
DISCCART	672234.49	4275882.08	149.80	214.93
DISCCART	672234.49	4276882.08	158.70	182.90
DISCCART	672234.49	4277882.08	158.66	227.58
DISCCART	672234.49	4278882.08	149.53	233.59
DISCCART	672234.49	4279882.08	154.74	229.74
DISCCART	672234.49	4280882.08	154.43	233.98
DISCCART	672234.49	4281882.08	158.43	243.79
DISCCART	672234.49	4282882.08	207.48	241.85
DISCCART	672234.49	4283882.08	238.27	238.27
DISCCART	672234.49	4284882.08	212.56	253.46
DISCCART	672234.49	4285882.08	240.53	246.66
DISCCART	672234.49	4286882.08	238.27	247.14
DISCCART	672234.49	4287882.08	254.60	254.60
DISCCART	672234.49	4288882.08	255.98	256.38
DISCCART	672234.49	4289882.08	247.37	247.37
DISCCART	672234.49	4290882.08	239.31	243.18
DISCCART	672234.49	4291882.08	210.00	238.14
DISCCART	672234.49	4292882.08	241.34	241.34
DISCCART	672234.49	4293882.08	253.22	253.22
DISCCART	672234.49	4294882.08	247.81	247.81
DISCCART	672234.49	4295882.08	233.88	233.88
DISCCART	672234.49	4296882.08	231.84	231.84
DISCCART	672234.49	4297882.08	224.30	224.30
DISCCART	672234.49	4298882.08	208.77	208.77
DISCCART	672234.49	4299882.08	218.60	220.49
DISCCART	672234.49	4300882.08	187.21	216.30
DISCCART	672234.49	4301882.08	187.11	187.11
DISCCART	672234.49	4302882.08	177.72	194.17
DISCCART	672234.49	4303882.08	186.57	186.57
DISCCART	672234.49	4304882.08	204.74	204.74
DISCCART	672234.49	4305882.08	204.31	204.31
DISCCART	672234.49	4306882.08	166.89	196.82
DISCCART	672234.49	4307882.08	152.45	152.45
DISCCART	672234.49	4308882.08	173.47	183.17
DISCCART	672234.49	4309882.08	172.00	172.00

DISCCART	672234.49	4310882.08	187.89	201.55
DISCCART	672234.49	4311882.08	191.93	191.93
DISCCART	672234.49	4312882.08	184.39	188.97
DISCCART	672234.49	4313882.08	192.65	192.65
DISCCART	672234.49	4314882.08	197.05	197.05
DISCCART	672234.49	4315882.08	197.58	197.58
DISCCART	672234.49	4316882.08	199.13	199.13
DISCCART	672234.49	4317882.08	169.66	196.00
DISCCART	672234.49	4318882.08	152.77	165.25
DISCCART	672234.49	4319882.08	172.65	172.65
DISCCART	671234.49	4258882.08	194.08	194.08
DISCCART	671234.49	4257882.08	214.55	214.73
DISCCART	671234.49	4256882.08	207.28	220.70
DISCCART	671234.49	4255882.08	184.93	207.73
DISCCART	671234.49	4254882.08	168.01	201.36
DISCCART	671234.49	4253882.08	190.74	204.80
DISCCART	671234.49	4252882.08	158.44	225.57
DISCCART	671234.49	4251882.08	193.74	196.96
DISCCART	671234.49	4250882.08	199.61	211.49
DISCCART	671234.49	4249882.08	211.65	211.65
DISCCART	671234.49	4248882.08	164.00	215.18
DISCCART	671234.49	4247882.08	181.47	221.86
DISCCART	671234.49	4246882.08	215.83	239.39
DISCCART	671234.49	4245882.08	241.36	258.18
DISCCART	671234.49	4244882.08	218.37	231.03
DISCCART	671234.49	4243882.08	231.73	238.61
DISCCART	671234.49	4242882.08	219.91	238.81
DISCCART	671234.49	4241882.08	239.09	250.76
DISCCART	671234.49	4240882.08	245.43	253.05
DISCCART	671234.49	4239882.08	253.46	253.46
DISCCART	671234.49	4238882.08	223.43	233.35
DISCCART	671234.49	4237882.08	178.69	227.43
DISCCART	671234.49	4236882.08	200.13	239.03
DISCCART	671234.49	4235882.08	214.60	244.51
DISCCART	671234.49	4234882.08	211.04	250.55
DISCCART	671234.49	4233882.08	255.97	257.79
DISCCART	671234.49	4232882.08	242.20	242.20
DISCCART	671234.49	4231882.08	221.73	270.41
DISCCART	671234.49	4230882.08	251.37	251.37
DISCCART	671234.49	4229882.08	239.72	276.17
DISCCART	671234.49	4228882.08	260.70	286.66
DISCCART	671234.49	4227882.08	264.27	269.80
DISCCART	671234.49	4226882.08	244.34	269.60
DISCCART	671234.49	4225882.08	263.13	263.13
DISCCART	671234.49	4224882.08	260.70	263.65
DISCCART	671234.49	4223882.08	241.49	280.69
DISCCART	671234.49	4222882.08	285.52	286.84
DISCCART	671234.49	4221882.08	283.64	283.64
DISCCART	671234.49	4220882.08	255.55	313.54
DISCCART	671234.49	4259882.08	205.70	205.70
DISCCART	671234.49	4259882.08	205.70	205.70
DISCCART	671234.49	4260882.08	217.74	225.36
DISCCART	671234.49	4261882.08	224.76	224.76
DISCCART	671234.49	4262882.08	204.36	212.66
DISCCART	671234.49	4263882.08	195.16	220.81
DISCCART	671234.49	4264882.08	204.82	221.04
DISCCART	671234.49	4265882.08	212.51	222.33
DISCCART	671234.49	4266882.08	198.95	198.95
DISCCART	671234.49	4267882.08	198.28	203.96
DISCCART	671234.49	4268882.08	178.99	221.08
DISCCART	671234.49	4269882.08	169.88	169.88
DISCCART	671234.49	4270882.08	191.22	200.50
DISCCART	671234.49	4271882.08	145.52	145.52
DISCCART	671234.49	4272882.08	146.93	146.93
DISCCART	671234.49	4273882.08	145.51	145.51
DISCCART	671234.49	4274882.08	147.81	147.81

DISCCART	671234.49	4275882.08	147.41	147.41
DISCCART	671234.49	4276882.08	148.41	164.96
DISCCART	671234.49	4277882.08	150.02	150.02
DISCCART	671234.49	4278882.08	168.48	169.45
DISCCART	671234.49	4279882.08	172.65	235.07
DISCCART	671234.49	4280882.08	161.51	239.03
DISCCART	671234.49	4281882.08	198.82	242.95
DISCCART	671234.49	4282882.08	180.13	247.26
DISCCART	671234.49	4283882.08	186.78	252.55
DISCCART	671234.49	4284882.08	228.46	260.46
DISCCART	671234.49	4285882.08	256.44	256.44
DISCCART	671234.49	4286882.08	249.64	249.64
DISCCART	671234.49	4287882.08	263.67	263.67
DISCCART	671234.49	4288882.08	255.14	265.99
DISCCART	671234.49	4289882.08	228.34	247.54
DISCCART	671234.49	4290882.08	222.45	241.63
DISCCART	671234.49	4291882.08	203.99	225.12
DISCCART	671234.49	4292882.08	216.63	228.64
DISCCART	671234.49	4293882.08	241.35	244.60
DISCCART	671234.49	4294882.08	244.48	244.87
DISCCART	671234.49	4295882.08	245.89	245.89
DISCCART	671234.49	4296882.08	239.97	239.97
DISCCART	671234.49	4297882.08	232.16	232.16
DISCCART	671234.49	4298882.08	213.93	213.93
DISCCART	671234.49	4299882.08	225.55	225.55
DISCCART	671234.49	4300882.08	217.42	222.56
DISCCART	671234.49	4301882.08	203.52	203.52
DISCCART	671234.49	4302882.08	189.73	208.51
DISCCART	671234.49	4303882.08	170.81	206.86
DISCCART	671234.49	4304882.08	211.45	211.45
DISCCART	671234.49	4305882.08	187.95	207.82
DISCCART	671234.49	4306882.08	186.84	189.83
DISCCART	671234.49	4307882.08	165.75	184.26
DISCCART	671234.49	4308882.08	165.38	172.41
DISCCART	671234.49	4309882.08	161.96	177.68
DISCCART	671234.49	4310882.08	188.50	196.44
DISCCART	671234.49	4311882.08	201.70	201.70
DISCCART	671234.49	4312882.08	192.61	192.61
DISCCART	671234.49	4313882.08	194.77	194.77
DISCCART	671234.49	4314882.08	199.38	199.38
DISCCART	671234.49	4315882.08	207.12	207.12
DISCCART	671234.49	4316882.08	176.41	176.41
DISCCART	671234.49	4317882.08	168.37	184.59
DISCCART	671234.49	4318882.08	178.80	178.80
DISCCART	671234.49	4319882.08	177.66	177.66
DISCCART	670234.49	4258882.08	244.00	244.00
DISCCART	670234.49	4257882.08	217.78	227.71
DISCCART	670234.49	4256882.08	203.55	224.39
DISCCART	670234.49	4255882.08	183.21	190.57
DISCCART	670234.49	4254882.08	177.57	199.75
DISCCART	670234.49	4253882.08	183.08	183.08
DISCCART	670234.49	4252882.08	201.82	201.82
DISCCART	670234.49	4251882.08	194.37	205.84
DISCCART	670234.49	4250882.08	179.66	179.66
DISCCART	670234.49	4249882.08	165.73	227.19
DISCCART	670234.49	4248882.08	184.41	239.73
DISCCART	670234.49	4247882.08	210.35	244.38
DISCCART	670234.49	4246882.08	249.75	249.75
DISCCART	670234.49	4245882.08	236.19	238.12
DISCCART	670234.49	4244882.08	198.06	226.63
DISCCART	670234.49	4243882.08	215.39	227.33
DISCCART	670234.49	4242882.08	216.46	226.20
DISCCART	670234.49	4241882.08	218.20	231.67
DISCCART	670234.49	4240882.08	233.50	251.05
DISCCART	670234.49	4239882.08	193.04	245.96
DISCCART	670234.49	4238882.08	195.09	232.33

DISCCART	670234.49	4237882.08	195.93	219.87
DISCCART	670234.49	4236882.08	214.09	233.15
DISCCART	670234.49	4235882.08	244.63	244.63
DISCCART	670234.49	4234882.08	215.54	226.11
DISCCART	670234.49	4233882.08	224.64	244.07
DISCCART	670234.49	4232882.08	194.56	251.92
DISCCART	670234.49	4231882.08	250.57	250.57
DISCCART	670234.49	4230882.08	250.66	250.66
DISCCART	670234.49	4229882.08	259.99	262.58
DISCCART	670234.49	4228882.08	246.14	257.33
DISCCART	670234.49	4227882.08	257.10	276.54
DISCCART	670234.49	4226882.08	243.40	243.40
DISCCART	670234.49	4225882.08	249.44	257.69
DISCCART	670234.49	4224882.08	215.01	260.71
DISCCART	670234.49	4223882.08	243.83	277.05
DISCCART	670234.49	4222882.08	281.36	281.36
DISCCART	670234.49	4221882.08	277.10	305.89
DISCCART	670234.49	4220882.08	305.85	324.10
DISCCART	670234.49	4259882.08	243.49	246.34
DISCCART	670234.49	4259882.08	243.49	246.34
DISCCART	670234.49	4260882.08	224.90	238.83
DISCCART	670234.49	4261882.08	230.74	230.74
DISCCART	670234.49	4262882.08	223.07	229.84
DISCCART	670234.49	4263882.08	231.58	233.98
DISCCART	670234.49	4264882.08	207.90	216.09
DISCCART	670234.49	4265882.08	180.19	198.32
DISCCART	670234.49	4266882.08	207.01	207.01
DISCCART	670234.49	4267882.08	188.35	198.72
DISCCART	670234.49	4268882.08	184.65	184.97
DISCCART	670234.49	4269882.08	176.55	178.19
DISCCART	670234.49	4270882.08	161.66	161.66
DISCCART	670234.49	4271882.08	150.86	150.86
DISCCART	670234.49	4272882.08	146.34	146.34
DISCCART	670234.49	4273882.08	147.23	147.23
DISCCART	670234.49	4274882.08	145.77	145.77
DISCCART	670234.49	4275882.08	147.17	147.17
DISCCART	670234.49	4276882.08	178.10	191.11
DISCCART	670234.49	4277882.08	162.61	181.30
DISCCART	670234.49	4278882.08	176.05	247.39
DISCCART	670234.49	4279882.08	231.37	240.42
DISCCART	670234.49	4280882.08	205.49	243.59
DISCCART	670234.49	4281882.08	201.78	255.52
DISCCART	670234.49	4282882.08	190.65	257.44
DISCCART	670234.49	4283882.08	215.16	260.67
DISCCART	670234.49	4284882.08	215.44	261.63
DISCCART	670234.49	4285882.08	262.48	262.48
DISCCART	670234.49	4286882.08	254.20	262.23
DISCCART	670234.49	4287882.08	250.77	250.77
DISCCART	670234.49	4288882.08	263.36	263.36
DISCCART	670234.49	4289882.08	247.39	247.39
DISCCART	670234.49	4290882.08	239.15	239.15
DISCCART	670234.49	4291882.08	216.61	223.14
DISCCART	670234.49	4292882.08	232.78	237.49
DISCCART	670234.49	4293882.08	231.92	235.60
DISCCART	670234.49	4294882.08	247.23	247.23
DISCCART	670234.49	4295882.08	248.18	248.18
DISCCART	670234.49	4296882.08	240.45	240.45
DISCCART	670234.49	4297882.08	235.60	235.60
DISCCART	670234.49	4298882.08	221.50	221.50
DISCCART	670234.49	4299882.08	224.96	227.53
DISCCART	670234.49	4300882.08	219.38	219.38
DISCCART	670234.49	4301882.08	221.55	221.55
DISCCART	670234.49	4302882.08	203.15	203.15
DISCCART	670234.49	4303882.08	174.38	174.38
DISCCART	670234.49	4304882.08	200.85	200.85
DISCCART	670234.49	4305882.08	201.57	202.75

DISCCART	670234.49	4306882.08	158.18	204.38
DISCCART	670234.49	4307882.08	155.32	201.06
DISCCART	670234.49	4308882.08	190.27	195.56
DISCCART	670234.49	4309882.08	189.13	189.13
DISCCART	670234.49	4310882.08	182.49	182.49
DISCCART	670234.49	4311882.08	200.08	200.08
DISCCART	670234.49	4312882.08	197.82	197.82
DISCCART	670234.49	4313882.08	206.47	206.47
DISCCART	670234.49	4314882.08	202.98	202.98
DISCCART	670234.49	4315882.08	187.59	187.59
DISCCART	670234.49	4316882.08	180.59	195.25
DISCCART	670234.49	4317882.08	201.96	201.96
DISCCART	670234.49	4318882.08	191.08	191.08
DISCCART	670234.49	4319882.08	160.95	160.95
DISCCART	669234.49	4258882.08	262.80	262.80
DISCCART	669234.49	4257882.08	231.31	245.70
DISCCART	669234.49	4256882.08	200.38	200.38
DISCCART	669234.49	4255882.08	190.97	212.22
DISCCART	669234.49	4254882.08	181.15	196.74
DISCCART	669234.49	4253882.08	196.36	200.60
DISCCART	669234.49	4252882.08	167.95	207.68
DISCCART	669234.49	4251882.08	189.12	204.30
DISCCART	669234.49	4250882.08	207.71	207.71
DISCCART	669234.49	4249882.08	205.24	205.24
DISCCART	669234.49	4248882.08	223.64	226.97
DISCCART	669234.49	4247882.08	164.37	238.56
DISCCART	669234.49	4246882.08	185.01	245.06
DISCCART	669234.49	4245882.08	191.34	252.50
DISCCART	669234.49	4244882.08	235.26	235.26
DISCCART	669234.49	4243882.08	213.09	232.16
DISCCART	669234.49	4242882.08	224.52	239.31
DISCCART	669234.49	4241882.08	237.77	237.77
DISCCART	669234.49	4240882.08	241.02	250.09
DISCCART	669234.49	4239882.08	226.17	233.09
DISCCART	669234.49	4238882.08	194.14	245.71
DISCCART	669234.49	4237882.08	166.39	201.69
DISCCART	669234.49	4236882.08	187.73	221.69
DISCCART	669234.49	4235882.08	185.96	233.39
DISCCART	669234.49	4234882.08	210.28	234.40
DISCCART	669234.49	4233882.08	171.93	240.14
DISCCART	669234.49	4232882.08	190.42	247.79
DISCCART	669234.49	4231882.08	240.62	246.09
DISCCART	669234.49	4230882.08	231.28	253.62
DISCCART	669234.49	4229882.08	235.98	253.16
DISCCART	669234.49	4228882.08	244.65	269.84
DISCCART	669234.49	4227882.08	231.12	276.78
DISCCART	669234.49	4226882.08	204.86	252.43
DISCCART	669234.49	4225882.08	211.45	268.04
DISCCART	669234.49	4224882.08	240.70	269.47
DISCCART	669234.49	4223882.08	278.09	288.03
DISCCART	669234.49	4222882.08	243.45	268.01
DISCCART	669234.49	4221882.08	255.08	306.42
DISCCART	669234.49	4220882.08	240.71	324.47
DISCCART	669234.49	4259882.08	226.95	229.81
DISCCART	669234.49	4259882.08	226.95	229.81
DISCCART	669234.49	4260882.08	225.93	225.93
DISCCART	669234.49	4261882.08	225.31	232.11
DISCCART	669234.49	4262882.08	213.71	213.71
DISCCART	669234.49	4263882.08	203.87	222.98
DISCCART	669234.49	4264882.08	175.21	205.83
DISCCART	669234.49	4265882.08	176.18	191.12
DISCCART	669234.49	4266882.08	165.78	195.05
DISCCART	669234.49	4267882.08	157.47	192.04
DISCCART	669234.49	4268882.08	151.15	151.15
DISCCART	669234.49	4269882.08	152.72	166.60
DISCCART	669234.49	4270882.08	169.76	170.68

DISCCART	669234.49	4271882.08	171.71	176.89
DISCCART	669234.49	4272882.08	167.37	168.23
DISCCART	669234.49	4273882.08	146.69	146.69
DISCCART	669234.49	4274882.08	145.98	145.98
DISCCART	669234.49	4275882.08	145.65	149.61
DISCCART	669234.49	4276882.08	147.86	176.76
DISCCART	669234.49	4277882.08	168.01	168.01
DISCCART	669234.49	4278882.08	187.66	198.77
DISCCART	669234.49	4279882.08	171.83	245.12
DISCCART	669234.49	4280882.08	217.60	250.32
DISCCART	669234.49	4281882.08	237.80	261.56
DISCCART	669234.49	4282882.08	227.99	263.22
DISCCART	669234.49	4283882.08	257.71	257.71
DISCCART	669234.49	4284882.08	256.66	256.66
DISCCART	669234.49	4285882.08	244.37	257.46
DISCCART	669234.49	4286882.08	234.07	261.35
DISCCART	669234.49	4287882.08	238.72	250.80
DISCCART	669234.49	4288882.08	247.81	249.76
DISCCART	669234.49	4289882.08	218.34	237.46
DISCCART	669234.49	4290882.08	214.01	243.68
DISCCART	669234.49	4291882.08	187.69	210.29
DISCCART	669234.49	4292882.08	222.28	224.15
DISCCART	669234.49	4293882.08	238.40	238.40
DISCCART	669234.49	4294882.08	232.44	235.00
DISCCART	669234.49	4295882.08	251.99	251.99
DISCCART	669234.49	4296882.08	241.00	241.00
DISCCART	669234.49	4297882.08	225.77	225.77
DISCCART	669234.49	4298882.08	237.69	237.69
DISCCART	669234.49	4299882.08	232.29	232.29
DISCCART	669234.49	4300882.08	218.44	218.44
DISCCART	669234.49	4301882.08	222.65	222.65
DISCCART	669234.49	4302882.08	210.22	216.35
DISCCART	669234.49	4303882.08	185.46	200.50
DISCCART	669234.49	4304882.08	214.60	214.60
DISCCART	669234.49	4305882.08	202.65	208.84
DISCCART	669234.49	4306882.08	169.48	196.73
DISCCART	669234.49	4307882.08	199.84	199.84
DISCCART	669234.49	4308882.08	206.02	206.02
DISCCART	669234.49	4309882.08	195.05	195.75
DISCCART	669234.49	4310882.08	180.14	180.14
DISCCART	669234.49	4311882.08	169.67	196.32
DISCCART	669234.49	4312882.08	198.69	208.72
DISCCART	669234.49	4313882.08	205.76	205.76
DISCCART	669234.49	4314882.08	208.42	208.42
DISCCART	669234.49	4315882.08	199.55	199.55
DISCCART	669234.49	4316882.08	192.36	192.36
DISCCART	669234.49	4317882.08	189.76	189.76
DISCCART	669234.49	4318882.08	175.62	186.63
DISCCART	669234.49	4319882.08	191.52	194.67
DISCCART	668234.49	4258882.08	235.45	244.54
DISCCART	668234.49	4257882.08	250.51	250.51
DISCCART	668234.49	4256882.08	211.09	218.40
DISCCART	668234.49	4255882.08	208.02	209.09
DISCCART	668234.49	4254882.08	183.78	189.86
DISCCART	668234.49	4253882.08	215.98	219.02
DISCCART	668234.49	4252882.08	202.49	213.59
DISCCART	668234.49	4251882.08	213.03	226.02
DISCCART	668234.49	4250882.08	211.05	231.17
DISCCART	668234.49	4249882.08	165.27	235.03
DISCCART	668234.49	4248882.08	194.21	221.47
DISCCART	668234.49	4247882.08	212.66	219.79
DISCCART	668234.49	4246882.08	171.37	215.02
DISCCART	668234.49	4245882.08	181.24	221.30
DISCCART	668234.49	4244882.08	183.40	238.21
DISCCART	668234.49	4243882.08	239.49	239.49
DISCCART	668234.49	4242882.08	230.27	243.79

DISCCART	668234.49	4241882.08	264.41	264.41
DISCCART	668234.49	4240882.08	256.91	256.91
DISCCART	668234.49	4239882.08	247.48	247.48
DISCCART	668234.49	4238882.08	211.35	257.62
DISCCART	668234.49	4237882.08	181.35	245.61
DISCCART	668234.49	4236882.08	208.37	239.35
DISCCART	668234.49	4235882.08	176.59	236.10
DISCCART	668234.49	4234882.08	195.40	240.60
DISCCART	668234.49	4233882.08	200.00	233.55
DISCCART	668234.49	4232882.08	203.36	207.64
DISCCART	668234.49	4231882.08	176.00	245.70
DISCCART	668234.49	4230882.08	247.29	249.94
DISCCART	668234.49	4229882.08	232.55	258.24
DISCCART	668234.49	4228882.08	239.48	270.10
DISCCART	668234.49	4227882.08	265.45	265.45
DISCCART	668234.49	4226882.08	218.32	219.06
DISCCART	668234.49	4225882.08	262.27	262.27
DISCCART	668234.49	4224882.08	264.84	278.38
DISCCART	668234.49	4223882.08	257.26	281.81
DISCCART	668234.49	4222882.08	231.50	231.50
DISCCART	668234.49	4221882.08	241.48	276.21
DISCCART	668234.49	4220882.08	273.40	282.97
DISCCART	668234.49	4259882.08	225.01	245.20
DISCCART	668234.49	4259882.08	225.01	245.20
DISCCART	668234.49	4260882.08	207.62	207.62
DISCCART	668234.49	4261882.08	184.92	217.06
DISCCART	668234.49	4262882.08	225.82	228.28
DISCCART	668234.49	4263882.08	214.45	214.45
DISCCART	668234.49	4264882.08	209.93	213.30
DISCCART	668234.49	4265882.08	175.44	184.67
DISCCART	668234.49	4266882.08	156.00	161.02
DISCCART	668234.49	4267882.08	158.37	158.37
DISCCART	668234.49	4268882.08	158.84	158.84
DISCCART	668234.49	4269882.08	157.28	157.28
DISCCART	668234.49	4270882.08	174.59	176.99
DISCCART	668234.49	4271882.08	186.25	198.91
DISCCART	668234.49	4272882.08	164.06	164.06
DISCCART	668234.49	4273882.08	150.82	172.77
DISCCART	668234.49	4274882.08	147.06	147.06
DISCCART	668234.49	4275882.08	147.21	147.21
DISCCART	668234.49	4276882.08	151.20	151.20
DISCCART	668234.49	4277882.08	152.19	160.44
DISCCART	668234.49	4278882.08	167.08	167.08
DISCCART	668234.49	4279882.08	203.38	247.01
DISCCART	668234.49	4280882.08	174.01	249.60
DISCCART	668234.49	4281882.08	214.41	260.73
DISCCART	668234.49	4282882.08	193.12	265.41
DISCCART	668234.49	4283882.08	256.41	259.97
DISCCART	668234.49	4284882.08	234.52	253.96
DISCCART	668234.49	4285882.08	187.05	254.11
DISCCART	668234.49	4286882.08	227.16	259.07
DISCCART	668234.49	4287882.08	241.01	241.01
DISCCART	668234.49	4288882.08	212.58	212.58
DISCCART	668234.49	4289882.08	191.79	195.45
DISCCART	668234.49	4290882.08	205.79	222.99
DISCCART	668234.49	4291882.08	228.76	231.22
DISCCART	668234.49	4292882.08	233.46	240.06
DISCCART	668234.49	4293882.08	234.88	239.43
DISCCART	668234.49	4294882.08	239.73	239.73
DISCCART	668234.49	4295882.08	241.58	241.58
DISCCART	668234.49	4296882.08	243.21	243.21
DISCCART	668234.49	4297882.08	247.81	247.81
DISCCART	668234.49	4298882.08	221.98	221.98
DISCCART	668234.49	4299882.08	224.89	224.89
DISCCART	668234.49	4300882.08	213.91	218.79
DISCCART	668234.49	4301882.08	211.06	222.28

DISCCART	668234.49	4302882.08	207.45	207.45
DISCCART	668234.49	4303882.08	187.33	214.78
DISCCART	668234.49	4304882.08	205.86	214.30
DISCCART	668234.49	4305882.08	207.38	214.91
DISCCART	668234.49	4306882.08	201.28	204.50
DISCCART	668234.49	4307882.08	169.52	169.52
DISCCART	668234.49	4308882.08	189.04	201.14
DISCCART	668234.49	4309882.08	202.50	208.66
DISCCART	668234.49	4310882.08	207.09	207.09
DISCCART	668234.49	4311882.08	173.41	191.22
DISCCART	668234.49	4312882.08	195.89	195.89
DISCCART	668234.49	4313882.08	210.15	210.15
DISCCART	668234.49	4314882.08	213.73	213.73
DISCCART	668234.49	4315882.08	202.42	207.22
DISCCART	668234.49	4316882.08	210.91	211.07
DISCCART	668234.49	4317882.08	201.51	201.51
DISCCART	668234.49	4318882.08	193.17	195.00
DISCCART	668234.49	4319882.08	160.70	194.94
DISCCART	667234.49	4258882.08	200.06	200.06
DISCCART	667234.49	4257882.08	216.87	216.87
DISCCART	667234.49	4256882.08	232.46	232.46
DISCCART	667234.49	4255882.08	220.71	220.71
DISCCART	667234.49	4254882.08	200.14	209.48
DISCCART	667234.49	4253882.08	231.01	231.01
DISCCART	667234.49	4252882.08	228.75	228.75
DISCCART	667234.49	4251882.08	211.69	235.87
DISCCART	667234.49	4250882.08	208.12	225.67
DISCCART	667234.49	4249882.08	211.08	235.13
DISCCART	667234.49	4248882.08	210.60	210.60
DISCCART	667234.49	4247882.08	214.56	226.07
DISCCART	667234.49	4246882.08	163.37	239.56
DISCCART	667234.49	4245882.08	203.49	225.40
DISCCART	667234.49	4244882.08	223.09	231.11
DISCCART	667234.49	4243882.08	220.12	238.86
DISCCART	667234.49	4242882.08	235.67	264.50
DISCCART	667234.49	4241882.08	266.07	266.07
DISCCART	667234.49	4240882.08	264.70	269.39
DISCCART	667234.49	4239882.08	219.72	233.08
DISCCART	667234.49	4238882.08	195.00	256.77
DISCCART	667234.49	4237882.08	222.82	250.24
DISCCART	667234.49	4236882.08	242.85	251.93
DISCCART	667234.49	4235882.08	222.47	250.65
DISCCART	667234.49	4234882.08	170.66	258.09
DISCCART	667234.49	4233882.08	170.57	258.09
DISCCART	667234.49	4232882.08	214.42	257.04
DISCCART	667234.49	4231882.08	223.20	257.99
DISCCART	667234.49	4230882.08	178.70	256.49
DISCCART	667234.49	4229882.08	244.07	251.18
DISCCART	667234.49	4228882.08	222.11	243.64
DISCCART	667234.49	4227882.08	251.45	251.45
DISCCART	667234.49	4226882.08	184.04	250.40
DISCCART	667234.49	4225882.08	210.71	234.86
DISCCART	667234.49	4224882.08	232.75	259.73
DISCCART	667234.49	4223882.08	252.96	257.91
DISCCART	667234.49	4222882.08	205.53	274.48
DISCCART	667234.49	4221882.08	261.57	289.64
DISCCART	667234.49	4220882.08	300.60	300.60
DISCCART	667234.49	4259882.08	225.31	225.31
DISCCART	667234.49	4259882.08	225.31	225.31
DISCCART	667234.49	4260882.08	214.12	214.12
DISCCART	667234.49	4261882.08	199.39	205.92
DISCCART	667234.49	4262882.08	211.29	211.29
DISCCART	667234.49	4263882.08	198.58	198.58
DISCCART	667234.49	4264882.08	195.55	195.55
DISCCART	667234.49	4265882.08	177.52	196.33
DISCCART	667234.49	4266882.08	173.65	173.65

DISCCART	667234.49	4267882.08	156.88	196.60
DISCCART	667234.49	4268882.08	174.16	175.08
DISCCART	667234.49	4269882.08	177.48	191.13
DISCCART	667234.49	4270882.08	189.07	199.70
DISCCART	667234.49	4271882.08	181.71	182.48
DISCCART	667234.49	4272882.08	156.97	179.43
DISCCART	667234.49	4273882.08	165.73	175.04
DISCCART	667234.49	4274882.08	147.49	148.85
DISCCART	667234.49	4275882.08	147.15	147.15
DISCCART	667234.49	4276882.08	146.96	146.96
DISCCART	667234.49	4277882.08	163.67	181.07
DISCCART	667234.49	4278882.08	156.75	157.96
DISCCART	667234.49	4279882.08	166.67	166.67
DISCCART	667234.49	4280882.08	211.17	224.34
DISCCART	667234.49	4281882.08	210.83	253.21
DISCCART	667234.49	4282882.08	175.84	265.41
DISCCART	667234.49	4283882.08	235.78	261.79
DISCCART	667234.49	4284882.08	258.72	258.72
DISCCART	667234.49	4285882.08	250.30	255.08
DISCCART	667234.49	4286882.08	255.28	255.28
DISCCART	667234.49	4287882.08	241.05	255.60
DISCCART	667234.49	4288882.08	223.66	253.98
DISCCART	667234.49	4289882.08	196.52	248.29
DISCCART	667234.49	4290882.08	207.28	223.98
DISCCART	667234.49	4291882.08	207.28	235.75
DISCCART	667234.49	4292882.08	232.27	240.11
DISCCART	667234.49	4293882.08	234.42	246.49
DISCCART	667234.49	4294882.08	229.19	239.90
DISCCART	667234.49	4295882.08	254.86	254.86
DISCCART	667234.49	4296882.08	247.80	247.80
DISCCART	667234.49	4297882.08	243.82	243.82
DISCCART	667234.49	4298882.08	245.49	250.91
DISCCART	667234.49	4299882.08	228.18	228.18
DISCCART	667234.49	4300882.08	217.11	221.61
DISCCART	667234.49	4301882.08	216.53	216.53
DISCCART	667234.49	4302882.08	214.72	223.93
DISCCART	667234.49	4303882.08	216.07	216.07
DISCCART	667234.49	4304882.08	224.28	224.28
DISCCART	667234.49	4305882.08	209.68	209.68
DISCCART	667234.49	4306882.08	173.67	214.66
DISCCART	667234.49	4307882.08	205.28	206.19
DISCCART	667234.49	4308882.08	193.24	210.05
DISCCART	667234.49	4309882.08	214.34	214.34
DISCCART	667234.49	4310882.08	203.86	203.86
DISCCART	667234.49	4311882.08	197.70	197.70
DISCCART	667234.49	4312882.08	186.12	198.57
DISCCART	667234.49	4313882.08	213.91	213.91
DISCCART	667234.49	4314882.08	213.38	213.38
DISCCART	667234.49	4315882.08	214.86	214.86
DISCCART	667234.49	4316882.08	213.82	213.82
DISCCART	667234.49	4317882.08	188.25	202.29
DISCCART	667234.49	4318882.08	169.24	182.36
DISCCART	667234.49	4319882.08	152.60	171.77
DISCCART	666234.49	4258882.08	208.21	213.16
DISCCART	666234.49	4257882.08	200.94	212.86
DISCCART	666234.49	4256882.08	212.83	212.83
DISCCART	666234.49	4255882.08	230.61	233.51
DISCCART	666234.49	4254882.08	223.81	223.81
DISCCART	666234.49	4253882.08	239.73	239.73
DISCCART	666234.49	4252882.08	212.80	224.60
DISCCART	666234.49	4251882.08	217.12	218.77
DISCCART	666234.49	4250882.08	234.85	235.54
DISCCART	666234.49	4249882.08	206.53	237.77
DISCCART	666234.49	4248882.08	197.16	232.85
DISCCART	666234.49	4247882.08	198.56	198.96
DISCCART	666234.49	4246882.08	167.17	239.83

DISCCART	666234.49	4245882.08	195.69	213.82
DISCCART	666234.49	4244882.08	211.49	220.84
DISCCART	666234.49	4243882.08	231.26	231.26
DISCCART	666234.49	4242882.08	242.09	269.77
DISCCART	666234.49	4241882.08	236.54	269.16
DISCCART	666234.49	4240882.08	269.04	269.04
DISCCART	666234.49	4239882.08	243.56	270.41
DISCCART	666234.49	4238882.08	237.44	262.48
DISCCART	666234.49	4237882.08	261.29	262.96
DISCCART	666234.49	4236882.08	245.27	245.27
DISCCART	666234.49	4235882.08	217.30	257.68
DISCCART	666234.49	4234882.08	242.95	257.09
DISCCART	666234.49	4233882.08	232.55	270.06
DISCCART	666234.49	4232882.08	234.54	257.15
DISCCART	666234.49	4231882.08	222.82	271.60
DISCCART	666234.49	4230882.08	238.81	257.00
DISCCART	666234.49	4229882.08	195.01	258.09
DISCCART	666234.49	4228882.08	186.07	186.07
DISCCART	666234.49	4227882.08	182.10	245.09
DISCCART	666234.49	4226882.08	182.27	183.37
DISCCART	666234.49	4225882.08	210.42	268.87
DISCCART	666234.49	4224882.08	213.90	213.90
DISCCART	666234.49	4223882.08	226.20	268.55
DISCCART	666234.49	4222882.08	200.24	200.24
DISCCART	666234.49	4221882.08	233.05	270.59
DISCCART	666234.49	4220882.08	273.84	275.16
DISCCART	666234.49	4259882.08	186.72	204.38
DISCCART	666234.49	4259882.08	186.72	204.38
DISCCART	666234.49	4260882.08	213.36	213.36
DISCCART	666234.49	4261882.08	205.65	205.65
DISCCART	666234.49	4262882.08	170.75	178.18
DISCCART	666234.49	4263882.08	161.48	161.48
DISCCART	666234.49	4264882.08	196.47	196.47
DISCCART	666234.49	4265882.08	170.36	190.02
DISCCART	666234.49	4266882.08	174.39	192.43
DISCCART	666234.49	4267882.08	157.92	157.92
DISCCART	666234.49	4268882.08	179.26	199.84
DISCCART	666234.49	4269882.08	224.90	224.90
DISCCART	666234.49	4270882.08	189.17	240.22
DISCCART	666234.49	4271882.08	193.30	226.59
DISCCART	666234.49	4272882.08	177.42	197.61
DISCCART	666234.49	4273882.08	184.10	205.67
DISCCART	666234.49	4274882.08	146.58	146.58
DISCCART	666234.49	4275882.08	147.68	147.68
DISCCART	666234.49	4276882.08	148.36	148.36
DISCCART	666234.49	4277882.08	173.38	178.87
DISCCART	666234.49	4278882.08	172.04	172.04
DISCCART	666234.49	4279882.08	168.33	168.33
DISCCART	666234.49	4280882.08	185.92	241.20
DISCCART	666234.49	4281882.08	180.03	248.04
DISCCART	666234.49	4282882.08	152.62	249.47
DISCCART	666234.49	4283882.08	182.75	261.79
DISCCART	666234.49	4284882.08	226.08	255.16
DISCCART	666234.49	4285882.08	159.13	258.90
DISCCART	666234.49	4286882.08	161.78	259.88
DISCCART	666234.49	4287882.08	165.72	256.79
DISCCART	666234.49	4288882.08	207.57	245.53
DISCCART	666234.49	4289882.08	204.63	233.36
DISCCART	666234.49	4290882.08	233.80	243.80
DISCCART	666234.49	4291882.08	224.67	243.58
DISCCART	666234.49	4292882.08	241.61	249.84
DISCCART	666234.49	4293882.08	254.28	257.01
DISCCART	666234.49	4294882.08	257.08	257.08
DISCCART	666234.49	4295882.08	246.59	246.59
DISCCART	666234.49	4296882.08	253.03	253.03
DISCCART	666234.49	4297882.08	248.05	248.05

DISCCART	666234.49	4298882.08	235.22	235.22
DISCCART	666234.49	4299882.08	217.94	217.94
DISCCART	666234.49	4300882.08	231.22	231.22
DISCCART	666234.49	4301882.08	231.69	231.69
DISCCART	666234.49	4302882.08	233.02	233.02
DISCCART	666234.49	4303882.08	216.67	217.62
DISCCART	666234.49	4304882.08	226.45	226.45
DISCCART	666234.49	4305882.08	215.94	219.61
DISCCART	666234.49	4306882.08	204.17	213.12
DISCCART	666234.49	4307882.08	195.69	217.32
DISCCART	666234.49	4308882.08	206.44	212.74
DISCCART	666234.49	4309882.08	210.14	210.14
DISCCART	666234.49	4310882.08	198.53	198.53
DISCCART	666234.49	4311882.08	208.03	208.03
DISCCART	666234.49	4312882.08	177.46	198.50
DISCCART	666234.49	4313882.08	204.31	204.31
DISCCART	666234.49	4314882.08	210.01	210.01
DISCCART	666234.49	4315882.08	219.68	219.68
DISCCART	666234.49	4316882.08	212.39	213.13
DISCCART	666234.49	4317882.08	176.08	209.10
DISCCART	666234.49	4318882.08	193.30	193.30
DISCCART	666234.49	4319882.08	160.47	160.47
DISCCART	665234.49	4258882.08	204.88	208.85
DISCCART	665234.49	4257882.08	201.53	213.97
DISCCART	665234.49	4256882.08	212.77	214.87
DISCCART	665234.49	4255882.08	213.65	218.08
DISCCART	665234.49	4254882.08	216.43	216.43
DISCCART	665234.49	4253882.08	235.70	235.70
DISCCART	665234.49	4252882.08	230.31	239.17
DISCCART	665234.49	4251882.08	228.43	228.43
DISCCART	665234.49	4250882.08	248.88	249.19
DISCCART	665234.49	4249882.08	220.98	228.92
DISCCART	665234.49	4248882.08	242.85	244.45
DISCCART	665234.49	4247882.08	228.92	251.60
DISCCART	665234.49	4246882.08	174.62	251.62
DISCCART	665234.49	4245882.08	170.56	225.97
DISCCART	665234.49	4244882.08	180.84	238.61
DISCCART	665234.49	4243882.08	196.83	245.11
DISCCART	665234.49	4242882.08	244.30	251.68
DISCCART	665234.49	4241882.08	245.34	250.56
DISCCART	665234.49	4240882.08	234.44	257.99
DISCCART	665234.49	4239882.08	265.67	265.67
DISCCART	665234.49	4238882.08	245.82	269.95
DISCCART	665234.49	4237882.08	268.15	268.15
DISCCART	665234.49	4236882.08	264.40	264.40
DISCCART	665234.49	4235882.08	263.28	263.28
DISCCART	665234.49	4234882.08	245.66	275.99
DISCCART	665234.49	4233882.08	216.69	264.53
DISCCART	665234.49	4232882.08	262.12	279.15
DISCCART	665234.49	4231882.08	249.70	263.56
DISCCART	665234.49	4230882.08	215.77	275.94
DISCCART	665234.49	4229882.08	200.10	270.89
DISCCART	665234.49	4228882.08	202.37	245.12
DISCCART	665234.49	4227882.08	195.17	256.24
DISCCART	665234.49	4226882.08	219.02	264.36
DISCCART	665234.49	4225882.08	183.73	183.73
DISCCART	665234.49	4224882.08	189.26	189.26
DISCCART	665234.49	4223882.08	184.42	184.42
DISCCART	665234.49	4222882.08	214.73	245.59
DISCCART	665234.49	4221882.08	260.52	282.49
DISCCART	665234.49	4220882.08	263.20	281.02
DISCCART	665234.49	4259882.08	175.76	204.43
DISCCART	665234.49	4259882.08	175.76	204.43
DISCCART	665234.49	4260882.08	167.08	167.08
DISCCART	665234.49	4261882.08	181.59	207.83
DISCCART	665234.49	4262882.08	161.73	197.60

DISCCART	665234.49	4263882.08	186.20	195.90
DISCCART	665234.49	4264882.08	160.03	160.03
DISCCART	665234.49	4265882.08	194.45	194.45
DISCCART	665234.49	4266882.08	172.40	197.05
DISCCART	665234.49	4267882.08	160.64	160.64
DISCCART	665234.49	4268882.08	192.49	197.07
DISCCART	665234.49	4269882.08	206.97	222.93
DISCCART	665234.49	4270882.08	207.69	209.87
DISCCART	665234.49	4271882.08	188.86	195.70
DISCCART	665234.49	4272882.08	191.15	210.30
DISCCART	665234.49	4273882.08	165.78	221.95
DISCCART	665234.49	4274882.08	148.05	148.05
DISCCART	665234.49	4275882.08	146.29	148.13
DISCCART	665234.49	4276882.08	149.67	149.67
DISCCART	665234.49	4277882.08	147.48	173.38
DISCCART	665234.49	4278882.08	172.39	176.65
DISCCART	665234.49	4279882.08	171.32	172.09
DISCCART	665234.49	4280882.08	151.32	151.32
DISCCART	665234.49	4281882.08	168.36	245.87
DISCCART	665234.49	4282882.08	240.25	247.24
DISCCART	665234.49	4283882.08	158.83	260.04
DISCCART	665234.49	4284882.08	156.44	263.51
DISCCART	665234.49	4285882.08	253.61	253.61
DISCCART	665234.49	4286882.08	240.87	258.97
DISCCART	665234.49	4287882.08	251.49	251.49
DISCCART	665234.49	4288882.08	251.27	251.27
DISCCART	665234.49	4289882.08	176.32	247.69
DISCCART	665234.49	4290882.08	219.52	222.72
DISCCART	665234.49	4291882.08	226.51	249.29
DISCCART	665234.49	4292882.08	218.35	253.43
DISCCART	665234.49	4293882.08	213.62	258.09
DISCCART	665234.49	4294882.08	251.02	251.02
DISCCART	665234.49	4295882.08	255.18	255.18
DISCCART	665234.49	4296882.08	261.96	261.96
DISCCART	665234.49	4297882.08	258.42	258.42
DISCCART	665234.49	4298882.08	243.66	243.66
DISCCART	665234.49	4299882.08	240.43	240.43
DISCCART	665234.49	4300882.08	242.87	242.87
DISCCART	665234.49	4301882.08	234.60	234.60
DISCCART	665234.49	4302882.08	231.59	231.59
DISCCART	665234.49	4303882.08	230.45	230.45
DISCCART	665234.49	4304882.08	214.09	223.57
DISCCART	665234.49	4305882.08	183.30	224.82
DISCCART	665234.49	4306882.08	175.03	223.71
DISCCART	665234.49	4307882.08	195.78	220.73
DISCCART	665234.49	4308882.08	202.92	204.20
DISCCART	665234.49	4309882.08	218.15	218.15
DISCCART	665234.49	4310882.08	201.82	207.81
DISCCART	665234.49	4311882.08	203.19	203.19
DISCCART	665234.49	4312882.08	207.11	213.32
DISCCART	665234.49	4313882.08	184.88	184.88
DISCCART	665234.49	4314882.08	198.72	209.51
DISCCART	665234.49	4315882.08	220.72	220.72
DISCCART	665234.49	4316882.08	215.76	215.76
DISCCART	665234.49	4317882.08	208.25	208.25
DISCCART	665234.49	4318882.08	179.31	179.31
DISCCART	665234.49	4319882.08	168.23	189.32
DISCCART	664234.49	4258882.08	172.14	203.09
DISCCART	664234.49	4257882.08	206.77	206.77
DISCCART	664234.49	4256882.08	197.94	210.17
DISCCART	664234.49	4255882.08	194.19	207.35
DISCCART	664234.49	4254882.08	203.45	216.76
DISCCART	664234.49	4253882.08	230.57	230.57
DISCCART	664234.49	4252882.08	238.79	241.81
DISCCART	664234.49	4251882.08	238.47	238.47
DISCCART	664234.49	4250882.08	251.38	257.60

DISCCART	664234.49	4249882.08	223.18	252.67
DISCCART	664234.49	4248882.08	240.64	251.10
DISCCART	664234.49	4247882.08	250.39	250.39
DISCCART	664234.49	4246882.08	225.22	233.43
DISCCART	664234.49	4245882.08	204.09	234.91
DISCCART	664234.49	4244882.08	176.16	239.73
DISCCART	664234.49	4243882.08	218.81	244.83
DISCCART	664234.49	4242882.08	216.50	258.08
DISCCART	664234.49	4241882.08	248.69	248.69
DISCCART	664234.49	4240882.08	236.58	238.10
DISCCART	664234.49	4239882.08	212.02	258.17
DISCCART	664234.49	4238882.08	240.41	240.41
DISCCART	664234.49	4237882.08	250.15	263.46
DISCCART	664234.49	4236882.08	254.69	269.78
DISCCART	664234.49	4235882.08	274.57	274.57
DISCCART	664234.49	4234882.08	274.95	274.95
DISCCART	664234.49	4233882.08	266.62	276.51
DISCCART	664234.49	4232882.08	266.65	270.44
DISCCART	664234.49	4231882.08	247.60	275.83
DISCCART	664234.49	4230882.08	270.38	287.31
DISCCART	664234.49	4229882.08	226.75	264.06
DISCCART	664234.49	4228882.08	261.30	287.28
DISCCART	664234.49	4227882.08	226.03	226.03
DISCCART	664234.49	4226882.08	243.48	243.48
DISCCART	664234.49	4225882.08	207.31	207.31
DISCCART	664234.49	4224882.08	208.35	208.35
DISCCART	664234.49	4223882.08	182.39	182.39
DISCCART	664234.49	4222882.08	212.26	212.26
DISCCART	664234.49	4221882.08	248.14	288.82
DISCCART	664234.49	4220882.08	216.10	275.85
DISCCART	664234.49	4259882.08	212.69	212.69
DISCCART	664234.49	4259882.08	212.69	212.69
DISCCART	664234.49	4260882.08	199.07	199.07
DISCCART	664234.49	4261882.08	170.48	170.48
DISCCART	664234.49	4262882.08	178.90	208.46
DISCCART	664234.49	4263882.08	185.64	196.28
DISCCART	664234.49	4264882.08	164.18	195.63
DISCCART	664234.49	4265882.08	157.51	191.45
DISCCART	664234.49	4266882.08	158.90	158.90
DISCCART	664234.49	4267882.08	184.10	184.10
DISCCART	664234.49	4268882.08	189.09	195.49
DISCCART	664234.49	4269882.08	176.54	176.54
DISCCART	664234.49	4270882.08	193.28	193.28
DISCCART	664234.49	4271882.08	174.41	191.32
DISCCART	664234.49	4272882.08	167.23	167.23
DISCCART	664234.49	4273882.08	147.02	207.75
DISCCART	664234.49	4274882.08	147.77	147.77
DISCCART	664234.49	4275882.08	147.21	147.21
DISCCART	664234.49	4276882.08	147.60	147.60
DISCCART	664234.49	4277882.08	152.58	170.98
DISCCART	664234.49	4278882.08	150.15	163.21
DISCCART	664234.49	4279882.08	167.46	168.27
DISCCART	664234.49	4280882.08	160.40	160.40
DISCCART	664234.49	4281882.08	203.85	222.81
DISCCART	664234.49	4282882.08	197.51	242.39
DISCCART	664234.49	4283882.08	175.54	260.32
DISCCART	664234.49	4284882.08	203.81	263.46
DISCCART	664234.49	4285882.08	236.67	263.76
DISCCART	664234.49	4286882.08	253.31	253.31
DISCCART	664234.49	4287882.08	222.63	255.20
DISCCART	664234.49	4288882.08	219.70	231.69
DISCCART	664234.49	4289882.08	223.25	247.26
DISCCART	664234.49	4290882.08	195.64	245.01
DISCCART	664234.49	4291882.08	187.81	251.33
DISCCART	664234.49	4292882.08	227.64	255.15
DISCCART	664234.49	4293882.08	256.56	257.80

DISCCART	664234.49	4294882.08	221.10	257.83
DISCCART	664234.49	4295882.08	238.62	259.94
DISCCART	664234.49	4296882.08	253.05	253.05
DISCCART	664234.49	4297882.08	251.84	254.08
DISCCART	664234.49	4298882.08	244.07	244.07
DISCCART	664234.49	4299882.08	244.69	244.69
DISCCART	664234.49	4300882.08	232.85	232.85
DISCCART	664234.49	4301882.08	212.40	222.07
DISCCART	664234.49	4302882.08	218.20	227.37
DISCCART	664234.49	4303882.08	201.19	228.24
DISCCART	664234.49	4304882.08	229.34	229.34
DISCCART	664234.49	4305882.08	230.67	230.67
DISCCART	664234.49	4306882.08	211.57	218.47
DISCCART	664234.49	4307882.08	207.10	221.42
DISCCART	664234.49	4308882.08	193.37	214.64
DISCCART	664234.49	4309882.08	207.93	217.47
DISCCART	664234.49	4310882.08	213.17	213.17
DISCCART	664234.49	4311882.08	219.63	219.63
DISCCART	664234.49	4312882.08	219.88	219.88
DISCCART	664234.49	4313882.08	214.64	214.64
DISCCART	664234.49	4314882.08	208.25	208.25
DISCCART	664234.49	4315882.08	219.92	219.92
DISCCART	664234.49	4316882.08	221.44	221.44
DISCCART	664234.49	4317882.08	204.34	204.34
DISCCART	664234.49	4318882.08	180.62	183.13
DISCCART	664234.49	4319882.08	159.34	170.52
DISCCART	663234.49	4258882.08	170.45	200.62
DISCCART	663234.49	4257882.08	213.00	213.00
DISCCART	663234.49	4256882.08	199.95	199.95
DISCCART	663234.49	4255882.08	214.04	214.04
DISCCART	663234.49	4254882.08	226.20	231.19
DISCCART	663234.49	4253882.08	217.99	243.89
DISCCART	663234.49	4252882.08	261.44	265.13
DISCCART	663234.49	4251882.08	264.02	264.02
DISCCART	663234.49	4250882.08	266.12	266.12
DISCCART	663234.49	4249882.08	268.17	268.17
DISCCART	663234.49	4248882.08	256.73	256.73
DISCCART	663234.49	4247882.08	228.82	255.15
DISCCART	663234.49	4246882.08	201.02	201.02
DISCCART	663234.49	4245882.08	191.28	207.96
DISCCART	663234.49	4244882.08	176.05	207.59
DISCCART	663234.49	4243882.08	221.05	221.05
DISCCART	663234.49	4242882.08	228.23	228.23
DISCCART	663234.49	4241882.08	226.27	226.27
DISCCART	663234.49	4240882.08	213.01	242.54
DISCCART	663234.49	4239882.08	252.44	252.44
DISCCART	663234.49	4238882.08	243.07	255.74
DISCCART	663234.49	4237882.08	255.16	255.16
DISCCART	663234.49	4236882.08	254.72	254.96
DISCCART	663234.49	4235882.08	269.63	269.63
DISCCART	663234.49	4234882.08	256.55	269.70
DISCCART	663234.49	4233882.08	273.57	273.57
DISCCART	663234.49	4232882.08	276.23	276.23
DISCCART	663234.49	4231882.08	276.36	282.34
DISCCART	663234.49	4230882.08	269.67	294.15
DISCCART	663234.49	4229882.08	275.26	275.26
DISCCART	663234.49	4228882.08	238.04	281.78
DISCCART	663234.49	4227882.08	249.67	270.16
DISCCART	663234.49	4226882.08	229.01	245.27
DISCCART	663234.49	4225882.08	255.25	257.47
DISCCART	663234.49	4224882.08	239.93	270.38
DISCCART	663234.49	4223882.08	207.74	207.74
DISCCART	663234.49	4222882.08	182.17	213.75
DISCCART	663234.49	4221882.08	213.70	257.93
DISCCART	663234.49	4220882.08	250.29	258.29
DISCCART	663234.49	4259882.08	176.12	176.12

DISCCART	663234.49	4259882.08	176.12	176.12
DISCCART	663234.49	4260882.08	213.58	219.39
DISCCART	663234.49	4261882.08	202.64	202.64
DISCCART	663234.49	4262882.08	192.69	192.69
DISCCART	663234.49	4263882.08	188.14	188.14
DISCCART	663234.49	4264882.08	177.39	177.39
DISCCART	663234.49	4265882.08	178.80	178.80
DISCCART	663234.49	4266882.08	202.18	202.18
DISCCART	663234.49	4267882.08	186.73	201.17
DISCCART	663234.49	4268882.08	193.09	213.78
DISCCART	663234.49	4269882.08	183.79	183.79
DISCCART	663234.49	4270882.08	163.84	163.84
DISCCART	663234.49	4271882.08	157.36	200.71
DISCCART	663234.49	4272882.08	149.89	170.61
DISCCART	663234.49	4273882.08	147.24	147.24
DISCCART	663234.49	4274882.08	148.77	148.77
DISCCART	663234.49	4275882.08	148.30	148.30
DISCCART	663234.49	4276882.08	148.26	148.26
DISCCART	663234.49	4277882.08	150.76	161.91
DISCCART	663234.49	4278882.08	173.34	178.10
DISCCART	663234.49	4279882.08	149.90	163.19
DISCCART	663234.49	4280882.08	149.46	149.46
DISCCART	663234.49	4281882.08	152.12	152.12
DISCCART	663234.49	4282882.08	215.07	229.27
DISCCART	663234.49	4283882.08	169.16	253.91
DISCCART	663234.49	4284882.08	233.59	252.83
DISCCART	663234.49	4285882.08	199.42	262.86
DISCCART	663234.49	4286882.08	234.61	259.55
DISCCART	663234.49	4287882.08	251.02	251.02
DISCCART	663234.49	4288882.08	204.85	254.87
DISCCART	663234.49	4289882.08	252.16	252.16
DISCCART	663234.49	4290882.08	256.08	260.96
DISCCART	663234.49	4291882.08	236.93	255.24
DISCCART	663234.49	4292882.08	238.02	252.82
DISCCART	663234.49	4293882.08	249.60	256.64
DISCCART	663234.49	4294882.08	257.36	261.89
DISCCART	663234.49	4295882.08	257.67	257.67
DISCCART	663234.49	4296882.08	251.64	251.64
DISCCART	663234.49	4297882.08	262.25	262.25
DISCCART	663234.49	4298882.08	252.21	253.85
DISCCART	663234.49	4299882.08	249.33	249.33
DISCCART	663234.49	4300882.08	244.61	244.61
DISCCART	663234.49	4301882.08	224.58	224.58
DISCCART	663234.49	4302882.08	234.36	234.36
DISCCART	663234.49	4303882.08	229.59	229.59
DISCCART	663234.49	4304882.08	233.46	233.46
DISCCART	663234.49	4305882.08	226.51	226.51
DISCCART	663234.49	4306882.08	188.28	225.97
DISCCART	663234.49	4307882.08	225.09	225.09
DISCCART	663234.49	4308882.08	228.43	228.43
DISCCART	663234.49	4309882.08	215.25	215.25
DISCCART	663234.49	4310882.08	225.69	225.69
DISCCART	663234.49	4311882.08	227.89	227.89
DISCCART	663234.49	4312882.08	222.32	222.32
DISCCART	663234.49	4313882.08	195.17	208.33
DISCCART	663234.49	4314882.08	211.48	213.22
DISCCART	663234.49	4315882.08	220.74	220.74
DISCCART	663234.49	4316882.08	212.83	212.83
DISCCART	663234.49	4317882.08	202.39	214.22
DISCCART	663234.49	4318882.08	180.71	203.11
DISCCART	663234.49	4319882.08	156.07	156.07
DISCCART	662234.49	4258882.08	188.91	210.99
DISCCART	662234.49	4257882.08	175.27	175.27
DISCCART	662234.49	4256882.08	208.01	208.01
DISCCART	662234.49	4255882.08	213.58	213.58
DISCCART	662234.49	4254882.08	214.26	214.26

DISCCART	662234.49	4253882.08	252.75	272.75
DISCCART	662234.49	4252882.08	258.69	274.22
DISCCART	662234.49	4251882.08	226.60	236.20
DISCCART	662234.49	4250882.08	219.27	258.03
DISCCART	662234.49	4249882.08	220.62	222.58
DISCCART	662234.49	4248882.08	200.19	225.05
DISCCART	662234.49	4247882.08	209.29	219.23
DISCCART	662234.49	4246882.08	184.21	215.00
DISCCART	662234.49	4245882.08	177.26	177.26
DISCCART	662234.49	4244882.08	226.10	226.10
DISCCART	662234.49	4243882.08	186.42	220.97
DISCCART	662234.49	4242882.08	226.73	227.16
DISCCART	662234.49	4241882.08	225.09	232.90
DISCCART	662234.49	4240882.08	239.37	239.37
DISCCART	662234.49	4239882.08	233.36	245.29
DISCCART	662234.49	4238882.08	258.96	258.96
DISCCART	662234.49	4237882.08	255.69	255.69
DISCCART	662234.49	4236882.08	280.04	280.04
DISCCART	662234.49	4235882.08	267.28	267.28
DISCCART	662234.49	4234882.08	253.37	253.37
DISCCART	662234.49	4233882.08	272.94	279.59
DISCCART	662234.49	4232882.08	286.86	286.86
DISCCART	662234.49	4231882.08	278.33	278.33
DISCCART	662234.49	4230882.08	290.19	290.19
DISCCART	662234.49	4229882.08	270.50	270.50
DISCCART	662234.49	4228882.08	248.19	258.03
DISCCART	662234.49	4227882.08	228.13	276.27
DISCCART	662234.49	4226882.08	263.10	268.51
DISCCART	662234.49	4225882.08	289.61	289.61
DISCCART	662234.49	4224882.08	234.09	296.76
DISCCART	662234.49	4223882.08	225.54	268.62
DISCCART	662234.49	4222882.08	252.70	252.70
DISCCART	662234.49	4221882.08	184.08	251.36
DISCCART	662234.49	4220882.08	185.42	270.40
DISCCART	662234.49	4259882.08	192.20	204.69
DISCCART	662234.49	4259882.08	192.20	204.69
DISCCART	662234.49	4260882.08	213.31	213.31
DISCCART	662234.49	4261882.08	181.80	181.80
DISCCART	662234.49	4262882.08	191.45	191.45
DISCCART	662234.49	4263882.08	173.65	195.30
DISCCART	662234.49	4264882.08	180.59	188.87
DISCCART	662234.49	4265882.08	200.19	200.19
DISCCART	662234.49	4266882.08	174.91	176.23
DISCCART	662234.49	4267882.08	202.44	202.44
DISCCART	662234.49	4268882.08	206.25	206.25
DISCCART	662234.49	4269882.08	194.05	202.88
DISCCART	662234.49	4270882.08	182.38	182.38
DISCCART	662234.49	4271882.08	195.83	236.45
DISCCART	662234.49	4272882.08	173.03	173.03
DISCCART	662234.49	4273882.08	147.36	147.36
DISCCART	662234.49	4274882.08	147.03	148.12
DISCCART	662234.49	4275882.08	149.78	149.78
DISCCART	662234.49	4276882.08	148.63	148.63
DISCCART	662234.49	4277882.08	149.27	183.03
DISCCART	662234.49	4278882.08	171.46	171.46
DISCCART	662234.49	4279882.08	169.91	182.23
DISCCART	662234.49	4280882.08	190.46	191.80
DISCCART	662234.49	4281882.08	155.63	234.57
DISCCART	662234.49	4282882.08	152.98	153.83
DISCCART	662234.49	4283882.08	174.11	233.25
DISCCART	662234.49	4284882.08	170.68	242.90
DISCCART	662234.49	4285882.08	206.47	260.16
DISCCART	662234.49	4286882.08	256.08	259.57
DISCCART	662234.49	4287882.08	261.59	261.59
DISCCART	662234.49	4288882.08	241.07	257.45
DISCCART	662234.49	4289882.08	262.68	262.68

DISCCART	662234.49	4290882.08	254.49	255.92
DISCCART	662234.49	4291882.08	254.25	263.37
DISCCART	662234.49	4292882.08	247.71	248.57
DISCCART	662234.49	4293882.08	232.99	245.49
DISCCART	662234.49	4294882.08	251.45	266.46
DISCCART	662234.49	4295882.08	262.10	262.10
DISCCART	662234.49	4296882.08	251.26	251.26
DISCCART	662234.49	4297882.08	256.14	256.14
DISCCART	662234.49	4298882.08	258.13	258.13
DISCCART	662234.49	4299882.08	242.92	249.68
DISCCART	662234.49	4300882.08	235.51	235.51
DISCCART	662234.49	4301882.08	233.22	233.22
DISCCART	662234.49	4302882.08	241.84	241.84
DISCCART	662234.49	4303882.08	236.61	236.61
DISCCART	662234.49	4304882.08	229.67	229.67
DISCCART	662234.49	4305882.08	213.69	213.69
DISCCART	662234.49	4306882.08	227.57	227.57
DISCCART	662234.49	4307882.08	216.26	225.16
DISCCART	662234.49	4308882.08	219.31	226.51
DISCCART	662234.49	4309882.08	227.18	227.18
DISCCART	662234.49	4310882.08	220.23	220.23
DISCCART	662234.49	4311882.08	230.44	230.44
DISCCART	662234.49	4312882.08	221.36	221.36
DISCCART	662234.49	4313882.08	208.86	209.53
DISCCART	662234.49	4314882.08	219.11	219.11
DISCCART	662234.49	4315882.08	215.63	215.63
DISCCART	662234.49	4316882.08	201.93	203.74
DISCCART	662234.49	4317882.08	204.84	204.84
DISCCART	662234.49	4318882.08	163.96	211.63
DISCCART	662234.49	4319882.08	177.69	177.69
DISCCART	661234.49	4258882.08	186.45	186.45
DISCCART	661234.49	4257882.08	178.27	178.27
DISCCART	661234.49	4256882.08	204.55	245.07
DISCCART	661234.49	4255882.08	234.32	234.32
DISCCART	661234.49	4254882.08	229.32	243.03
DISCCART	661234.49	4253882.08	243.30	243.30
DISCCART	661234.49	4252882.08	251.62	251.62
DISCCART	661234.49	4251882.08	225.02	225.02
DISCCART	661234.49	4250882.08	228.27	240.27
DISCCART	661234.49	4249882.08	209.14	209.14
DISCCART	661234.49	4248882.08	192.67	223.28
DISCCART	661234.49	4247882.08	182.34	182.34
DISCCART	661234.49	4246882.08	195.63	195.63
DISCCART	661234.49	4245882.08	234.19	234.19
DISCCART	661234.49	4244882.08	229.41	236.23
DISCCART	661234.49	4243882.08	200.19	233.16
DISCCART	661234.49	4242882.08	232.53	232.53
DISCCART	661234.49	4241882.08	243.49	243.49
DISCCART	661234.49	4240882.08	231.42	239.95
DISCCART	661234.49	4239882.08	243.60	243.60
DISCCART	661234.49	4238882.08	246.53	256.58
DISCCART	661234.49	4237882.08	274.01	274.01
DISCCART	661234.49	4236882.08	256.49	256.49
DISCCART	661234.49	4235882.08	257.87	261.45
DISCCART	661234.49	4234882.08	262.90	262.90
DISCCART	661234.49	4233882.08	276.70	276.70
DISCCART	661234.49	4232882.08	280.12	280.12
DISCCART	661234.49	4231882.08	291.97	291.97
DISCCART	661234.49	4230882.08	295.76	295.76
DISCCART	661234.49	4229882.08	277.05	298.89
DISCCART	661234.49	4228882.08	251.39	270.89
DISCCART	661234.49	4227882.08	243.57	282.35
DISCCART	661234.49	4226882.08	245.29	311.42
DISCCART	661234.49	4225882.08	294.87	318.42
DISCCART	661234.49	4224882.08	278.81	281.53
DISCCART	661234.49	4223882.08	229.10	250.12

DISCCART	661234.49	4222882.08	223.39	274.80
DISCCART	661234.49	4221882.08	222.74	244.20
DISCCART	661234.49	4220882.08	182.88	275.71
DISCCART	661234.49	4259882.08	219.81	219.81
DISCCART	661234.49	4259882.08	219.81	219.81
DISCCART	661234.49	4260882.08	207.01	217.11
DISCCART	661234.49	4261882.08	188.01	204.66
DISCCART	661234.49	4262882.08	183.95	183.95
DISCCART	661234.49	4263882.08	206.95	212.50
DISCCART	661234.49	4264882.08	202.28	202.28
DISCCART	661234.49	4265882.08	206.59	206.59
DISCCART	661234.49	4266882.08	203.83	207.76
DISCCART	661234.49	4267882.08	210.57	210.57
DISCCART	661234.49	4268882.08	200.82	221.36
DISCCART	661234.49	4269882.08	165.85	190.53
DISCCART	661234.49	4270882.08	186.50	191.19
DISCCART	661234.49	4271882.08	154.04	154.04
DISCCART	661234.49	4272882.08	182.46	182.46
DISCCART	661234.49	4273882.08	149.36	180.42
DISCCART	661234.49	4274882.08	147.59	147.59
DISCCART	661234.49	4275882.08	149.37	149.37
DISCCART	661234.49	4276882.08	148.42	148.42
DISCCART	661234.49	4277882.08	148.84	179.64
DISCCART	661234.49	4278882.08	176.27	187.55
DISCCART	661234.49	4279882.08	190.48	190.48
DISCCART	661234.49	4280882.08	194.65	240.39
DISCCART	661234.49	4281882.08	178.70	236.17
DISCCART	661234.49	4282882.08	165.87	165.87
DISCCART	661234.49	4283882.08	170.81	177.55
DISCCART	661234.49	4284882.08	172.89	264.66
DISCCART	661234.49	4285882.08	228.32	264.92
DISCCART	661234.49	4286882.08	230.68	273.67
DISCCART	661234.49	4287882.08	263.06	266.82
DISCCART	661234.49	4288882.08	251.22	268.08
DISCCART	661234.49	4289882.08	252.78	264.63
DISCCART	661234.49	4290882.08	266.91	266.91
DISCCART	661234.49	4291882.08	272.69	272.69
DISCCART	661234.49	4292882.08	267.99	267.99
DISCCART	661234.49	4293882.08	256.16	258.34
DISCCART	661234.49	4294882.08	251.55	269.25
DISCCART	661234.49	4295882.08	271.57	271.57
DISCCART	661234.49	4296882.08	268.09	268.09
DISCCART	661234.49	4297882.08	264.33	264.33
DISCCART	661234.49	4298882.08	250.81	250.81
DISCCART	661234.49	4299882.08	255.70	255.70
DISCCART	661234.49	4300882.08	250.02	250.02
DISCCART	661234.49	4301882.08	248.39	249.32
DISCCART	661234.49	4302882.08	238.31	238.31
DISCCART	661234.49	4303882.08	211.93	226.57
DISCCART	661234.49	4304882.08	207.00	222.45
DISCCART	661234.49	4305882.08	229.72	229.72
DISCCART	661234.49	4306882.08	229.60	229.60
DISCCART	661234.49	4307882.08	226.11	226.11
DISCCART	661234.49	4308882.08	228.69	228.69
DISCCART	661234.49	4309882.08	231.17	231.17
DISCCART	661234.49	4310882.08	228.65	228.65
DISCCART	661234.49	4311882.08	229.18	229.18
DISCCART	661234.49	4312882.08	216.91	216.91
DISCCART	661234.49	4313882.08	219.38	219.38
DISCCART	661234.49	4314882.08	223.24	223.24
DISCCART	661234.49	4315882.08	216.85	216.85
DISCCART	661234.49	4316882.08	208.86	208.86
DISCCART	661234.49	4317882.08	181.02	207.69
DISCCART	661234.49	4318882.08	194.02	194.02
DISCCART	661234.49	4319882.08	196.66	196.66
DISCCART	660234.49	4258882.08	209.37	231.87

DISCCART	660234.49	4257882.08	180.27	180.27
DISCCART	660234.49	4256882.08	189.53	214.18
DISCCART	660234.49	4255882.08	216.39	220.35
DISCCART	660234.49	4254882.08	223.05	223.05
DISCCART	660234.49	4253882.08	256.33	256.33
DISCCART	660234.49	4252882.08	206.99	206.99
DISCCART	660234.49	4251882.08	201.19	210.23
DISCCART	660234.49	4250882.08	215.73	241.26
DISCCART	660234.49	4249882.08	222.89	222.89
DISCCART	660234.49	4248882.08	207.18	213.18
DISCCART	660234.49	4247882.08	179.79	179.79
DISCCART	660234.49	4246882.08	210.87	218.71
DISCCART	660234.49	4245882.08	238.86	238.86
DISCCART	660234.49	4244882.08	232.24	232.24
DISCCART	660234.49	4243882.08	192.64	238.59
DISCCART	660234.49	4242882.08	197.20	245.54
DISCCART	660234.49	4241882.08	228.87	249.71
DISCCART	660234.49	4240882.08	247.65	262.56
DISCCART	660234.49	4239882.08	246.07	263.58
DISCCART	660234.49	4238882.08	242.30	257.93
DISCCART	660234.49	4237882.08	249.33	249.33
DISCCART	660234.49	4236882.08	234.77	256.42
DISCCART	660234.49	4235882.08	250.48	262.63
DISCCART	660234.49	4234882.08	269.57	269.57
DISCCART	660234.49	4233882.08	280.02	280.02
DISCCART	660234.49	4232882.08	278.47	278.47
DISCCART	660234.49	4231882.08	284.67	284.67
DISCCART	660234.49	4230882.08	289.06	289.06
DISCCART	660234.49	4229882.08	288.61	288.61
DISCCART	660234.49	4228882.08	297.20	297.20
DISCCART	660234.49	4227882.08	277.40	277.40
DISCCART	660234.49	4226882.08	241.30	300.23
DISCCART	660234.49	4225882.08	278.27	318.60
DISCCART	660234.49	4224882.08	248.50	329.79
DISCCART	660234.49	4223882.08	231.70	231.70
DISCCART	660234.49	4222882.08	225.06	263.58
DISCCART	660234.49	4221882.08	289.00	291.80
DISCCART	660234.49	4220882.08	267.34	268.29
DISCCART	660234.49	4259882.08	203.85	218.93
DISCCART	660234.49	4259882.08	203.85	218.93
DISCCART	660234.49	4260882.08	221.45	221.45
DISCCART	660234.49	4261882.08	201.12	223.41
DISCCART	660234.49	4262882.08	215.20	215.20
DISCCART	660234.49	4263882.08	193.13	212.67
DISCCART	660234.49	4264882.08	221.37	221.37
DISCCART	660234.49	4265882.08	208.21	208.21
DISCCART	660234.49	4266882.08	204.91	204.91
DISCCART	660234.49	4267882.08	221.09	221.09
DISCCART	660234.49	4268882.08	174.23	196.98
DISCCART	660234.49	4269882.08	161.07	188.44
DISCCART	660234.49	4270882.08	152.14	152.14
DISCCART	660234.49	4271882.08	160.00	193.16
DISCCART	660234.49	4272882.08	150.81	150.81
DISCCART	660234.49	4273882.08	164.70	184.13
DISCCART	660234.49	4274882.08	149.94	152.12
DISCCART	660234.49	4275882.08	148.11	148.11
DISCCART	660234.49	4276882.08	148.24	148.24
DISCCART	660234.49	4277882.08	149.90	149.90
DISCCART	660234.49	4278882.08	168.00	168.00
DISCCART	660234.49	4279882.08	162.66	177.54
DISCCART	660234.49	4280882.08	182.54	200.34
DISCCART	660234.49	4281882.08	200.38	260.82
DISCCART	660234.49	4282882.08	183.78	250.51
DISCCART	660234.49	4283882.08	161.35	161.35
DISCCART	660234.49	4284882.08	218.96	267.11
DISCCART	660234.49	4285882.08	216.47	264.63

DISCCART	660234.49	4286882.08	203.24	276.16
DISCCART	660234.49	4287882.08	222.23	275.40
DISCCART	660234.49	4288882.08	263.32	272.09
DISCCART	660234.49	4289882.08	231.20	276.36
DISCCART	660234.49	4290882.08	270.22	270.22
DISCCART	660234.49	4291882.08	266.49	266.49
DISCCART	660234.49	4292882.08	253.29	264.15
DISCCART	660234.49	4293882.08	257.15	257.15
DISCCART	660234.49	4294882.08	247.50	266.58
DISCCART	660234.49	4295882.08	258.18	261.39
DISCCART	660234.49	4296882.08	257.81	257.81
DISCCART	660234.49	4297882.08	245.25	255.85
DISCCART	660234.49	4298882.08	250.49	250.49
DISCCART	660234.49	4299882.08	239.61	243.98
DISCCART	660234.49	4300882.08	237.36	246.04
DISCCART	660234.49	4301882.08	244.07	244.07
DISCCART	660234.49	4302882.08	212.23	240.31
DISCCART	660234.49	4303882.08	228.27	228.27
DISCCART	660234.49	4304882.08	227.49	231.72
DISCCART	660234.49	4305882.08	205.97	214.94
DISCCART	660234.49	4306882.08	236.06	236.06
DISCCART	660234.49	4307882.08	231.25	231.25
DISCCART	660234.49	4308882.08	233.76	233.76
DISCCART	660234.49	4309882.08	233.95	233.95
DISCCART	660234.49	4310882.08	235.24	235.24
DISCCART	660234.49	4311882.08	230.20	230.20
DISCCART	660234.49	4312882.08	221.94	221.94
DISCCART	660234.49	4313882.08	227.21	227.21
DISCCART	660234.49	4314882.08	217.82	217.82
DISCCART	660234.49	4315882.08	215.59	215.59
DISCCART	660234.49	4316882.08	192.56	206.47
DISCCART	660234.49	4317882.08	193.88	193.88
DISCCART	660234.49	4318882.08	202.04	202.04
DISCCART	660234.49	4319882.08	175.85	209.29
DISCCART	659234.49	4258882.08	232.68	233.65
DISCCART	659234.49	4257882.08	188.73	188.73
DISCCART	659234.49	4256882.08	198.03	198.03
DISCCART	659234.49	4255882.08	214.90	229.70
DISCCART	659234.49	4254882.08	222.90	241.20
DISCCART	659234.49	4253882.08	240.74	253.52
DISCCART	659234.49	4252882.08	200.89	200.89
DISCCART	659234.49	4251882.08	187.14	219.14
DISCCART	659234.49	4250882.08	185.64	185.64
DISCCART	659234.49	4249882.08	182.30	182.30
DISCCART	659234.49	4248882.08	219.32	219.32
DISCCART	659234.49	4247882.08	183.04	202.56
DISCCART	659234.49	4246882.08	200.45	250.93
DISCCART	659234.49	4245882.08	223.78	223.78
DISCCART	659234.49	4244882.08	228.93	245.49
DISCCART	659234.49	4243882.08	246.45	246.45
DISCCART	659234.49	4242882.08	205.20	251.57
DISCCART	659234.49	4241882.08	195.70	256.18
DISCCART	659234.49	4240882.08	206.56	257.64
DISCCART	659234.49	4239882.08	210.08	251.20
DISCCART	659234.49	4238882.08	227.88	258.01
DISCCART	659234.49	4237882.08	258.53	258.53
DISCCART	659234.49	4236882.08	251.23	255.94
DISCCART	659234.49	4235882.08	249.94	258.47
DISCCART	659234.49	4234882.08	277.87	277.87
DISCCART	659234.49	4233882.08	277.36	277.36
DISCCART	659234.49	4232882.08	277.32	277.32
DISCCART	659234.49	4231882.08	288.10	288.10
DISCCART	659234.49	4230882.08	286.99	286.99
DISCCART	659234.49	4229882.08	299.14	299.14
DISCCART	659234.49	4228882.08	281.90	297.63
DISCCART	659234.49	4227882.08	281.18	288.49

DISCCART	659234.49	4226882.08	283.87	307.11
DISCCART	659234.49	4225882.08	298.51	298.51
DISCCART	659234.49	4224882.08	286.21	286.21
DISCCART	659234.49	4223882.08	235.35	251.03
DISCCART	659234.49	4222882.08	217.45	263.09
DISCCART	659234.49	4221882.08	260.93	274.78
DISCCART	659234.49	4220882.08	256.04	264.01
DISCCART	659234.49	4259882.08	240.32	240.32
DISCCART	659234.49	4259882.08	240.32	240.32
DISCCART	659234.49	4260882.08	239.35	239.35
DISCCART	659234.49	4261882.08	235.57	235.57
DISCCART	659234.49	4262882.08	234.28	243.88
DISCCART	659234.49	4263882.08	217.85	227.38
DISCCART	659234.49	4264882.08	229.06	229.06
DISCCART	659234.49	4265882.08	189.19	214.64
DISCCART	659234.49	4266882.08	200.89	200.89
DISCCART	659234.49	4267882.08	196.56	196.56
DISCCART	659234.49	4268882.08	167.53	169.96
DISCCART	659234.49	4269882.08	167.55	167.55
DISCCART	659234.49	4270882.08	153.78	163.64
DISCCART	659234.49	4271882.08	157.84	157.84
DISCCART	659234.49	4272882.08	178.54	183.25
DISCCART	659234.49	4273882.08	185.20	201.54
DISCCART	659234.49	4274882.08	148.08	150.81
DISCCART	659234.49	4275882.08	149.10	149.10
DISCCART	659234.49	4276882.08	148.12	148.12
DISCCART	659234.49	4277882.08	149.81	149.81
DISCCART	659234.49	4278882.08	172.96	176.88
DISCCART	659234.49	4279882.08	177.50	199.69
DISCCART	659234.49	4280882.08	192.30	192.30
DISCCART	659234.49	4281882.08	216.33	251.53
DISCCART	659234.49	4282882.08	196.69	252.20
DISCCART	659234.49	4283882.08	168.86	168.86
DISCCART	659234.49	4284882.08	186.77	263.67
DISCCART	659234.49	4285882.08	186.90	253.33
DISCCART	659234.49	4286882.08	179.93	275.31
DISCCART	659234.49	4287882.08	182.07	275.31
DISCCART	659234.49	4288882.08	238.13	268.90
DISCCART	659234.49	4289882.08	207.78	271.38
DISCCART	659234.49	4290882.08	204.99	266.07
DISCCART	659234.49	4291882.08	208.25	269.39
DISCCART	659234.49	4292882.08	233.96	262.17
DISCCART	659234.49	4293882.08	247.11	269.35
DISCCART	659234.49	4294882.08	271.76	271.76
DISCCART	659234.49	4295882.08	274.55	274.55
DISCCART	659234.49	4296882.08	257.72	257.72
DISCCART	659234.49	4297882.08	267.95	267.95
DISCCART	659234.49	4298882.08	260.75	260.75
DISCCART	659234.49	4299882.08	250.29	255.63
DISCCART	659234.49	4300882.08	257.38	257.38
DISCCART	659234.49	4301882.08	232.25	241.38
DISCCART	659234.49	4302882.08	244.71	244.71
DISCCART	659234.49	4303882.08	218.15	227.50
DISCCART	659234.49	4304882.08	233.36	233.36
DISCCART	659234.49	4305882.08	213.42	227.59
DISCCART	659234.49	4306882.08	235.76	235.76
DISCCART	659234.49	4307882.08	235.90	235.90
DISCCART	659234.49	4308882.08	235.21	235.21
DISCCART	659234.49	4309882.08	238.19	238.19
DISCCART	659234.49	4310882.08	231.52	231.52
DISCCART	659234.49	4311882.08	232.46	232.46
DISCCART	659234.49	4312882.08	223.86	223.86
DISCCART	659234.49	4313882.08	226.68	226.68
DISCCART	659234.49	4314882.08	220.26	220.26
DISCCART	659234.49	4315882.08	205.90	205.90
DISCCART	659234.49	4316882.08	192.74	192.74

DISCCART	659234.49	4317882.08	202.40	202.40
DISCCART	659234.49	4318882.08	201.39	206.77
DISCCART	659234.49	4319882.08	191.54	207.51
DISCCART	658234.49	4258882.08	188.20	188.20
DISCCART	658234.49	4257882.08	207.60	207.60
DISCCART	658234.49	4256882.08	215.15	234.23
DISCCART	658234.49	4255882.08	221.82	244.12
DISCCART	658234.49	4254882.08	238.07	238.07
DISCCART	658234.49	4253882.08	242.65	256.00
DISCCART	658234.49	4252882.08	226.69	226.69
DISCCART	658234.49	4251882.08	202.34	219.01
DISCCART	658234.49	4250882.08	179.92	223.28
DISCCART	658234.49	4249882.08	188.51	226.46
DISCCART	658234.49	4248882.08	177.11	214.06
DISCCART	658234.49	4247882.08	201.28	201.28
DISCCART	658234.49	4246882.08	230.17	256.22
DISCCART	658234.49	4245882.08	240.60	240.60
DISCCART	658234.49	4244882.08	250.97	250.97
DISCCART	658234.49	4243882.08	233.70	253.67
DISCCART	658234.49	4242882.08	212.95	233.31
DISCCART	658234.49	4241882.08	213.36	226.03
DISCCART	658234.49	4240882.08	208.55	237.29
DISCCART	658234.49	4239882.08	236.29	245.44
DISCCART	658234.49	4238882.08	244.24	244.86
DISCCART	658234.49	4237882.08	235.14	250.29
DISCCART	658234.49	4236882.08	250.04	254.42
DISCCART	658234.49	4235882.08	241.12	257.45
DISCCART	658234.49	4234882.08	262.73	262.73
DISCCART	658234.49	4233882.08	267.10	267.10
DISCCART	658234.49	4232882.08	265.23	265.23
DISCCART	658234.49	4231882.08	277.57	277.57
DISCCART	658234.49	4230882.08	295.40	298.22
DISCCART	658234.49	4229882.08	305.40	305.40
DISCCART	658234.49	4228882.08	294.00	294.00
DISCCART	658234.49	4227882.08	304.11	304.11
DISCCART	658234.49	4226882.08	313.20	313.20
DISCCART	658234.49	4225882.08	307.44	307.44
DISCCART	658234.49	4224882.08	279.31	299.08
DISCCART	658234.49	4223882.08	267.73	267.73
DISCCART	658234.49	4222882.08	255.56	269.20
DISCCART	658234.49	4221882.08	244.32	262.40
DISCCART	658234.49	4220882.08	208.10	270.66
DISCCART	658234.49	4259882.08	231.88	231.88
DISCCART	658234.49	4259882.08	231.88	231.88
DISCCART	658234.49	4260882.08	213.32	236.10
DISCCART	658234.49	4261882.08	224.91	224.91
DISCCART	658234.49	4262882.08	236.40	241.17
DISCCART	658234.49	4263882.08	200.23	227.52
DISCCART	658234.49	4264882.08	203.42	210.66
DISCCART	658234.49	4265882.08	198.04	201.67
DISCCART	658234.49	4266882.08	169.80	169.80
DISCCART	658234.49	4267882.08	177.16	190.08
DISCCART	658234.49	4268882.08	171.93	171.93
DISCCART	658234.49	4269882.08	160.01	182.44
DISCCART	658234.49	4270882.08	159.63	162.02
DISCCART	658234.49	4271882.08	151.80	151.80
DISCCART	658234.49	4272882.08	169.39	185.42
DISCCART	658234.49	4273882.08	192.21	195.63
DISCCART	658234.49	4274882.08	148.23	179.45
DISCCART	658234.49	4275882.08	149.62	149.62
DISCCART	658234.49	4276882.08	149.25	149.25
DISCCART	658234.49	4277882.08	150.58	150.58
DISCCART	658234.49	4278882.08	156.71	182.50
DISCCART	658234.49	4279882.08	164.65	164.65
DISCCART	658234.49	4280882.08	167.48	167.48
DISCCART	658234.49	4281882.08	189.74	248.16

DISCCART	658234.49	4282882.08	185.81	256.77
DISCCART	658234.49	4283882.08	213.50	249.09
DISCCART	658234.49	4284882.08	186.59	263.67
DISCCART	658234.49	4285882.08	192.05	272.93
DISCCART	658234.49	4286882.08	216.44	275.45
DISCCART	658234.49	4287882.08	203.27	276.77
DISCCART	658234.49	4288882.08	215.61	270.79
DISCCART	658234.49	4289882.08	249.64	270.19
DISCCART	658234.49	4290882.08	228.76	275.18
DISCCART	658234.49	4291882.08	248.99	269.62
DISCCART	658234.49	4292882.08	256.36	262.17
DISCCART	658234.49	4293882.08	258.24	261.68
DISCCART	658234.49	4294882.08	269.11	271.76
DISCCART	658234.49	4295882.08	272.06	272.06
DISCCART	658234.49	4296882.08	270.06	270.06
DISCCART	658234.49	4297882.08	260.20	260.20
DISCCART	658234.49	4298882.08	261.45	261.45
DISCCART	658234.49	4299882.08	259.52	259.52
DISCCART	658234.49	4300882.08	254.69	255.39
DISCCART	658234.49	4301882.08	229.08	245.20
DISCCART	658234.49	4302882.08	238.44	238.44
DISCCART	658234.49	4303882.08	235.83	241.63
DISCCART	658234.49	4304882.08	238.75	238.75
DISCCART	658234.49	4305882.08	232.46	232.46
DISCCART	658234.49	4306882.08	235.19	235.19
DISCCART	658234.49	4307882.08	242.33	242.33
DISCCART	658234.49	4308882.08	242.52	242.52
DISCCART	658234.49	4309882.08	237.72	237.72
DISCCART	658234.49	4310882.08	229.41	229.41
DISCCART	658234.49	4311882.08	231.22	231.22
DISCCART	658234.49	4312882.08	232.79	232.79
DISCCART	658234.49	4313882.08	226.13	226.13
DISCCART	658234.49	4314882.08	208.56	208.56
DISCCART	658234.49	4315882.08	209.38	209.38
DISCCART	658234.49	4316882.08	209.79	209.79
DISCCART	658234.49	4317882.08	220.70	220.70
DISCCART	658234.49	4318882.08	214.41	214.41
DISCCART	658234.49	4319882.08	206.41	206.55
DISCCART	657234.49	4258882.08	217.62	217.62
DISCCART	657234.49	4257882.08	206.51	215.37
DISCCART	657234.49	4256882.08	224.02	224.02
DISCCART	657234.49	4255882.08	232.40	232.40
DISCCART	657234.49	4254882.08	229.14	241.91
DISCCART	657234.49	4253882.08	243.56	246.93
DISCCART	657234.49	4252882.08	203.34	213.22
DISCCART	657234.49	4251882.08	183.28	183.28
DISCCART	657234.49	4250882.08	185.95	185.95
DISCCART	657234.49	4249882.08	196.20	198.39
DISCCART	657234.49	4248882.08	189.13	189.13
DISCCART	657234.49	4247882.08	193.37	214.69
DISCCART	657234.49	4246882.08	224.91	224.91
DISCCART	657234.49	4245882.08	262.03	262.03
DISCCART	657234.49	4244882.08	253.95	253.95
DISCCART	657234.49	4243882.08	245.96	245.96
DISCCART	657234.49	4242882.08	233.41	238.43
DISCCART	657234.49	4241882.08	220.13	238.16
DISCCART	657234.49	4240882.08	245.39	245.39
DISCCART	657234.49	4239882.08	247.62	250.22
DISCCART	657234.49	4238882.08	249.66	249.66
DISCCART	657234.49	4237882.08	243.15	262.76
DISCCART	657234.49	4236882.08	246.07	246.07
DISCCART	657234.49	4235882.08	264.68	264.68
DISCCART	657234.49	4234882.08	266.88	266.88
DISCCART	657234.49	4233882.08	268.34	274.01
DISCCART	657234.49	4232882.08	289.30	289.30
DISCCART	657234.49	4231882.08	287.97	287.97

DISCCART	657234.49	4230882.08	302.53	302.53
DISCCART	657234.49	4229882.08	294.73	298.54
DISCCART	657234.49	4228882.08	278.91	287.92
DISCCART	657234.49	4227882.08	299.31	299.31
DISCCART	657234.49	4226882.08	295.54	295.54
DISCCART	657234.49	4225882.08	286.87	293.63
DISCCART	657234.49	4224882.08	293.99	293.99
DISCCART	657234.49	4223882.08	279.06	298.93
DISCCART	657234.49	4222882.08	262.86	269.24
DISCCART	657234.49	4221882.08	253.80	274.57
DISCCART	657234.49	4220882.08	240.97	274.97
DISCCART	657234.49	4259882.08	197.61	197.61
DISCCART	657234.49	4259882.08	197.61	197.61
DISCCART	657234.49	4260882.08	206.62	206.62
DISCCART	657234.49	4261882.08	237.95	237.95
DISCCART	657234.49	4262882.08	243.22	243.22
DISCCART	657234.49	4263882.08	197.82	214.00
DISCCART	657234.49	4264882.08	187.71	219.64
DISCCART	657234.49	4265882.08	179.71	202.77
DISCCART	657234.49	4266882.08	190.38	215.28
DISCCART	657234.49	4267882.08	181.01	196.54
DISCCART	657234.49	4268882.08	158.61	183.87
DISCCART	657234.49	4269882.08	163.75	191.47
DISCCART	657234.49	4270882.08	154.89	164.30
DISCCART	657234.49	4271882.08	162.56	172.82
DISCCART	657234.49	4272882.08	162.09	190.54
DISCCART	657234.49	4273882.08	171.14	199.09
DISCCART	657234.49	4274882.08	164.04	207.81
DISCCART	657234.49	4275882.08	150.69	150.69
DISCCART	657234.49	4276882.08	149.15	149.15
DISCCART	657234.49	4277882.08	150.54	150.54
DISCCART	657234.49	4278882.08	154.33	154.33
DISCCART	657234.49	4279882.08	188.05	195.57
DISCCART	657234.49	4280882.08	169.83	169.83
DISCCART	657234.49	4281882.08	182.96	250.08
DISCCART	657234.49	4282882.08	204.00	266.73
DISCCART	657234.49	4283882.08	234.84	270.57
DISCCART	657234.49	4284882.08	261.95	271.12
DISCCART	657234.49	4285882.08	261.06	278.99
DISCCART	657234.49	4286882.08	255.39	277.94
DISCCART	657234.49	4287882.08	277.07	277.07
DISCCART	657234.49	4288882.08	248.09	275.94
DISCCART	657234.49	4289882.08	227.60	283.07
DISCCART	657234.49	4290882.08	270.25	277.74
DISCCART	657234.49	4291882.08	268.62	269.82
DISCCART	657234.49	4292882.08	272.44	272.44
DISCCART	657234.49	4293882.08	266.60	273.80
DISCCART	657234.49	4294882.08	266.94	266.94
DISCCART	657234.49	4295882.08	239.95	263.32
DISCCART	657234.49	4296882.08	259.68	271.27
DISCCART	657234.49	4297882.08	266.53	266.53
DISCCART	657234.49	4298882.08	248.95	263.59
DISCCART	657234.49	4299882.08	240.12	248.61
DISCCART	657234.49	4300882.08	248.46	248.46
DISCCART	657234.49	4301882.08	246.09	246.09
DISCCART	657234.49	4302882.08	256.59	256.59
DISCCART	657234.49	4303882.08	250.48	250.48
DISCCART	657234.49	4304882.08	240.21	240.21
DISCCART	657234.49	4305882.08	237.42	237.42
DISCCART	657234.49	4306882.08	222.06	222.06
DISCCART	657234.49	4307882.08	242.49	242.49
DISCCART	657234.49	4308882.08	241.88	241.88
DISCCART	657234.49	4309882.08	239.21	239.21
DISCCART	657234.49	4310882.08	234.35	234.35
DISCCART	657234.49	4311882.08	231.27	231.27
DISCCART	657234.49	4312882.08	232.24	232.24

DISCCART	657234.49	4313882.08	228.27	228.27
DISCCART	657234.49	4314882.08	217.36	217.36
DISCCART	657234.49	4315882.08	211.89	211.89
DISCCART	657234.49	4316882.08	214.56	214.56
DISCCART	657234.49	4317882.08	197.28	210.09
DISCCART	657234.49	4318882.08	214.48	214.48
DISCCART	657234.49	4319882.08	208.66	208.66
DISCCART	656234.49	4258882.08	218.86	218.86
DISCCART	656234.49	4257882.08	204.96	216.74
DISCCART	656234.49	4256882.08	198.70	198.70
DISCCART	656234.49	4255882.08	216.48	216.48
DISCCART	656234.49	4254882.08	234.22	234.22
DISCCART	656234.49	4253882.08	238.41	245.24
DISCCART	656234.49	4252882.08	198.10	226.32
DISCCART	656234.49	4251882.08	183.89	225.81
DISCCART	656234.49	4250882.08	213.40	229.54
DISCCART	656234.49	4249882.08	183.09	183.09
DISCCART	656234.49	4248882.08	189.37	225.84
DISCCART	656234.49	4247882.08	189.40	189.40
DISCCART	656234.49	4246882.08	186.18	186.18
DISCCART	656234.49	4245882.08	218.62	237.79
DISCCART	656234.49	4244882.08	224.83	224.83
DISCCART	656234.49	4243882.08	250.59	250.59
DISCCART	656234.49	4242882.08	233.72	233.72
DISCCART	656234.49	4241882.08	216.09	239.42
DISCCART	656234.49	4240882.08	249.50	249.50
DISCCART	656234.49	4239882.08	237.64	256.74
DISCCART	656234.49	4238882.08	262.54	262.54
DISCCART	656234.49	4237882.08	270.27	280.86
DISCCART	656234.49	4236882.08	276.30	276.30
DISCCART	656234.49	4235882.08	271.52	274.51
DISCCART	656234.49	4234882.08	272.40	274.81
DISCCART	656234.49	4233882.08	283.97	283.97
DISCCART	656234.49	4232882.08	300.65	300.65
DISCCART	656234.49	4231882.08	282.70	285.87
DISCCART	656234.49	4230882.08	293.51	293.51
DISCCART	656234.49	4229882.08	270.47	273.61
DISCCART	656234.49	4228882.08	291.81	291.81
DISCCART	656234.49	4227882.08	301.13	301.13
DISCCART	656234.49	4226882.08	290.33	290.33
DISCCART	656234.49	4225882.08	282.82	286.57
DISCCART	656234.49	4224882.08	283.75	293.78
DISCCART	656234.49	4223882.08	296.62	296.62
DISCCART	656234.49	4222882.08	246.48	281.37
DISCCART	656234.49	4221882.08	215.01	269.37
DISCCART	656234.49	4220882.08	274.51	274.51
DISCCART	656234.49	4259882.08	237.44	241.45
DISCCART	656234.49	4259882.08	237.44	241.45
DISCCART	656234.49	4260882.08	227.94	231.61
DISCCART	656234.49	4261882.08	233.06	235.50
DISCCART	656234.49	4262882.08	243.93	243.93
DISCCART	656234.49	4263882.08	225.48	244.31
DISCCART	656234.49	4264882.08	206.73	225.68
DISCCART	656234.49	4265882.08	183.48	183.48
DISCCART	656234.49	4266882.08	187.14	202.85
DISCCART	656234.49	4267882.08	165.17	165.17
DISCCART	656234.49	4268882.08	170.73	190.45
DISCCART	656234.49	4269882.08	163.48	163.48
DISCCART	656234.49	4270882.08	161.90	161.90
DISCCART	656234.49	4271882.08	153.98	194.84
DISCCART	656234.49	4272882.08	183.25	194.31
DISCCART	656234.49	4273882.08	209.51	213.09
DISCCART	656234.49	4274882.08	169.69	194.62
DISCCART	656234.49	4275882.08	150.71	150.71
DISCCART	656234.49	4276882.08	149.32	149.32
DISCCART	656234.49	4277882.08	151.78	151.78

DISCCART	656234.49	4278882.08	176.28	194.05
DISCCART	656234.49	4279882.08	159.19	176.44
DISCCART	656234.49	4280882.08	166.81	166.81
DISCCART	656234.49	4281882.08	186.50	186.50
DISCCART	656234.49	4282882.08	204.18	269.48
DISCCART	656234.49	4283882.08	215.19	275.56
DISCCART	656234.49	4284882.08	218.42	279.88
DISCCART	656234.49	4285882.08	229.22	279.88
DISCCART	656234.49	4286882.08	264.70	283.45
DISCCART	656234.49	4287882.08	283.01	283.01
DISCCART	656234.49	4288882.08	277.21	279.21
DISCCART	656234.49	4289882.08	279.27	279.27
DISCCART	656234.49	4290882.08	263.41	282.22
DISCCART	656234.49	4291882.08	264.68	274.74
DISCCART	656234.49	4292882.08	259.30	259.30
DISCCART	656234.49	4293882.08	251.79	253.15
DISCCART	656234.49	4294882.08	239.86	250.45
DISCCART	656234.49	4295882.08	235.02	249.25
DISCCART	656234.49	4296882.08	249.97	260.98
DISCCART	656234.49	4297882.08	248.74	270.47
DISCCART	656234.49	4298882.08	267.89	267.89
DISCCART	656234.49	4299882.08	264.41	264.41
DISCCART	656234.49	4300882.08	241.94	253.88
DISCCART	656234.49	4301882.08	260.76	260.76
DISCCART	656234.49	4302882.08	257.95	257.95
DISCCART	656234.49	4303882.08	256.95	256.95
DISCCART	656234.49	4304882.08	252.83	252.83
DISCCART	656234.49	4305882.08	242.89	242.89
DISCCART	656234.49	4306882.08	236.12	236.12
DISCCART	656234.49	4307882.08	242.17	242.17
DISCCART	656234.49	4308882.08	236.88	236.88
DISCCART	656234.49	4309882.08	239.11	239.11
DISCCART	656234.49	4310882.08	235.82	235.82
DISCCART	656234.49	4311882.08	230.62	230.62
DISCCART	656234.49	4312882.08	225.52	225.52
DISCCART	656234.49	4313882.08	218.65	222.96
DISCCART	656234.49	4314882.08	218.85	218.85
DISCCART	656234.49	4315882.08	211.95	211.95
DISCCART	656234.49	4316882.08	199.74	212.43
DISCCART	656234.49	4317882.08	176.67	206.30
DISCCART	656234.49	4318882.08	177.02	208.56
DISCCART	656234.49	4319882.08	208.57	208.57
DISCCART	655234.49	4258882.08	225.10	225.10
DISCCART	655234.49	4257882.08	243.59	243.59
DISCCART	655234.49	4256882.08	214.25	214.25
DISCCART	655234.49	4255882.08	205.23	205.23
DISCCART	655234.49	4254882.08	221.87	221.87
DISCCART	655234.49	4253882.08	235.24	251.77
DISCCART	655234.49	4252882.08	239.68	244.51
DISCCART	655234.49	4251882.08	237.69	244.04
DISCCART	655234.49	4250882.08	205.95	205.95
DISCCART	655234.49	4249882.08	187.93	206.16
DISCCART	655234.49	4248882.08	193.30	193.30
DISCCART	655234.49	4247882.08	215.96	220.37
DISCCART	655234.49	4246882.08	197.76	197.76
DISCCART	655234.49	4245882.08	209.10	213.94
DISCCART	655234.49	4244882.08	233.45	233.45
DISCCART	655234.49	4243882.08	232.45	237.57
DISCCART	655234.49	4242882.08	204.68	262.49
DISCCART	655234.49	4241882.08	246.32	246.32
DISCCART	655234.49	4240882.08	231.72	250.77
DISCCART	655234.49	4239882.08	251.97	262.04
DISCCART	655234.49	4238882.08	269.24	269.24
DISCCART	655234.49	4237882.08	249.47	270.04
DISCCART	655234.49	4236882.08	255.36	269.26
DISCCART	655234.49	4235882.08	238.41	238.41

DISCCART	655234.49	4234882.08	275.59	275.59
DISCCART	655234.49	4233882.08	280.63	280.63
DISCCART	655234.49	4232882.08	288.16	291.83
DISCCART	655234.49	4231882.08	278.15	281.58
DISCCART	655234.49	4230882.08	272.29	280.89
DISCCART	655234.49	4229882.08	276.92	276.92
DISCCART	655234.49	4228882.08	277.69	280.32
DISCCART	655234.49	4227882.08	281.88	281.88
DISCCART	655234.49	4226882.08	291.38	291.38
DISCCART	655234.49	4225882.08	269.34	269.34
DISCCART	655234.49	4224882.08	281.47	281.47
DISCCART	655234.49	4223882.08	272.62	274.26
DISCCART	655234.49	4222882.08	229.12	261.33
DISCCART	655234.49	4221882.08	262.38	262.38
DISCCART	655234.49	4220882.08	271.61	271.61
DISCCART	655234.49	4259882.08	226.88	232.02
DISCCART	655234.49	4259882.08	226.88	232.02
DISCCART	655234.49	4260882.08	222.53	244.97
DISCCART	655234.49	4261882.08	226.36	226.36
DISCCART	655234.49	4262882.08	229.18	231.50
DISCCART	655234.49	4263882.08	236.82	236.82
DISCCART	655234.49	4264882.08	216.61	225.71
DISCCART	655234.49	4265882.08	180.60	212.04
DISCCART	655234.49	4266882.08	174.11	178.97
DISCCART	655234.49	4267882.08	186.13	196.02
DISCCART	655234.49	4268882.08	179.17	201.96
DISCCART	655234.49	4269882.08	163.50	163.50
DISCCART	655234.49	4270882.08	179.28	187.99
DISCCART	655234.49	4271882.08	164.60	174.44
DISCCART	655234.49	4272882.08	175.33	177.00
DISCCART	655234.49	4273882.08	181.40	181.40
DISCCART	655234.49	4274882.08	192.71	212.89
DISCCART	655234.49	4275882.08	148.69	214.22
DISCCART	655234.49	4276882.08	151.02	151.02
DISCCART	655234.49	4277882.08	151.04	151.04
DISCCART	655234.49	4278882.08	150.53	195.76
DISCCART	655234.49	4279882.08	197.33	197.33
DISCCART	655234.49	4280882.08	208.31	208.31
DISCCART	655234.49	4281882.08	197.79	262.13
DISCCART	655234.49	4282882.08	195.53	273.05
DISCCART	655234.49	4283882.08	229.16	278.40
DISCCART	655234.49	4284882.08	255.85	277.49
DISCCART	655234.49	4285882.08	240.20	278.66
DISCCART	655234.49	4286882.08	244.95	283.04
DISCCART	655234.49	4287882.08	252.11	283.47
DISCCART	655234.49	4288882.08	284.68	284.68
DISCCART	655234.49	4289882.08	256.57	287.08
DISCCART	655234.49	4290882.08	250.98	270.44
DISCCART	655234.49	4291882.08	232.36	263.58
DISCCART	655234.49	4292882.08	246.16	254.01
DISCCART	655234.49	4293882.08	219.47	256.84
DISCCART	655234.49	4294882.08	234.94	255.34
DISCCART	655234.49	4295882.08	260.45	260.45
DISCCART	655234.49	4296882.08	253.03	269.17
DISCCART	655234.49	4297882.08	249.70	267.73
DISCCART	655234.49	4298882.08	264.20	268.00
DISCCART	655234.49	4299882.08	272.13	272.13
DISCCART	655234.49	4300882.08	266.72	266.72
DISCCART	655234.49	4301882.08	262.73	262.73
DISCCART	655234.49	4302882.08	257.65	257.65
DISCCART	655234.49	4303882.08	255.41	255.41
DISCCART	655234.49	4304882.08	244.05	244.05
DISCCART	655234.49	4305882.08	240.72	240.72
DISCCART	655234.49	4306882.08	243.51	243.51
DISCCART	655234.49	4307882.08	239.11	239.11
DISCCART	655234.49	4308882.08	232.77	232.77

DISCCART	655234.49	4309882.08	232.83	232.83
DISCCART	655234.49	4310882.08	230.73	230.73
DISCCART	655234.49	4311882.08	226.08	226.08
DISCCART	655234.49	4312882.08	215.38	228.06
DISCCART	655234.49	4313882.08	224.10	224.10
DISCCART	655234.49	4314882.08	208.03	208.03
DISCCART	655234.49	4315882.08	205.51	215.31
DISCCART	655234.49	4316882.08	180.29	180.29
DISCCART	655234.49	4317882.08	201.10	201.10
DISCCART	655234.49	4318882.08	207.65	207.65
DISCCART	655234.49	4319882.08	199.87	202.63
DISCCART	654234.49	4258882.08	247.84	248.74
DISCCART	654234.49	4257882.08	249.57	255.98
DISCCART	654234.49	4256882.08	227.33	227.33
DISCCART	654234.49	4255882.08	208.82	233.58
DISCCART	654234.49	4254882.08	239.98	243.47
DISCCART	654234.49	4253882.08	238.81	238.81
DISCCART	654234.49	4252882.08	254.50	255.68
DISCCART	654234.49	4251882.08	206.38	231.71
DISCCART	654234.49	4250882.08	200.98	217.18
DISCCART	654234.49	4249882.08	218.63	222.46
DISCCART	654234.49	4248882.08	184.56	215.63
DISCCART	654234.49	4247882.08	208.16	219.25
DISCCART	654234.49	4246882.08	200.84	213.80
DISCCART	654234.49	4245882.08	226.06	226.06
DISCCART	654234.49	4244882.08	217.04	217.04
DISCCART	654234.49	4243882.08	191.48	191.48
DISCCART	654234.49	4242882.08	196.56	196.56
DISCCART	654234.49	4241882.08	235.18	251.34
DISCCART	654234.49	4240882.08	258.76	258.76
DISCCART	654234.49	4239882.08	280.50	280.50
DISCCART	654234.49	4238882.08	265.96	274.33
DISCCART	654234.49	4237882.08	237.39	237.39
DISCCART	654234.49	4236882.08	247.65	250.31
DISCCART	654234.49	4235882.08	255.82	282.06
DISCCART	654234.49	4234882.08	284.57	285.27
DISCCART	654234.49	4233882.08	257.50	291.47
DISCCART	654234.49	4232882.08	288.86	291.30
DISCCART	654234.49	4231882.08	256.34	256.34
DISCCART	654234.49	4230882.08	268.36	268.36
DISCCART	654234.49	4229882.08	252.24	263.67
DISCCART	654234.49	4228882.08	250.83	250.83
DISCCART	654234.49	4227882.08	265.57	265.57
DISCCART	654234.49	4226882.08	258.72	258.72
DISCCART	654234.49	4225882.08	276.62	276.62
DISCCART	654234.49	4224882.08	293.88	293.88
DISCCART	654234.49	4223882.08	266.02	274.57
DISCCART	654234.49	4222882.08	267.58	275.57
DISCCART	654234.49	4221882.08	253.89	264.10
DISCCART	654234.49	4220882.08	269.71	275.15
DISCCART	654234.49	4259882.08	236.73	236.73
DISCCART	654234.49	4259882.08	236.73	236.73
DISCCART	654234.49	4260882.08	221.92	221.92
DISCCART	654234.49	4261882.08	235.43	242.73
DISCCART	654234.49	4262882.08	251.17	251.17
DISCCART	654234.49	4263882.08	236.53	257.14
DISCCART	654234.49	4264882.08	222.90	222.90
DISCCART	654234.49	4265882.08	201.89	214.06
DISCCART	654234.49	4266882.08	212.33	212.33
DISCCART	654234.49	4267882.08	206.60	206.60
DISCCART	654234.49	4268882.08	174.33	174.33
DISCCART	654234.49	4269882.08	189.37	190.04
DISCCART	654234.49	4270882.08	186.72	197.22
DISCCART	654234.49	4271882.08	151.81	156.84
DISCCART	654234.49	4272882.08	164.18	167.72
DISCCART	654234.49	4273882.08	187.98	195.17

DISCCART	654234.49	4274882.08	198.67	216.79
DISCCART	654234.49	4275882.08	192.74	210.73
DISCCART	654234.49	4276882.08	148.85	148.85
DISCCART	654234.49	4277882.08	149.05	149.05
DISCCART	654234.49	4278882.08	149.20	149.20
DISCCART	654234.49	4279882.08	181.87	195.98
DISCCART	654234.49	4280882.08	188.59	191.90
DISCCART	654234.49	4281882.08	202.55	262.13
DISCCART	654234.49	4282882.08	196.36	199.03
DISCCART	654234.49	4283882.08	211.37	278.77
DISCCART	654234.49	4284882.08	212.60	278.02
DISCCART	654234.49	4285882.08	249.08	278.77
DISCCART	654234.49	4286882.08	240.07	277.94
DISCCART	654234.49	4287882.08	268.35	268.35
DISCCART	654234.49	4288882.08	272.05	272.05
DISCCART	654234.49	4289882.08	261.90	261.90
DISCCART	654234.49	4290882.08	260.05	266.40
DISCCART	654234.49	4291882.08	196.66	262.62
DISCCART	654234.49	4292882.08	223.42	253.53
DISCCART	654234.49	4293882.08	226.48	255.09
DISCCART	654234.49	4294882.08	234.80	258.28
DISCCART	654234.49	4295882.08	256.57	256.57
DISCCART	654234.49	4296882.08	252.74	278.44
DISCCART	654234.49	4297882.08	271.72	272.84
DISCCART	654234.49	4298882.08	260.74	267.53
DISCCART	654234.49	4299882.08	274.56	274.56
DISCCART	654234.49	4300882.08	267.42	267.42
DISCCART	654234.49	4301882.08	265.81	265.81
DISCCART	654234.49	4302882.08	263.31	263.31
DISCCART	654234.49	4303882.08	255.66	255.66
DISCCART	654234.49	4304882.08	253.56	253.56
DISCCART	654234.49	4305882.08	246.50	246.50
DISCCART	654234.49	4306882.08	246.27	246.27
DISCCART	654234.49	4307882.08	244.76	244.76
DISCCART	654234.49	4308882.08	239.03	239.03
DISCCART	654234.49	4309882.08	238.83	238.83
DISCCART	654234.49	4310882.08	234.68	234.68
DISCCART	654234.49	4311882.08	230.71	230.71
DISCCART	654234.49	4312882.08	227.86	227.86
DISCCART	654234.49	4313882.08	226.83	226.83
DISCCART	654234.49	4314882.08	207.02	219.49
DISCCART	654234.49	4315882.08	189.65	210.67
DISCCART	654234.49	4316882.08	190.49	190.49
DISCCART	654234.49	4317882.08	203.36	203.36
DISCCART	654234.49	4318882.08	219.86	219.86
DISCCART	654234.49	4319882.08	205.21	207.04
DISCCART	653234.49	4258882.08	241.07	253.76
DISCCART	653234.49	4257882.08	256.82	256.82
DISCCART	653234.49	4256882.08	239.05	244.45
DISCCART	653234.49	4255882.08	239.22	239.22
DISCCART	653234.49	4254882.08	219.99	241.21
DISCCART	653234.49	4253882.08	246.05	246.05
DISCCART	653234.49	4252882.08	236.91	236.91
DISCCART	653234.49	4251882.08	243.74	243.74
DISCCART	653234.49	4250882.08	218.73	226.26
DISCCART	653234.49	4249882.08	195.45	195.45
DISCCART	653234.49	4248882.08	192.80	237.73
DISCCART	653234.49	4247882.08	231.65	239.27
DISCCART	653234.49	4246882.08	193.12	193.12
DISCCART	653234.49	4245882.08	188.96	215.17
DISCCART	653234.49	4244882.08	193.82	209.05
DISCCART	653234.49	4243882.08	198.16	201.47
DISCCART	653234.49	4242882.08	217.75	217.75
DISCCART	653234.49	4241882.08	227.63	227.63
DISCCART	653234.49	4240882.08	208.88	252.94
DISCCART	653234.49	4239882.08	251.02	251.02

DISCCART	653234.49	4238882.08	229.85	229.85
DISCCART	653234.49	4237882.08	213.71	254.76
DISCCART	653234.49	4236882.08	252.23	267.93
DISCCART	653234.49	4235882.08	256.12	293.99
DISCCART	653234.49	4234882.08	279.09	279.09
DISCCART	653234.49	4233882.08	270.84	294.15
DISCCART	653234.49	4232882.08	278.07	278.07
DISCCART	653234.49	4231882.08	244.48	244.48
DISCCART	653234.49	4230882.08	266.56	282.24
DISCCART	653234.49	4229882.08	254.83	254.83
DISCCART	653234.49	4228882.08	257.11	257.11
DISCCART	653234.49	4227882.08	249.85	256.57
DISCCART	653234.49	4226882.08	263.54	263.54
DISCCART	653234.49	4225882.08	274.96	274.96
DISCCART	653234.49	4224882.08	275.65	285.66
DISCCART	653234.49	4223882.08	293.26	293.26
DISCCART	653234.49	4222882.08	287.47	287.47
DISCCART	653234.49	4221882.08	264.06	287.88
DISCCART	653234.49	4220882.08	261.58	276.93
DISCCART	653234.49	4259882.08	250.05	250.05
DISCCART	653234.49	4259882.08	250.05	250.05
DISCCART	653234.49	4260882.08	257.19	257.19
DISCCART	653234.49	4261882.08	241.86	241.86
DISCCART	653234.49	4262882.08	257.43	257.43
DISCCART	653234.49	4263882.08	237.24	245.70
DISCCART	653234.49	4264882.08	236.24	244.92
DISCCART	653234.49	4265882.08	222.35	226.45
DISCCART	653234.49	4266882.08	213.54	213.54
DISCCART	653234.49	4267882.08	214.19	219.96
DISCCART	653234.49	4268882.08	191.14	225.64
DISCCART	653234.49	4269882.08	183.59	186.63
DISCCART	653234.49	4270882.08	177.70	177.70
DISCCART	653234.49	4271882.08	156.68	156.68
DISCCART	653234.49	4272882.08	164.95	164.95
DISCCART	653234.49	4273882.08	202.86	202.86
DISCCART	653234.49	4274882.08	232.21	232.21
DISCCART	653234.49	4275882.08	200.82	225.06
DISCCART	653234.49	4276882.08	148.93	224.41
DISCCART	653234.49	4277882.08	149.49	149.49
DISCCART	653234.49	4278882.08	150.39	150.39
DISCCART	653234.49	4279882.08	149.58	149.58
DISCCART	653234.49	4280882.08	155.01	193.12
DISCCART	653234.49	4281882.08	164.02	248.91
DISCCART	653234.49	4282882.08	161.01	192.00
DISCCART	653234.49	4283882.08	166.61	260.21
DISCCART	653234.49	4284882.08	192.76	264.19
DISCCART	653234.49	4285882.08	209.63	277.93
DISCCART	653234.49	4286882.08	241.10	279.83
DISCCART	653234.49	4287882.08	269.71	269.71
DISCCART	653234.49	4288882.08	255.59	264.65
DISCCART	653234.49	4289882.08	226.96	256.58
DISCCART	653234.49	4290882.08	209.05	264.01
DISCCART	653234.49	4291882.08	246.09	253.33
DISCCART	653234.49	4292882.08	231.52	256.60
DISCCART	653234.49	4293882.08	252.82	258.30
DISCCART	653234.49	4294882.08	250.86	267.59
DISCCART	653234.49	4295882.08	260.76	263.43
DISCCART	653234.49	4296882.08	272.11	278.16
DISCCART	653234.49	4297882.08	282.86	282.86
DISCCART	653234.49	4298882.08	278.55	278.55
DISCCART	653234.49	4299882.08	273.85	273.85
DISCCART	653234.49	4300882.08	273.41	273.41
DISCCART	653234.49	4301882.08	267.31	267.31
DISCCART	653234.49	4302882.08	260.87	260.87
DISCCART	653234.49	4303882.08	258.83	258.83
DISCCART	653234.49	4304882.08	242.69	242.69

DISCCART	653234.49	4305882.08	241.24	241.24
DISCCART	653234.49	4306882.08	218.12	244.58
DISCCART	653234.49	4307882.08	213.75	239.19
DISCCART	653234.49	4308882.08	238.25	238.25
DISCCART	653234.49	4309882.08	234.27	234.27
DISCCART	653234.49	4310882.08	212.38	231.47
DISCCART	653234.49	4311882.08	216.13	224.65
DISCCART	653234.49	4312882.08	209.06	214.55
DISCCART	653234.49	4313882.08	187.68	217.90
DISCCART	653234.49	4314882.08	186.59	218.40
DISCCART	653234.49	4315882.08	215.46	215.46
DISCCART	653234.49	4316882.08	212.86	212.86
DISCCART	653234.49	4317882.08	224.13	224.13
DISCCART	653234.49	4318882.08	213.56	213.56
DISCCART	653234.49	4319882.08	211.38	211.38
DISCCART	652234.49	4258882.08	239.84	254.30
DISCCART	652234.49	4257882.08	263.16	263.16
DISCCART	652234.49	4256882.08	260.47	274.45
DISCCART	652234.49	4255882.08	256.62	268.23
DISCCART	652234.49	4254882.08	255.27	256.63
DISCCART	652234.49	4253882.08	248.29	249.51
DISCCART	652234.49	4252882.08	232.78	250.55
DISCCART	652234.49	4251882.08	220.51	220.51
DISCCART	652234.49	4250882.08	224.81	224.81
DISCCART	652234.49	4249882.08	202.23	202.23
DISCCART	652234.49	4248882.08	221.65	243.19
DISCCART	652234.49	4247882.08	230.36	250.89
DISCCART	652234.49	4246882.08	202.26	220.89
DISCCART	652234.49	4245882.08	218.85	218.85
DISCCART	652234.49	4244882.08	196.83	213.64
DISCCART	652234.49	4243882.08	210.75	225.10
DISCCART	652234.49	4242882.08	195.51	227.04
DISCCART	652234.49	4241882.08	198.76	198.76
DISCCART	652234.49	4240882.08	224.61	242.89
DISCCART	652234.49	4239882.08	232.41	248.37
DISCCART	652234.49	4238882.08	242.80	246.82
DISCCART	652234.49	4237882.08	207.50	256.91
DISCCART	652234.49	4236882.08	255.60	260.26
DISCCART	652234.49	4235882.08	245.41	259.92
DISCCART	652234.49	4234882.08	274.14	274.14
DISCCART	652234.49	4233882.08	277.66	280.82
DISCCART	652234.49	4232882.08	281.93	281.93
DISCCART	652234.49	4231882.08	253.88	253.88
DISCCART	652234.49	4230882.08	256.08	262.52
DISCCART	652234.49	4229882.08	257.09	257.09
DISCCART	652234.49	4228882.08	273.86	273.86
DISCCART	652234.49	4227882.08	276.41	287.77
DISCCART	652234.49	4226882.08	275.29	275.29
DISCCART	652234.49	4225882.08	294.13	294.13
DISCCART	652234.49	4224882.08	281.60	281.60
DISCCART	652234.49	4223882.08	290.31	290.31
DISCCART	652234.49	4222882.08	299.67	299.67
DISCCART	652234.49	4221882.08	307.33	310.85
DISCCART	652234.49	4220882.08	275.38	275.38
DISCCART	652234.49	4259882.08	239.93	242.41
DISCCART	652234.49	4259882.08	239.93	242.41
DISCCART	652234.49	4260882.08	235.84	239.95
DISCCART	652234.49	4261882.08	231.19	232.13
DISCCART	652234.49	4262882.08	234.48	234.48
DISCCART	652234.49	4263882.08	213.08	244.16
DISCCART	652234.49	4264882.08	236.94	243.49
DISCCART	652234.49	4265882.08	189.83	220.28
DISCCART	652234.49	4266882.08	194.90	214.46
DISCCART	652234.49	4267882.08	182.16	221.69
DISCCART	652234.49	4268882.08	166.49	195.97
DISCCART	652234.49	4269882.08	183.15	183.15

DISCCART	652234.49	4270882.08	158.49	158.49
DISCCART	652234.49	4271882.08	162.70	183.40
DISCCART	652234.49	4272882.08	164.28	164.28
DISCCART	652234.49	4273882.08	183.54	196.25
DISCCART	652234.49	4274882.08	207.15	226.30
DISCCART	652234.49	4275882.08	161.95	213.54
DISCCART	652234.49	4276882.08	148.80	188.99
DISCCART	652234.49	4277882.08	149.62	149.62
DISCCART	652234.49	4278882.08	149.91	149.91
DISCCART	652234.49	4279882.08	149.71	149.71
DISCCART	652234.49	4280882.08	149.73	205.70
DISCCART	652234.49	4281882.08	174.87	207.61
DISCCART	652234.49	4282882.08	181.90	197.90
DISCCART	652234.49	4283882.08	208.33	218.10
DISCCART	652234.49	4284882.08	177.79	260.68
DISCCART	652234.49	4285882.08	234.55	282.78
DISCCART	652234.49	4286882.08	270.33	278.34
DISCCART	652234.49	4287882.08	228.96	276.16
DISCCART	652234.49	4288882.08	171.79	274.86
DISCCART	652234.49	4289882.08	242.40	270.13
DISCCART	652234.49	4290882.08	264.52	264.52
DISCCART	652234.49	4291882.08	250.02	259.36
DISCCART	652234.49	4292882.08	230.89	265.77
DISCCART	652234.49	4293882.08	254.51	262.80
DISCCART	652234.49	4294882.08	252.29	259.10
DISCCART	652234.49	4295882.08	257.93	272.31
DISCCART	652234.49	4296882.08	249.72	272.59
DISCCART	652234.49	4297882.08	270.65	272.64
DISCCART	652234.49	4298882.08	269.22	269.22
DISCCART	652234.49	4299882.08	274.68	274.68
DISCCART	652234.49	4300882.08	255.05	258.36
DISCCART	652234.49	4301882.08	250.28	262.21
DISCCART	652234.49	4302882.08	247.43	247.43
DISCCART	652234.49	4303882.08	245.23	245.23
DISCCART	652234.49	4304882.08	244.10	244.10
DISCCART	652234.49	4305882.08	248.43	248.43
DISCCART	652234.49	4306882.08	250.50	250.50
DISCCART	652234.49	4307882.08	241.63	241.63
DISCCART	652234.49	4308882.08	227.25	227.25
DISCCART	652234.49	4309882.08	237.31	237.31
DISCCART	652234.49	4310882.08	228.13	228.13
DISCCART	652234.49	4311882.08	195.82	217.22
DISCCART	652234.49	4312882.08	216.46	222.29
DISCCART	652234.49	4313882.08	223.72	223.72
DISCCART	652234.49	4314882.08	195.41	216.35
DISCCART	652234.49	4315882.08	220.06	220.06
DISCCART	652234.49	4316882.08	220.74	221.75
DISCCART	652234.49	4317882.08	217.91	217.91
DISCCART	652234.49	4318882.08	213.21	213.21
DISCCART	652234.49	4319882.08	219.85	219.85
DISCCART	651234.49	4258882.08	230.89	241.18
DISCCART	651234.49	4257882.08	251.38	251.38
DISCCART	651234.49	4256882.08	248.48	252.44
DISCCART	651234.49	4255882.08	271.98	274.57
DISCCART	651234.49	4254882.08	257.32	267.23
DISCCART	651234.49	4253882.08	253.15	253.15
DISCCART	651234.49	4252882.08	256.75	264.64
DISCCART	651234.49	4251882.08	228.78	228.78
DISCCART	651234.49	4250882.08	206.72	206.72
DISCCART	651234.49	4249882.08	201.28	201.28
DISCCART	651234.49	4248882.08	230.09	241.41
DISCCART	651234.49	4247882.08	234.09	252.95
DISCCART	651234.49	4246882.08	235.76	248.72
DISCCART	651234.49	4245882.08	217.35	217.35
DISCCART	651234.49	4244882.08	229.12	229.12
DISCCART	651234.49	4243882.08	210.00	226.77

DISCCART	651234.49	4242882.08	228.12	228.12
DISCCART	651234.49	4241882.08	209.59	209.59
DISCCART	651234.49	4240882.08	232.25	232.25
DISCCART	651234.49	4239882.08	244.62	244.62
DISCCART	651234.49	4238882.08	235.20	250.11
DISCCART	651234.49	4237882.08	204.76	204.76
DISCCART	651234.49	4236882.08	228.04	253.96
DISCCART	651234.49	4235882.08	238.28	259.81
DISCCART	651234.49	4234882.08	242.27	262.57
DISCCART	651234.49	4233882.08	263.41	263.41
DISCCART	651234.49	4232882.08	239.66	282.44
DISCCART	651234.49	4231882.08	230.04	255.42
DISCCART	651234.49	4230882.08	231.61	263.38
DISCCART	651234.49	4229882.08	262.13	262.13
DISCCART	651234.49	4228882.08	260.91	260.91
DISCCART	651234.49	4227882.08	283.57	283.57
DISCCART	651234.49	4226882.08	294.09	294.09
DISCCART	651234.49	4225882.08	286.32	287.94
DISCCART	651234.49	4224882.08	293.72	293.72
DISCCART	651234.49	4223882.08	286.51	286.51
DISCCART	651234.49	4222882.08	296.85	296.85
DISCCART	651234.49	4221882.08	304.23	304.23
DISCCART	651234.49	4220882.08	305.68	305.68
DISCCART	651234.49	4259882.08	213.68	226.45
DISCCART	651234.49	4259882.08	213.68	226.45
DISCCART	651234.49	4260882.08	205.91	238.15
DISCCART	651234.49	4261882.08	239.97	239.97
DISCCART	651234.49	4262882.08	207.71	225.85
DISCCART	651234.49	4263882.08	222.84	230.96
DISCCART	651234.49	4264882.08	215.61	215.61
DISCCART	651234.49	4265882.08	200.60	214.24
DISCCART	651234.49	4266882.08	189.85	203.03
DISCCART	651234.49	4267882.08	201.49	201.49
DISCCART	651234.49	4268882.08	158.55	178.27
DISCCART	651234.49	4269882.08	163.72	163.72
DISCCART	651234.49	4270882.08	196.44	196.44
DISCCART	651234.49	4271882.08	171.98	202.63
DISCCART	651234.49	4272882.08	191.07	215.92
DISCCART	651234.49	4273882.08	184.50	202.65
DISCCART	651234.49	4274882.08	213.30	213.30
DISCCART	651234.49	4275882.08	222.53	275.56
DISCCART	651234.49	4276882.08	169.34	275.56
DISCCART	651234.49	4277882.08	150.82	202.59
DISCCART	651234.49	4278882.08	150.20	150.20
DISCCART	651234.49	4279882.08	151.61	151.61
DISCCART	651234.49	4280882.08	150.81	154.38
DISCCART	651234.49	4281882.08	208.82	209.04
DISCCART	651234.49	4282882.08	158.51	215.27
DISCCART	651234.49	4283882.08	161.50	204.24
DISCCART	651234.49	4284882.08	179.53	209.68
DISCCART	651234.49	4285882.08	221.30	283.20
DISCCART	651234.49	4286882.08	234.53	280.84
DISCCART	651234.49	4287882.08	200.00	272.44
DISCCART	651234.49	4288882.08	184.93	273.16
DISCCART	651234.49	4289882.08	267.37	267.37
DISCCART	651234.49	4290882.08	266.14	271.59
DISCCART	651234.49	4291882.08	252.93	267.72
DISCCART	651234.49	4292882.08	222.02	254.56
DISCCART	651234.49	4293882.08	240.75	253.85
DISCCART	651234.49	4294882.08	206.85	255.13
DISCCART	651234.49	4295882.08	242.12	256.30
DISCCART	651234.49	4296882.08	262.43	262.93
DISCCART	651234.49	4297882.08	278.35	280.70
DISCCART	651234.49	4298882.08	273.89	273.89
DISCCART	651234.49	4299882.08	271.02	271.02
DISCCART	651234.49	4300882.08	272.00	272.00

DISCCART	651234.49	4301882.08	261.91	261.91
DISCCART	651234.49	4302882.08	261.65	261.65
DISCCART	651234.49	4303882.08	251.06	253.37
DISCCART	651234.49	4304882.08	250.34	250.85
DISCCART	651234.49	4305882.08	254.83	254.83
DISCCART	651234.49	4306882.08	245.46	245.46
DISCCART	651234.49	4307882.08	244.97	244.97
DISCCART	651234.49	4308882.08	240.71	240.71
DISCCART	651234.49	4309882.08	228.76	228.76
DISCCART	651234.49	4310882.08	206.21	206.21
DISCCART	651234.49	4311882.08	226.83	226.83
DISCCART	651234.49	4312882.08	234.80	234.80
DISCCART	651234.49	4313882.08	211.04	222.32
DISCCART	651234.49	4314882.08	221.08	221.08
DISCCART	651234.49	4315882.08	221.35	221.35
DISCCART	651234.49	4316882.08	228.42	228.42
DISCCART	651234.49	4317882.08	222.05	222.05
DISCCART	651234.49	4318882.08	214.15	215.38
DISCCART	651234.49	4319882.08	201.76	201.76
DISCCART	650234.49	4258882.08	219.10	223.67
DISCCART	650234.49	4257882.08	223.39	233.65
DISCCART	650234.49	4256882.08	255.88	255.88
DISCCART	650234.49	4255882.08	269.73	271.05
DISCCART	650234.49	4254882.08	261.72	284.17
DISCCART	650234.49	4253882.08	257.99	257.99
DISCCART	650234.49	4252882.08	223.27	258.82
DISCCART	650234.49	4251882.08	225.64	225.64
DISCCART	650234.49	4250882.08	224.94	224.94
DISCCART	650234.49	4249882.08	232.50	236.49
DISCCART	650234.49	4248882.08	239.30	239.30
DISCCART	650234.49	4247882.08	241.60	242.64
DISCCART	650234.49	4246882.08	238.70	257.16
DISCCART	650234.49	4245882.08	240.32	244.33
DISCCART	650234.49	4244882.08	238.32	246.83
DISCCART	650234.49	4243882.08	240.90	240.90
DISCCART	650234.49	4242882.08	234.51	234.51
DISCCART	650234.49	4241882.08	205.45	212.63
DISCCART	650234.49	4240882.08	223.10	223.10
DISCCART	650234.49	4239882.08	222.38	222.38
DISCCART	650234.49	4238882.08	204.82	228.86
DISCCART	650234.49	4237882.08	211.76	213.16
DISCCART	650234.49	4236882.08	209.24	209.24
DISCCART	650234.49	4235882.08	211.80	235.92
DISCCART	650234.49	4234882.08	220.64	220.64
DISCCART	650234.49	4233882.08	221.71	221.71
DISCCART	650234.49	4232882.08	231.11	237.73
DISCCART	650234.49	4231882.08	236.76	239.49
DISCCART	650234.49	4230882.08	256.18	256.18
DISCCART	650234.49	4229882.08	281.31	300.08
DISCCART	650234.49	4228882.08	282.58	282.58
DISCCART	650234.49	4227882.08	267.74	279.71
DISCCART	650234.49	4226882.08	262.67	262.67
DISCCART	650234.49	4225882.08	273.80	273.80
DISCCART	650234.49	4224882.08	299.63	299.63
DISCCART	650234.49	4223882.08	284.43	284.43
DISCCART	650234.49	4222882.08	297.80	297.80
DISCCART	650234.49	4221882.08	304.85	304.85
DISCCART	650234.49	4220882.08	290.74	290.74
DISCCART	650234.49	4259882.08	228.10	228.10
DISCCART	650234.49	4259882.08	228.10	228.10
DISCCART	650234.49	4260882.08	212.28	224.96
DISCCART	650234.49	4261882.08	192.14	235.29
DISCCART	650234.49	4262882.08	215.84	226.74
DISCCART	650234.49	4263882.08	217.02	220.53
DISCCART	650234.49	4264882.08	225.73	239.44
DISCCART	650234.49	4265882.08	201.93	201.93

DISCCART	650234.49	4266882.08	182.95	182.95
DISCCART	650234.49	4267882.08	169.14	189.98
DISCCART	650234.49	4268882.08	162.61	172.99
DISCCART	650234.49	4269882.08	169.58	169.58
DISCCART	650234.49	4270882.08	186.76	208.91
DISCCART	650234.49	4271882.08	214.28	233.67
DISCCART	650234.49	4272882.08	193.76	238.15
DISCCART	650234.49	4273882.08	201.10	221.30
DISCCART	650234.49	4274882.08	200.37	269.44
DISCCART	650234.49	4275882.08	179.52	275.56
DISCCART	650234.49	4276882.08	177.91	192.28
DISCCART	650234.49	4277882.08	154.63	174.30
DISCCART	650234.49	4278882.08	150.20	150.20
DISCCART	650234.49	4279882.08	153.03	153.03
DISCCART	650234.49	4280882.08	149.46	149.46
DISCCART	650234.49	4281882.08	150.58	150.58
DISCCART	650234.49	4282882.08	208.57	208.57
DISCCART	650234.49	4283882.08	198.63	213.91
DISCCART	650234.49	4284882.08	208.32	268.43
DISCCART	650234.49	4285882.08	261.25	271.50
DISCCART	650234.49	4286882.08	261.87	279.10
DISCCART	650234.49	4287882.08	163.83	279.89
DISCCART	650234.49	4288882.08	249.43	269.22
DISCCART	650234.49	4289882.08	251.56	263.21
DISCCART	650234.49	4290882.08	255.94	264.55
DISCCART	650234.49	4291882.08	249.00	259.95
DISCCART	650234.49	4292882.08	187.06	258.20
DISCCART	650234.49	4293882.08	199.10	257.12
DISCCART	650234.49	4294882.08	249.38	249.38
DISCCART	650234.49	4295882.08	249.80	255.33
DISCCART	650234.49	4296882.08	247.82	255.77
DISCCART	650234.49	4297882.08	271.76	273.31
DISCCART	650234.49	4298882.08	266.55	271.78
DISCCART	650234.49	4299882.08	278.42	278.42
DISCCART	650234.49	4300882.08	277.59	277.59
DISCCART	650234.49	4301882.08	270.56	270.56
DISCCART	650234.49	4302882.08	266.19	266.19
DISCCART	650234.49	4303882.08	252.11	252.11
DISCCART	650234.49	4304882.08	258.92	258.92
DISCCART	650234.49	4305882.08	250.68	250.68
DISCCART	650234.49	4306882.08	244.00	244.00
DISCCART	650234.49	4307882.08	245.18	245.18
DISCCART	650234.49	4308882.08	236.77	236.77
DISCCART	650234.49	4309882.08	236.05	236.05
DISCCART	650234.49	4310882.08	232.82	232.82
DISCCART	650234.49	4311882.08	239.28	239.28
DISCCART	650234.49	4312882.08	233.61	233.61
DISCCART	650234.49	4313882.08	227.69	227.69
DISCCART	650234.49	4314882.08	230.60	230.60
DISCCART	650234.49	4315882.08	225.83	225.83
DISCCART	650234.49	4316882.08	216.03	221.24
DISCCART	650234.49	4317882.08	219.58	219.58
DISCCART	650234.49	4318882.08	217.08	217.08
DISCCART	650234.49	4319882.08	179.96	208.28
DISCCART	649234.49	4258882.08	229.85	250.08
DISCCART	649234.49	4257882.08	246.35	246.35
DISCCART	649234.49	4256882.08	260.47	264.73
DISCCART	649234.49	4255882.08	242.27	256.99
DISCCART	649234.49	4254882.08	252.62	277.43
DISCCART	649234.49	4253882.08	274.00	281.00
DISCCART	649234.49	4252882.08	244.25	274.57
DISCCART	649234.49	4251882.08	244.45	244.45
DISCCART	649234.49	4250882.08	215.07	244.97
DISCCART	649234.49	4249882.08	241.53	241.53
DISCCART	649234.49	4248882.08	228.12	233.16
DISCCART	649234.49	4247882.08	257.79	257.79

DISCCART	649234.49	4246882.08	244.80	263.26
DISCCART	649234.49	4245882.08	236.19	236.19
DISCCART	649234.49	4244882.08	256.07	256.07
DISCCART	649234.49	4243882.08	197.02	259.40
DISCCART	649234.49	4242882.08	211.11	211.11
DISCCART	649234.49	4241882.08	201.43	201.43
DISCCART	649234.49	4240882.08	195.69	235.33
DISCCART	649234.49	4239882.08	208.06	225.49
DISCCART	649234.49	4238882.08	218.61	227.00
DISCCART	649234.49	4237882.08	221.10	262.79
DISCCART	649234.49	4236882.08	250.21	253.07
DISCCART	649234.49	4235882.08	228.72	228.72
DISCCART	649234.49	4234882.08	238.23	245.39
DISCCART	649234.49	4233882.08	240.10	248.97
DISCCART	649234.49	4232882.08	251.73	270.00
DISCCART	649234.49	4231882.08	251.55	262.31
DISCCART	649234.49	4230882.08	267.87	287.47
DISCCART	649234.49	4229882.08	265.66	268.78
DISCCART	649234.49	4228882.08	263.04	263.04
DISCCART	649234.49	4227882.08	263.58	268.88
DISCCART	649234.49	4226882.08	260.63	288.10
DISCCART	649234.49	4225882.08	282.17	293.33
DISCCART	649234.49	4224882.08	293.57	293.57
DISCCART	649234.49	4223882.08	273.69	273.69
DISCCART	649234.49	4222882.08	291.56	291.56
DISCCART	649234.49	4221882.08	299.26	299.26
DISCCART	649234.49	4220882.08	280.78	288.08
DISCCART	649234.49	4259882.08	228.36	245.48
DISCCART	649234.49	4259882.08	228.36	245.48
DISCCART	649234.49	4260882.08	211.62	214.46
DISCCART	649234.49	4261882.08	194.75	213.18
DISCCART	649234.49	4262882.08	209.60	209.60
DISCCART	649234.49	4263882.08	205.10	207.57
DISCCART	649234.49	4264882.08	215.09	238.55
DISCCART	649234.49	4265882.08	206.02	220.59
DISCCART	649234.49	4266882.08	206.76	206.76
DISCCART	649234.49	4267882.08	170.91	201.84
DISCCART	649234.49	4268882.08	164.40	201.55
DISCCART	649234.49	4269882.08	177.03	207.21
DISCCART	649234.49	4270882.08	194.61	194.61
DISCCART	649234.49	4271882.08	209.45	209.45
DISCCART	649234.49	4272882.08	234.85	234.85
DISCCART	649234.49	4273882.08	222.66	282.19
DISCCART	649234.49	4274882.08	202.45	202.45
DISCCART	649234.49	4275882.08	194.26	256.62
DISCCART	649234.49	4276882.08	187.42	205.59
DISCCART	649234.49	4277882.08	201.43	206.57
DISCCART	649234.49	4278882.08	149.74	221.56
DISCCART	649234.49	4279882.08	151.60	151.60
DISCCART	649234.49	4280882.08	150.66	150.66
DISCCART	649234.49	4281882.08	151.08	151.08
DISCCART	649234.49	4282882.08	153.74	153.74
DISCCART	649234.49	4283882.08	175.15	217.82
DISCCART	649234.49	4284882.08	211.10	219.82
DISCCART	649234.49	4285882.08	184.60	280.45
DISCCART	649234.49	4286882.08	205.35	278.28
DISCCART	649234.49	4287882.08	239.38	272.73
DISCCART	649234.49	4288882.08	257.91	268.49
DISCCART	649234.49	4289882.08	262.45	265.47
DISCCART	649234.49	4290882.08	238.58	256.05
DISCCART	649234.49	4291882.08	202.04	260.23
DISCCART	649234.49	4292882.08	211.30	257.42
DISCCART	649234.49	4293882.08	230.26	253.54
DISCCART	649234.49	4294882.08	246.39	262.69
DISCCART	649234.49	4295882.08	257.88	269.52
DISCCART	649234.49	4296882.08	251.14	273.52

DISCCART	649234.49	4297882.08	249.80	269.37
DISCCART	649234.49	4298882.08	257.89	272.12
DISCCART	649234.49	4299882.08	258.51	263.27
DISCCART	649234.49	4300882.08	274.63	274.63
DISCCART	649234.49	4301882.08	260.52	262.19
DISCCART	649234.49	4302882.08	264.96	264.96
DISCCART	649234.49	4303882.08	262.95	262.95
DISCCART	649234.49	4304882.08	257.75	257.75
DISCCART	649234.49	4305882.08	242.88	242.88
DISCCART	649234.49	4306882.08	243.69	243.69
DISCCART	649234.49	4307882.08	244.39	244.39
DISCCART	649234.49	4308882.08	241.33	241.33
DISCCART	649234.49	4309882.08	240.89	240.89
DISCCART	649234.49	4310882.08	232.22	232.22
DISCCART	649234.49	4311882.08	231.61	231.61
DISCCART	649234.49	4312882.08	238.62	238.62
DISCCART	649234.49	4313882.08	235.56	235.56
DISCCART	649234.49	4314882.08	228.49	228.49
DISCCART	649234.49	4315882.08	215.89	215.89
DISCCART	649234.49	4316882.08	210.91	210.91
DISCCART	649234.49	4317882.08	210.86	210.86
DISCCART	649234.49	4318882.08	212.52	212.52
DISCCART	649234.49	4319882.08	201.85	201.85
DISCCART	648234.49	4258882.08	218.41	247.93
DISCCART	648234.49	4257882.08	232.08	250.55
DISCCART	648234.49	4256882.08	236.12	249.42
DISCCART	648234.49	4255882.08	232.90	254.06
DISCCART	648234.49	4254882.08	271.43	271.43
DISCCART	648234.49	4253882.08	269.79	269.79
DISCCART	648234.49	4252882.08	239.72	256.23
DISCCART	648234.49	4251882.08	247.38	247.38
DISCCART	648234.49	4250882.08	240.62	266.34
DISCCART	648234.49	4249882.08	238.75	238.75
DISCCART	648234.49	4248882.08	255.98	273.32
DISCCART	648234.49	4247882.08	253.32	256.46
DISCCART	648234.49	4246882.08	274.89	279.21
DISCCART	648234.49	4245882.08	255.05	255.05
DISCCART	648234.49	4244882.08	245.61	254.64
DISCCART	648234.49	4243882.08	196.84	241.71
DISCCART	648234.49	4242882.08	204.67	204.67
DISCCART	648234.49	4241882.08	207.52	207.52
DISCCART	648234.49	4240882.08	253.07	261.77
DISCCART	648234.49	4239882.08	244.71	244.71
DISCCART	648234.49	4238882.08	210.63	228.91
DISCCART	648234.49	4237882.08	229.57	252.60
DISCCART	648234.49	4236882.08	241.35	241.35
DISCCART	648234.49	4235882.08	248.29	275.45
DISCCART	648234.49	4234882.08	279.00	279.00
DISCCART	648234.49	4233882.08	271.80	282.17
DISCCART	648234.49	4232882.08	282.24	282.24
DISCCART	648234.49	4231882.08	292.88	292.88
DISCCART	648234.49	4230882.08	256.36	256.36
DISCCART	648234.49	4229882.08	258.83	268.05
DISCCART	648234.49	4228882.08	253.91	253.91
DISCCART	648234.49	4227882.08	235.82	235.82
DISCCART	648234.49	4226882.08	254.80	286.73
DISCCART	648234.49	4225882.08	277.29	277.29
DISCCART	648234.49	4224882.08	276.01	276.01
DISCCART	648234.49	4223882.08	265.91	300.21
DISCCART	648234.49	4222882.08	297.22	297.22
DISCCART	648234.49	4221882.08	289.99	289.99
DISCCART	648234.49	4220882.08	271.43	271.43
DISCCART	648234.49	4259882.08	216.10	219.24
DISCCART	648234.49	4259882.08	216.10	219.24
DISCCART	648234.49	4260882.08	227.03	241.76
DISCCART	648234.49	4261882.08	191.62	219.45

DISCCART	648234.49	4262882.08	211.40	227.78
DISCCART	648234.49	4263882.08	177.34	227.40
DISCCART	648234.49	4264882.08	187.51	232.92
DISCCART	648234.49	4265882.08	164.45	221.63
DISCCART	648234.49	4266882.08	176.28	220.28
DISCCART	648234.49	4267882.08	180.43	200.81
DISCCART	648234.49	4268882.08	191.76	191.76
DISCCART	648234.49	4269882.08	177.03	220.61
DISCCART	648234.49	4270882.08	207.77	214.88
DISCCART	648234.49	4271882.08	195.49	214.81
DISCCART	648234.49	4272882.08	214.97	214.97
DISCCART	648234.49	4273882.08	214.52	282.19
DISCCART	648234.49	4274882.08	206.47	206.47
DISCCART	648234.49	4275882.08	174.52	174.52
DISCCART	648234.49	4276882.08	183.73	192.30
DISCCART	648234.49	4277882.08	171.10	200.66
DISCCART	648234.49	4278882.08	152.62	213.79
DISCCART	648234.49	4279882.08	151.59	151.59
DISCCART	648234.49	4280882.08	151.33	151.33
DISCCART	648234.49	4281882.08	150.31	150.31
DISCCART	648234.49	4282882.08	151.87	151.87
DISCCART	648234.49	4283882.08	150.68	228.38
DISCCART	648234.49	4284882.08	207.62	216.37
DISCCART	648234.49	4285882.08	212.75	221.47
DISCCART	648234.49	4286882.08	184.52	263.45
DISCCART	648234.49	4287882.08	171.78	266.35
DISCCART	648234.49	4288882.08	157.03	270.79
DISCCART	648234.49	4289882.08	164.10	275.57
DISCCART	648234.49	4290882.08	240.25	253.12
DISCCART	648234.49	4291882.08	250.46	251.40
DISCCART	648234.49	4292882.08	214.08	254.81
DISCCART	648234.49	4293882.08	246.72	251.59
DISCCART	648234.49	4294882.08	218.79	247.84
DISCCART	648234.49	4295882.08	245.04	249.50
DISCCART	648234.49	4296882.08	249.98	261.50
DISCCART	648234.49	4297882.08	249.00	255.41
DISCCART	648234.49	4298882.08	256.18	259.98
DISCCART	648234.49	4299882.08	268.75	268.75
DISCCART	648234.49	4300882.08	275.17	275.17
DISCCART	648234.49	4301882.08	275.04	275.04
DISCCART	648234.49	4302882.08	269.50	269.50
DISCCART	648234.49	4303882.08	255.48	255.48
DISCCART	648234.49	4304882.08	260.47	260.47
DISCCART	648234.49	4305882.08	246.06	246.68
DISCCART	648234.49	4306882.08	254.81	254.81
DISCCART	648234.49	4307882.08	243.92	243.92
DISCCART	648234.49	4308882.08	239.92	239.92
DISCCART	648234.49	4309882.08	236.49	236.49
DISCCART	648234.49	4310882.08	242.12	242.12
DISCCART	648234.49	4311882.08	236.73	236.73
DISCCART	648234.49	4312882.08	225.34	225.34
DISCCART	648234.49	4313882.08	232.56	232.56
DISCCART	648234.49	4314882.08	226.72	226.72
DISCCART	648234.49	4315882.08	219.38	219.38
DISCCART	648234.49	4316882.08	194.69	194.69
DISCCART	648234.49	4317882.08	223.38	223.38
DISCCART	648234.49	4318882.08	215.97	215.97
DISCCART	648234.49	4319882.08	218.99	218.99
DISCCART	647234.49	4258882.08	209.37	209.37
DISCCART	647234.49	4257882.08	220.64	246.97
DISCCART	647234.49	4256882.08	210.23	246.66
DISCCART	647234.49	4255882.08	239.63	250.74
DISCCART	647234.49	4254882.08	254.01	254.01
DISCCART	647234.49	4253882.08	248.20	259.71
DISCCART	647234.49	4252882.08	263.39	271.62
DISCCART	647234.49	4251882.08	242.20	242.20

DISCCART	647234.49	4250882.08	242.37	242.37
DISCCART	647234.49	4249882.08	251.32	251.32
DISCCART	647234.49	4248882.08	280.40	280.40
DISCCART	647234.49	4247882.08	265.57	265.57
DISCCART	647234.49	4246882.08	237.27	253.92
DISCCART	647234.49	4245882.08	232.25	232.25
DISCCART	647234.49	4244882.08	247.15	247.15
DISCCART	647234.49	4243882.08	227.74	236.42
DISCCART	647234.49	4242882.08	230.33	230.33
DISCCART	647234.49	4241882.08	202.24	202.24
DISCCART	647234.49	4240882.08	201.45	244.88
DISCCART	647234.49	4239882.08	209.30	238.70
DISCCART	647234.49	4238882.08	231.56	241.46
DISCCART	647234.49	4237882.08	226.14	246.81
DISCCART	647234.49	4236882.08	250.60	250.60
DISCCART	647234.49	4235882.08	236.86	236.86
DISCCART	647234.49	4234882.08	256.00	256.00
DISCCART	647234.49	4233882.08	249.78	274.85
DISCCART	647234.49	4232882.08	238.70	249.92
DISCCART	647234.49	4231882.08	253.99	253.99
DISCCART	647234.49	4230882.08	273.10	275.25
DISCCART	647234.49	4229882.08	250.56	250.56
DISCCART	647234.49	4228882.08	246.52	246.52
DISCCART	647234.49	4227882.08	263.16	263.16
DISCCART	647234.49	4226882.08	240.92	240.92
DISCCART	647234.49	4225882.08	244.56	275.68
DISCCART	647234.49	4224882.08	283.11	283.11
DISCCART	647234.49	4223882.08	288.86	293.75
DISCCART	647234.49	4222882.08	288.09	288.09
DISCCART	647234.49	4221882.08	287.80	292.49
DISCCART	647234.49	4220882.08	277.58	287.20
DISCCART	647234.49	4259882.08	242.42	246.96
DISCCART	647234.49	4259882.08	242.42	246.96
DISCCART	647234.49	4260882.08	199.78	208.55
DISCCART	647234.49	4261882.08	220.77	235.06
DISCCART	647234.49	4262882.08	186.60	214.22
DISCCART	647234.49	4263882.08	171.77	171.77
DISCCART	647234.49	4264882.08	195.94	208.68
DISCCART	647234.49	4265882.08	202.54	214.92
DISCCART	647234.49	4266882.08	189.12	214.35
DISCCART	647234.49	4267882.08	207.77	215.16
DISCCART	647234.49	4268882.08	191.21	215.20
DISCCART	647234.49	4269882.08	199.15	218.78
DISCCART	647234.49	4270882.08	221.25	221.25
DISCCART	647234.49	4271882.08	224.26	224.26
DISCCART	647234.49	4272882.08	220.16	220.16
DISCCART	647234.49	4273882.08	184.33	202.33
DISCCART	647234.49	4274882.08	203.15	203.15
DISCCART	647234.49	4275882.08	188.29	188.29
DISCCART	647234.49	4276882.08	151.81	198.94
DISCCART	647234.49	4277882.08	153.12	153.12
DISCCART	647234.49	4278882.08	168.16	178.29
DISCCART	647234.49	4279882.08	171.28	191.88
DISCCART	647234.49	4280882.08	152.02	152.02
DISCCART	647234.49	4281882.08	151.47	151.47
DISCCART	647234.49	4282882.08	151.58	151.58
DISCCART	647234.49	4283882.08	151.74	151.74
DISCCART	647234.49	4284882.08	150.95	213.12
DISCCART	647234.49	4285882.08	164.68	224.34
DISCCART	647234.49	4286882.08	159.43	193.63
DISCCART	647234.49	4287882.08	156.71	237.36
DISCCART	647234.49	4288882.08	164.78	273.71
DISCCART	647234.49	4289882.08	228.67	275.57
DISCCART	647234.49	4290882.08	260.47	266.88
DISCCART	647234.49	4291882.08	250.11	250.11
DISCCART	647234.49	4292882.08	252.92	252.92

DISCCART	647234.49	4293882.08	241.17	251.31
DISCCART	647234.49	4294882.08	224.66	240.25
DISCCART	647234.49	4295882.08	235.48	244.71
DISCCART	647234.49	4296882.08	254.28	254.74
DISCCART	647234.49	4297882.08	220.31	253.14
DISCCART	647234.49	4298882.08	254.73	261.69
DISCCART	647234.49	4299882.08	262.09	262.09
DISCCART	647234.49	4300882.08	263.65	274.18
DISCCART	647234.49	4301882.08	271.81	271.81
DISCCART	647234.49	4302882.08	263.38	263.38
DISCCART	647234.49	4303882.08	261.23	261.23
DISCCART	647234.49	4304882.08	252.94	252.94
DISCCART	647234.49	4305882.08	258.86	258.86
DISCCART	647234.49	4306882.08	244.44	244.44
DISCCART	647234.49	4307882.08	242.76	242.76
DISCCART	647234.49	4308882.08	249.40	249.40
DISCCART	647234.49	4309882.08	245.59	245.59
DISCCART	647234.49	4310882.08	231.51	231.51
DISCCART	647234.49	4311882.08	235.45	235.45
DISCCART	647234.49	4312882.08	219.77	227.32
DISCCART	647234.49	4313882.08	212.53	228.41
DISCCART	647234.49	4314882.08	216.87	216.87
DISCCART	647234.49	4315882.08	216.83	217.70
DISCCART	647234.49	4316882.08	215.41	215.41
DISCCART	647234.49	4317882.08	220.08	220.08
DISCCART	647234.49	4318882.08	222.65	222.65
DISCCART	647234.49	4319882.08	226.64	226.64
DISCCART	646234.49	4258882.08	232.18	248.34
DISCCART	646234.49	4257882.08	254.24	254.24
DISCCART	646234.49	4256882.08	241.91	257.47
DISCCART	646234.49	4255882.08	229.70	254.09
DISCCART	646234.49	4254882.08	225.53	250.95
DISCCART	646234.49	4253882.08	240.63	260.19
DISCCART	646234.49	4252882.08	260.37	260.37
DISCCART	646234.49	4251882.08	270.92	270.92
DISCCART	646234.49	4250882.08	273.05	273.05
DISCCART	646234.49	4249882.08	276.97	276.97
DISCCART	646234.49	4248882.08	256.37	260.57
DISCCART	646234.49	4247882.08	258.10	258.30
DISCCART	646234.49	4246882.08	255.08	265.54
DISCCART	646234.49	4245882.08	253.91	256.68
DISCCART	646234.49	4244882.08	236.29	242.39
DISCCART	646234.49	4243882.08	217.82	223.20
DISCCART	646234.49	4242882.08	201.24	201.24
DISCCART	646234.49	4241882.08	206.38	206.38
DISCCART	646234.49	4240882.08	212.13	227.17
DISCCART	646234.49	4239882.08	203.82	226.24
DISCCART	646234.49	4238882.08	223.44	223.44
DISCCART	646234.49	4237882.08	207.70	254.67
DISCCART	646234.49	4236882.08	207.99	227.01
DISCCART	646234.49	4235882.08	235.76	235.76
DISCCART	646234.49	4234882.08	214.53	234.25
DISCCART	646234.49	4233882.08	219.78	219.78
DISCCART	646234.49	4232882.08	225.53	232.39
DISCCART	646234.49	4231882.08	240.06	240.06
DISCCART	646234.49	4230882.08	276.60	276.60
DISCCART	646234.49	4229882.08	231.15	231.15
DISCCART	646234.49	4228882.08	260.65	260.65
DISCCART	646234.49	4227882.08	288.52	288.52
DISCCART	646234.49	4226882.08	279.64	279.64
DISCCART	646234.49	4225882.08	243.94	243.94
DISCCART	646234.49	4224882.08	276.04	276.04
DISCCART	646234.49	4223882.08	277.91	292.48
DISCCART	646234.49	4222882.08	256.20	276.77
DISCCART	646234.49	4221882.08	256.23	256.23
DISCCART	646234.49	4220882.08	274.80	293.90

DISCCART	646234.49	4259882.08	202.28	250.23
DISCCART	646234.49	4259882.08	202.28	250.23
DISCCART	646234.49	4260882.08	205.44	240.80
DISCCART	646234.49	4261882.08	236.58	237.36
DISCCART	646234.49	4262882.08	205.00	214.60
DISCCART	646234.49	4263882.08	171.97	232.49
DISCCART	646234.49	4264882.08	211.11	211.11
DISCCART	646234.49	4265882.08	175.19	177.09
DISCCART	646234.49	4266882.08	209.59	209.59
DISCCART	646234.49	4267882.08	218.25	218.25
DISCCART	646234.49	4268882.08	184.18	214.13
DISCCART	646234.49	4269882.08	211.80	221.14
DISCCART	646234.49	4270882.08	237.29	237.29
DISCCART	646234.49	4271882.08	200.94	200.94
DISCCART	646234.49	4272882.08	188.13	188.13
DISCCART	646234.49	4273882.08	172.30	201.49
DISCCART	646234.49	4274882.08	163.75	183.57
DISCCART	646234.49	4275882.08	178.23	183.69
DISCCART	646234.49	4276882.08	152.41	179.03
DISCCART	646234.49	4277882.08	160.12	169.27
DISCCART	646234.49	4278882.08	185.97	209.09
DISCCART	646234.49	4279882.08	189.53	201.40
DISCCART	646234.49	4280882.08	170.15	170.15
DISCCART	646234.49	4281882.08	151.43	151.43
DISCCART	646234.49	4282882.08	152.16	152.16
DISCCART	646234.49	4283882.08	152.69	152.69
DISCCART	646234.49	4284882.08	154.08	154.08
DISCCART	646234.49	4285882.08	151.10	204.09
DISCCART	646234.49	4286882.08	175.81	177.05
DISCCART	646234.49	4287882.08	195.24	237.36
DISCCART	646234.49	4288882.08	220.62	256.56
DISCCART	646234.49	4289882.08	186.68	268.70
DISCCART	646234.49	4290882.08	252.31	264.37
DISCCART	646234.49	4291882.08	236.51	257.67
DISCCART	646234.49	4292882.08	256.88	256.88
DISCCART	646234.49	4293882.08	181.30	260.66
DISCCART	646234.49	4294882.08	220.96	244.65
DISCCART	646234.49	4295882.08	227.69	240.72
DISCCART	646234.49	4296882.08	204.81	240.93
DISCCART	646234.49	4297882.08	241.44	241.44
DISCCART	646234.49	4298882.08	214.07	252.78
DISCCART	646234.49	4299882.08	235.31	255.30
DISCCART	646234.49	4300882.08	247.84	262.70
DISCCART	646234.49	4301882.08	274.96	274.96
DISCCART	646234.49	4302882.08	265.09	265.09
DISCCART	646234.49	4303882.08	265.23	265.23
DISCCART	646234.49	4304882.08	257.41	257.41
DISCCART	646234.49	4305882.08	252.87	252.87
DISCCART	646234.49	4306882.08	253.10	253.10
DISCCART	646234.49	4307882.08	252.40	252.40
DISCCART	646234.49	4308882.08	239.09	239.09
DISCCART	646234.49	4309882.08	241.14	241.14
DISCCART	646234.49	4310882.08	241.35	241.35
DISCCART	646234.49	4311882.08	237.65	237.65
DISCCART	646234.49	4312882.08	236.07	236.07
DISCCART	646234.49	4313882.08	233.39	233.39
DISCCART	646234.49	4314882.08	228.57	228.57
DISCCART	646234.49	4315882.08	202.01	202.01
DISCCART	646234.49	4316882.08	226.86	226.86
DISCCART	646234.49	4317882.08	224.01	224.01
DISCCART	646234.49	4318882.08	225.65	225.65
DISCCART	646234.49	4319882.08	227.12	227.12
DISCCART	645234.49	4258882.08	219.07	251.51
DISCCART	645234.49	4257882.08	229.09	237.64
DISCCART	645234.49	4256882.08	220.78	238.53
DISCCART	645234.49	4255882.08	228.76	265.30

DISCCART	645234.49	4254882.08	250.75	261.34
DISCCART	645234.49	4253882.08	246.91	246.91
DISCCART	645234.49	4252882.08	264.51	266.35
DISCCART	645234.49	4251882.08	265.83	265.83
DISCCART	645234.49	4250882.08	275.04	275.04
DISCCART	645234.49	4249882.08	252.03	264.76
DISCCART	645234.49	4248882.08	264.71	264.71
DISCCART	645234.49	4247882.08	242.42	256.45
DISCCART	645234.49	4246882.08	259.86	273.73
DISCCART	645234.49	4245882.08	238.29	250.17
DISCCART	645234.49	4244882.08	230.13	231.44
DISCCART	645234.49	4243882.08	226.27	226.27
DISCCART	645234.49	4242882.08	216.70	216.70
DISCCART	645234.49	4241882.08	223.71	223.71
DISCCART	645234.49	4240882.08	237.04	253.29
DISCCART	645234.49	4239882.08	244.11	244.11
DISCCART	645234.49	4238882.08	206.55	206.55
DISCCART	645234.49	4237882.08	225.63	227.63
DISCCART	645234.49	4236882.08	204.38	232.92
DISCCART	645234.49	4235882.08	214.22	214.22
DISCCART	645234.49	4234882.08	234.72	234.72
DISCCART	645234.49	4233882.08	219.35	219.35
DISCCART	645234.49	4232882.08	263.07	263.07
DISCCART	645234.49	4231882.08	265.95	265.95
DISCCART	645234.49	4230882.08	256.64	256.64
DISCCART	645234.49	4229882.08	231.00	231.00
DISCCART	645234.49	4228882.08	256.63	256.63
DISCCART	645234.49	4227882.08	260.63	275.69
DISCCART	645234.49	4226882.08	278.97	278.97
DISCCART	645234.49	4225882.08	296.36	296.36
DISCCART	645234.49	4224882.08	244.02	263.42
DISCCART	645234.49	4223882.08	250.86	250.86
DISCCART	645234.49	4222882.08	260.21	281.12
DISCCART	645234.49	4221882.08	273.80	285.93
DISCCART	645234.49	4220882.08	261.29	261.29
DISCCART	645234.49	4259882.08	209.99	256.39
DISCCART	645234.49	4259882.08	209.99	256.39
DISCCART	645234.49	4260882.08	203.21	253.77
DISCCART	645234.49	4261882.08	180.65	214.35
DISCCART	645234.49	4262882.08	177.07	177.07
DISCCART	645234.49	4263882.08	191.41	215.54
DISCCART	645234.49	4264882.08	189.51	209.08
DISCCART	645234.49	4265882.08	196.67	196.67
DISCCART	645234.49	4266882.08	221.52	224.04
DISCCART	645234.49	4267882.08	200.11	220.48
DISCCART	645234.49	4268882.08	211.74	211.74
DISCCART	645234.49	4269882.08	219.01	219.01
DISCCART	645234.49	4270882.08	233.04	233.04
DISCCART	645234.49	4271882.08	198.51	200.60
DISCCART	645234.49	4272882.08	172.56	172.56
DISCCART	645234.49	4273882.08	175.25	179.20
DISCCART	645234.49	4274882.08	154.91	194.85
DISCCART	645234.49	4275882.08	159.44	159.44
DISCCART	645234.49	4276882.08	164.71	195.40
DISCCART	645234.49	4277882.08	188.52	188.52
DISCCART	645234.49	4278882.08	189.83	215.45
DISCCART	645234.49	4279882.08	186.37	209.57
DISCCART	645234.49	4280882.08	182.34	207.34
DISCCART	645234.49	4281882.08	184.98	191.45
DISCCART	645234.49	4282882.08	153.71	153.71
DISCCART	645234.49	4283882.08	152.65	152.65
DISCCART	645234.49	4284882.08	153.45	153.45
DISCCART	645234.49	4285882.08	151.89	151.89
DISCCART	645234.49	4286882.08	184.60	201.73
DISCCART	645234.49	4287882.08	194.91	229.76
DISCCART	645234.49	4288882.08	194.47	264.29

DISCCART	645234.49	4289882.08	231.00	266.22
DISCCART	645234.49	4290882.08	264.77	265.97
DISCCART	645234.49	4291882.08	258.83	258.83
DISCCART	645234.49	4292882.08	227.64	266.00
DISCCART	645234.49	4293882.08	259.79	260.13
DISCCART	645234.49	4294882.08	230.40	260.63
DISCCART	645234.49	4295882.08	227.04	243.81
DISCCART	645234.49	4296882.08	238.30	250.95
DISCCART	645234.49	4297882.08	250.36	252.46
DISCCART	645234.49	4298882.08	240.02	253.01
DISCCART	645234.49	4299882.08	253.75	253.75
DISCCART	645234.49	4300882.08	253.63	267.64
DISCCART	645234.49	4301882.08	278.37	278.37
DISCCART	645234.49	4302882.08	271.22	271.22
DISCCART	645234.49	4303882.08	266.20	266.20
DISCCART	645234.49	4304882.08	262.63	262.63
DISCCART	645234.49	4305882.08	252.97	252.97
DISCCART	645234.49	4306882.08	258.88	258.88
DISCCART	645234.49	4307882.08	246.01	246.01
DISCCART	645234.49	4308882.08	249.36	249.36
DISCCART	645234.49	4309882.08	249.12	249.12
DISCCART	645234.49	4310882.08	243.97	243.97
DISCCART	645234.49	4311882.08	240.10	240.10
DISCCART	645234.49	4312882.08	231.97	231.97
DISCCART	645234.49	4313882.08	215.76	231.96
DISCCART	645234.49	4314882.08	220.14	220.14
DISCCART	645234.49	4315882.08	229.27	229.27
DISCCART	645234.49	4316882.08	227.09	227.09
DISCCART	645234.49	4317882.08	230.49	230.49
DISCCART	645234.49	4318882.08	222.48	222.48
DISCCART	645234.49	4319882.08	220.89	220.89
DISCCART	644234.49	4258882.08	193.30	259.74
DISCCART	644234.49	4257882.08	227.87	234.34
DISCCART	644234.49	4256882.08	215.14	248.03
DISCCART	644234.49	4255882.08	250.89	250.89
DISCCART	644234.49	4254882.08	244.88	244.88
DISCCART	644234.49	4253882.08	238.25	238.25
DISCCART	644234.49	4252882.08	273.60	273.60
DISCCART	644234.49	4251882.08	255.55	268.69
DISCCART	644234.49	4250882.08	264.10	266.04
DISCCART	644234.49	4249882.08	252.00	258.91
DISCCART	644234.49	4248882.08	232.14	262.92
DISCCART	644234.49	4247882.08	265.24	265.24
DISCCART	644234.49	4246882.08	221.32	251.11
DISCCART	644234.49	4245882.08	224.90	239.92
DISCCART	644234.49	4244882.08	218.66	218.66
DISCCART	644234.49	4243882.08	216.28	216.28
DISCCART	644234.49	4242882.08	221.40	226.45
DISCCART	644234.49	4241882.08	232.48	250.88
DISCCART	644234.49	4240882.08	250.72	262.61
DISCCART	644234.49	4239882.08	252.02	266.19
DISCCART	644234.49	4238882.08	241.40	247.49
DISCCART	644234.49	4237882.08	240.65	247.72
DISCCART	644234.49	4236882.08	208.60	252.68
DISCCART	644234.49	4235882.08	214.22	244.54
DISCCART	644234.49	4234882.08	250.31	250.31
DISCCART	644234.49	4233882.08	232.88	232.88
DISCCART	644234.49	4232882.08	251.97	251.97
DISCCART	644234.49	4231882.08	241.72	241.72
DISCCART	644234.49	4230882.08	226.96	230.96
DISCCART	644234.49	4229882.08	259.75	259.75
DISCCART	644234.49	4228882.08	249.76	249.76
DISCCART	644234.49	4227882.08	261.02	268.85
DISCCART	644234.49	4226882.08	285.21	285.21
DISCCART	644234.49	4225882.08	299.12	299.12
DISCCART	644234.49	4224882.08	261.46	281.43

DISCCART	644234.49	4223882.08	260.35	260.35
DISCCART	644234.49	4222882.08	296.52	296.52
DISCCART	644234.49	4221882.08	280.73	287.06
DISCCART	644234.49	4220882.08	276.29	276.29
DISCCART	644234.49	4259882.08	201.49	235.33
DISCCART	644234.49	4259882.08	201.49	235.33
DISCCART	644234.49	4260882.08	205.83	234.97
DISCCART	644234.49	4261882.08	209.23	219.88
DISCCART	644234.49	4262882.08	198.64	200.90
DISCCART	644234.49	4263882.08	212.31	232.07
DISCCART	644234.49	4264882.08	192.43	220.71
DISCCART	644234.49	4265882.08	183.76	220.08
DISCCART	644234.49	4266882.08	216.99	232.09
DISCCART	644234.49	4267882.08	227.00	227.00
DISCCART	644234.49	4268882.08	242.62	242.62
DISCCART	644234.49	4269882.08	210.93	219.22
DISCCART	644234.49	4270882.08	201.35	214.05
DISCCART	644234.49	4271882.08	201.91	213.05
DISCCART	644234.49	4272882.08	202.84	202.84
DISCCART	644234.49	4273882.08	201.83	209.04
DISCCART	644234.49	4274882.08	193.30	193.30
DISCCART	644234.49	4275882.08	174.25	196.31
DISCCART	644234.49	4276882.08	158.49	158.49
DISCCART	644234.49	4277882.08	172.04	215.80
DISCCART	644234.49	4278882.08	222.60	222.60
DISCCART	644234.49	4279882.08	186.06	187.87
DISCCART	644234.49	4280882.08	194.57	194.57
DISCCART	644234.49	4281882.08	164.25	178.53
DISCCART	644234.49	4282882.08	182.76	200.77
DISCCART	644234.49	4283882.08	151.67	151.67
DISCCART	644234.49	4284882.08	151.50	151.50
DISCCART	644234.49	4285882.08	151.92	151.92
DISCCART	644234.49	4286882.08	151.64	151.64
DISCCART	644234.49	4287882.08	186.79	186.79
DISCCART	644234.49	4288882.08	179.55	267.09
DISCCART	644234.49	4289882.08	253.19	265.03
DISCCART	644234.49	4290882.08	261.87	267.16
DISCCART	644234.49	4291882.08	226.37	260.57
DISCCART	644234.49	4292882.08	207.79	266.90
DISCCART	644234.49	4293882.08	252.64	254.75
DISCCART	644234.49	4294882.08	252.96	259.99
DISCCART	644234.49	4295882.08	244.61	248.98
DISCCART	644234.49	4296882.08	227.34	242.02
DISCCART	644234.49	4297882.08	227.29	227.29
DISCCART	644234.49	4298882.08	237.28	244.33
DISCCART	644234.49	4299882.08	252.54	252.54
DISCCART	644234.49	4300882.08	255.63	256.65
DISCCART	644234.49	4301882.08	259.56	272.90
DISCCART	644234.49	4302882.08	271.00	273.33
DISCCART	644234.49	4303882.08	260.01	264.67
DISCCART	644234.49	4304882.08	256.75	256.75
DISCCART	644234.49	4305882.08	256.38	256.38
DISCCART	644234.49	4306882.08	248.63	248.63
DISCCART	644234.49	4307882.08	256.35	256.35
DISCCART	644234.49	4308882.08	248.31	248.31
DISCCART	644234.49	4309882.08	234.79	234.79
DISCCART	644234.49	4310882.08	233.36	233.36
DISCCART	644234.49	4311882.08	229.26	229.26
DISCCART	644234.49	4312882.08	217.26	217.26
DISCCART	644234.49	4313882.08	218.87	218.87
DISCCART	644234.49	4314882.08	223.54	223.54
DISCCART	644234.49	4315882.08	235.09	235.09
DISCCART	644234.49	4316882.08	235.18	235.18
DISCCART	644234.49	4317882.08	226.43	226.43
DISCCART	644234.49	4318882.08	231.71	231.71
DISCCART	644234.49	4319882.08	229.48	229.48

DISCCART	643234.49	4258882.08	228.33	232.40
DISCCART	643234.49	4257882.08	234.35	240.76
DISCCART	643234.49	4256882.08	204.18	238.66
DISCCART	643234.49	4255882.08	213.03	213.03
DISCCART	643234.49	4254882.08	220.66	248.64
DISCCART	643234.49	4253882.08	228.99	228.99
DISCCART	643234.49	4252882.08	255.74	255.74
DISCCART	643234.49	4251882.08	254.19	258.55
DISCCART	643234.49	4250882.08	265.34	265.34
DISCCART	643234.49	4249882.08	242.41	261.55
DISCCART	643234.49	4248882.08	237.31	255.23
DISCCART	643234.49	4247882.08	232.94	234.71
DISCCART	643234.49	4246882.08	208.29	247.87
DISCCART	643234.49	4245882.08	239.15	239.15
DISCCART	643234.49	4244882.08	225.53	225.53
DISCCART	643234.49	4243882.08	247.27	247.27
DISCCART	643234.49	4242882.08	254.30	254.30
DISCCART	643234.49	4241882.08	224.17	224.17
DISCCART	643234.49	4240882.08	231.25	253.44
DISCCART	643234.49	4239882.08	263.10	275.00
DISCCART	643234.49	4238882.08	245.36	246.63
DISCCART	643234.49	4237882.08	249.16	256.56
DISCCART	643234.49	4236882.08	210.72	238.02
DISCCART	643234.49	4235882.08	243.07	243.07
DISCCART	643234.49	4234882.08	238.20	238.20
DISCCART	643234.49	4233882.08	213.46	245.91
DISCCART	643234.49	4232882.08	224.98	285.96
DISCCART	643234.49	4231882.08	236.82	299.51
DISCCART	643234.49	4230882.08	240.51	294.12
DISCCART	643234.49	4229882.08	252.32	252.32
DISCCART	643234.49	4228882.08	259.26	281.43
DISCCART	643234.49	4227882.08	257.58	257.58
DISCCART	643234.49	4226882.08	283.40	294.25
DISCCART	643234.49	4225882.08	289.14	289.14
DISCCART	643234.49	4224882.08	291.18	292.44
DISCCART	643234.49	4223882.08	286.62	286.62
DISCCART	643234.49	4222882.08	289.78	289.78
DISCCART	643234.49	4221882.08	308.63	308.63
DISCCART	643234.49	4220882.08	305.35	305.35
DISCCART	643234.49	4259882.08	192.96	236.92
DISCCART	643234.49	4259882.08	192.96	236.92
DISCCART	643234.49	4260882.08	189.59	191.86
DISCCART	643234.49	4261882.08	217.40	217.40
DISCCART	643234.49	4262882.08	191.37	227.32
DISCCART	643234.49	4263882.08	210.99	222.70
DISCCART	643234.49	4264882.08	216.06	239.42
DISCCART	643234.49	4265882.08	237.86	245.68
DISCCART	643234.49	4266882.08	240.06	240.06
DISCCART	643234.49	4267882.08	247.54	247.54
DISCCART	643234.49	4268882.08	244.60	244.60
DISCCART	643234.49	4269882.08	232.92	232.92
DISCCART	643234.49	4270882.08	213.10	213.10
DISCCART	643234.49	4271882.08	190.82	201.10
DISCCART	643234.49	4272882.08	164.57	208.80
DISCCART	643234.49	4273882.08	163.31	163.31
DISCCART	643234.49	4274882.08	157.89	195.82
DISCCART	643234.49	4275882.08	162.82	162.82
DISCCART	643234.49	4276882.08	237.91	237.91
DISCCART	643234.49	4277882.08	173.38	203.71
DISCCART	643234.49	4278882.08	218.63	234.23
DISCCART	643234.49	4279882.08	177.13	177.78
DISCCART	643234.49	4280882.08	173.26	173.26
DISCCART	643234.49	4281882.08	176.34	184.86
DISCCART	643234.49	4282882.08	172.03	172.03
DISCCART	643234.49	4283882.08	152.87	200.51
DISCCART	643234.49	4284882.08	151.69	151.69

DISCCART	643234.49	4285882.08	152.08	152.08
DISCCART	643234.49	4286882.08	153.67	153.67
DISCCART	643234.49	4287882.08	156.95	213.67
DISCCART	643234.49	4288882.08	197.44	267.09
DISCCART	643234.49	4289882.08	201.61	269.39
DISCCART	643234.49	4290882.08	222.75	271.02
DISCCART	643234.49	4291882.08	162.94	272.82
DISCCART	643234.49	4292882.08	208.62	259.34
DISCCART	643234.49	4293882.08	248.50	266.77
DISCCART	643234.49	4294882.08	260.70	260.70
DISCCART	643234.49	4295882.08	247.53	249.54
DISCCART	643234.49	4296882.08	227.24	234.62
DISCCART	643234.49	4297882.08	209.10	214.93
DISCCART	643234.49	4298882.08	229.32	233.08
DISCCART	643234.49	4299882.08	236.30	249.77
DISCCART	643234.49	4300882.08	255.05	255.05
DISCCART	643234.49	4301882.08	247.50	251.00
DISCCART	643234.49	4302882.08	256.16	268.19
DISCCART	643234.49	4303882.08	272.68	272.68
DISCCART	643234.49	4304882.08	262.71	262.71
DISCCART	643234.49	4305882.08	255.15	255.15
DISCCART	643234.49	4306882.08	250.55	250.55
DISCCART	643234.49	4307882.08	257.35	257.35
DISCCART	643234.49	4308882.08	257.88	257.88
DISCCART	643234.49	4309882.08	254.18	254.18
DISCCART	643234.49	4310882.08	249.29	249.29
DISCCART	643234.49	4311882.08	238.83	238.83
DISCCART	643234.49	4312882.08	228.60	228.60
DISCCART	643234.49	4313882.08	217.74	223.67
DISCCART	643234.49	4314882.08	227.93	227.93
DISCCART	643234.49	4315882.08	236.34	236.34
DISCCART	643234.49	4316882.08	233.26	233.26
DISCCART	643234.49	4317882.08	234.72	234.72
DISCCART	643234.49	4318882.08	232.11	232.11
DISCCART	643234.49	4319882.08	231.61	231.61
DISCCART	642234.49	4258882.08	227.56	231.96
DISCCART	642234.49	4257882.08	201.66	235.03
DISCCART	642234.49	4256882.08	208.04	250.51
DISCCART	642234.49	4255882.08	227.67	253.32
DISCCART	642234.49	4254882.08	246.44	246.44
DISCCART	642234.49	4253882.08	260.93	260.93
DISCCART	642234.49	4252882.08	255.10	255.10
DISCCART	642234.49	4251882.08	267.65	267.65
DISCCART	642234.49	4250882.08	270.98	270.98
DISCCART	642234.49	4249882.08	274.79	274.79
DISCCART	642234.49	4248882.08	264.76	272.78
DISCCART	642234.49	4247882.08	239.90	255.87
DISCCART	642234.49	4246882.08	218.73	218.73
DISCCART	642234.49	4245882.08	228.86	247.06
DISCCART	642234.49	4244882.08	242.61	261.27
DISCCART	642234.49	4243882.08	273.10	273.10
DISCCART	642234.49	4242882.08	255.54	255.54
DISCCART	642234.49	4241882.08	247.15	247.15
DISCCART	642234.49	4240882.08	252.98	262.70
DISCCART	642234.49	4239882.08	268.31	268.31
DISCCART	642234.49	4238882.08	229.90	270.96
DISCCART	642234.49	4237882.08	219.39	219.39
DISCCART	642234.49	4236882.08	231.90	231.90
DISCCART	642234.49	4235882.08	219.78	251.31
DISCCART	642234.49	4234882.08	237.00	263.67
DISCCART	642234.49	4233882.08	244.34	244.34
DISCCART	642234.49	4232882.08	256.81	256.81
DISCCART	642234.49	4231882.08	262.81	262.81
DISCCART	642234.49	4230882.08	298.64	298.64
DISCCART	642234.49	4229882.08	245.04	245.04
DISCCART	642234.49	4228882.08	256.04	256.04

DISCCART	642234.49	4227882.08	245.14	251.70
DISCCART	642234.49	4226882.08	250.89	269.47
DISCCART	642234.49	4225882.08	273.73	280.41
DISCCART	642234.49	4224882.08	279.28	297.56
DISCCART	642234.49	4223882.08	300.57	305.69
DISCCART	642234.49	4222882.08	304.43	310.88
DISCCART	642234.49	4221882.08	304.29	304.29
DISCCART	642234.49	4220882.08	294.83	294.83
DISCCART	642234.49	4259882.08	217.49	232.31
DISCCART	642234.49	4259882.08	217.49	232.31
DISCCART	642234.49	4260882.08	210.46	231.80
DISCCART	642234.49	4261882.08	214.60	241.89
DISCCART	642234.49	4262882.08	238.08	238.08
DISCCART	642234.49	4263882.08	211.22	227.02
DISCCART	642234.49	4264882.08	215.74	251.77
DISCCART	642234.49	4265882.08	241.09	243.59
DISCCART	642234.49	4266882.08	252.62	252.62
DISCCART	642234.49	4267882.08	247.95	249.63
DISCCART	642234.49	4268882.08	219.92	225.68
DISCCART	642234.49	4269882.08	195.64	220.99
DISCCART	642234.49	4270882.08	218.34	218.34
DISCCART	642234.49	4271882.08	199.91	199.91
DISCCART	642234.49	4272882.08	190.23	190.23
DISCCART	642234.49	4273882.08	185.08	185.08
DISCCART	642234.49	4274882.08	159.75	202.86
DISCCART	642234.49	4275882.08	198.35	206.79
DISCCART	642234.49	4276882.08	213.48	213.48
DISCCART	642234.49	4277882.08	221.12	221.12
DISCCART	642234.49	4278882.08	216.53	216.53
DISCCART	642234.49	4279882.08	198.77	200.01
DISCCART	642234.49	4280882.08	201.57	206.63
DISCCART	642234.49	4281882.08	201.89	245.17
DISCCART	642234.49	4282882.08	179.98	196.24
DISCCART	642234.49	4283882.08	167.79	196.67
DISCCART	642234.49	4284882.08	154.19	154.19
DISCCART	642234.49	4285882.08	152.02	152.02
DISCCART	642234.49	4286882.08	153.09	153.09
DISCCART	642234.49	4287882.08	151.39	151.39
DISCCART	642234.49	4288882.08	153.94	204.04
DISCCART	642234.49	4289882.08	158.17	248.01
DISCCART	642234.49	4290882.08	159.39	248.79
DISCCART	642234.49	4291882.08	173.66	255.85
DISCCART	642234.49	4292882.08	232.99	269.43
DISCCART	642234.49	4293882.08	250.92	268.95
DISCCART	642234.49	4294882.08	256.14	263.68
DISCCART	642234.49	4295882.08	250.41	252.56
DISCCART	642234.49	4296882.08	209.35	244.20
DISCCART	642234.49	4297882.08	190.57	234.02
DISCCART	642234.49	4298882.08	190.68	249.34
DISCCART	642234.49	4299882.08	225.46	251.94
DISCCART	642234.49	4300882.08	256.04	256.04
DISCCART	642234.49	4301882.08	247.43	264.22
DISCCART	642234.49	4302882.08	262.05	267.33
DISCCART	642234.49	4303882.08	269.47	271.30
DISCCART	642234.49	4304882.08	269.39	269.39
DISCCART	642234.49	4305882.08	264.80	264.80
DISCCART	642234.49	4306882.08	265.87	265.87
DISCCART	642234.49	4307882.08	262.77	262.77
DISCCART	642234.49	4308882.08	253.28	253.28
DISCCART	642234.49	4309882.08	254.50	254.50
DISCCART	642234.49	4310882.08	243.09	243.09
DISCCART	642234.49	4311882.08	243.30	243.30
DISCCART	642234.49	4312882.08	226.92	226.92
DISCCART	642234.49	4313882.08	230.23	230.23
DISCCART	642234.49	4314882.08	234.84	234.84
DISCCART	642234.49	4315882.08	238.45	238.45

DISCCART	642234.49	4316882.08	235.88	235.88
DISCCART	642234.49	4317882.08	234.41	234.41
DISCCART	642234.49	4318882.08	230.00	230.00
DISCCART	642234.49	4319882.08	234.65	234.65
DISCCART	641234.49	4258882.08	197.37	262.17
DISCCART	641234.49	4257882.08	212.44	231.66
DISCCART	641234.49	4256882.08	216.21	216.21
DISCCART	641234.49	4255882.08	243.51	244.89
DISCCART	641234.49	4254882.08	253.38	253.38
DISCCART	641234.49	4253882.08	261.40	261.40
DISCCART	641234.49	4252882.08	253.33	263.90
DISCCART	641234.49	4251882.08	257.82	265.58
DISCCART	641234.49	4250882.08	251.03	251.03
DISCCART	641234.49	4249882.08	272.53	272.53
DISCCART	641234.49	4248882.08	268.10	268.10
DISCCART	641234.49	4247882.08	221.09	255.78
DISCCART	641234.49	4246882.08	214.11	214.11
DISCCART	641234.49	4245882.08	228.61	228.61
DISCCART	641234.49	4244882.08	247.86	272.71
DISCCART	641234.49	4243882.08	271.20	273.52
DISCCART	641234.49	4242882.08	265.56	265.56
DISCCART	641234.49	4241882.08	250.99	253.56
DISCCART	641234.49	4240882.08	248.34	251.46
DISCCART	641234.49	4239882.08	228.31	228.31
DISCCART	641234.49	4238882.08	213.31	213.31
DISCCART	641234.49	4237882.08	230.10	230.10
DISCCART	641234.49	4236882.08	212.94	278.01
DISCCART	641234.49	4235882.08	238.56	240.22
DISCCART	641234.49	4234882.08	244.22	280.99
DISCCART	641234.49	4233882.08	269.61	269.61
DISCCART	641234.49	4232882.08	256.13	256.13
DISCCART	641234.49	4231882.08	282.47	285.63
DISCCART	641234.49	4230882.08	286.70	286.70
DISCCART	641234.49	4229882.08	270.79	273.18
DISCCART	641234.49	4228882.08	286.16	286.16
DISCCART	641234.49	4227882.08	293.96	293.96
DISCCART	641234.49	4226882.08	254.76	272.80
DISCCART	641234.49	4225882.08	288.07	288.07
DISCCART	641234.49	4224882.08	301.22	301.22
DISCCART	641234.49	4223882.08	311.08	311.08
DISCCART	641234.49	4222882.08	311.49	311.49
DISCCART	641234.49	4221882.08	305.05	305.05
DISCCART	641234.49	4220882.08	276.93	276.93
DISCCART	641234.49	4259882.08	211.86	262.17
DISCCART	641234.49	4259882.08	211.86	262.17
DISCCART	641234.49	4260882.08	224.77	262.08
DISCCART	641234.49	4261882.08	219.40	247.96
DISCCART	641234.49	4262882.08	198.00	219.22
DISCCART	641234.49	4263882.08	222.11	227.11
DISCCART	641234.49	4264882.08	221.19	239.08
DISCCART	641234.49	4265882.08	249.74	249.74
DISCCART	641234.49	4266882.08	250.40	250.40
DISCCART	641234.49	4267882.08	212.80	232.60
DISCCART	641234.49	4268882.08	198.67	214.51
DISCCART	641234.49	4269882.08	188.01	208.45
DISCCART	641234.49	4270882.08	197.23	215.41
DISCCART	641234.49	4271882.08	211.95	211.95
DISCCART	641234.49	4272882.08	227.87	227.87
DISCCART	641234.49	4273882.08	168.98	220.33
DISCCART	641234.49	4274882.08	211.21	211.21
DISCCART	641234.49	4275882.08	202.57	202.57
DISCCART	641234.49	4276882.08	220.76	234.85
DISCCART	641234.49	4277882.08	201.11	233.32
DISCCART	641234.49	4278882.08	180.37	180.37
DISCCART	641234.49	4279882.08	190.11	190.11
DISCCART	641234.49	4280882.08	177.86	177.86

DISCCART	641234.49	4281882.08	172.05	172.05
DISCCART	641234.49	4282882.08	158.14	158.14
DISCCART	641234.49	4283882.08	166.73	229.25
DISCCART	641234.49	4284882.08	152.08	235.34
DISCCART	641234.49	4285882.08	153.48	153.48
DISCCART	641234.49	4286882.08	151.95	151.95
DISCCART	641234.49	4287882.08	153.80	153.80
DISCCART	641234.49	4288882.08	162.33	176.08
DISCCART	641234.49	4289882.08	176.60	192.04
DISCCART	641234.49	4290882.08	171.05	232.99
DISCCART	641234.49	4291882.08	206.74	274.32
DISCCART	641234.49	4292882.08	200.57	271.43
DISCCART	641234.49	4293882.08	224.42	272.09
DISCCART	641234.49	4294882.08	248.46	253.11
DISCCART	641234.49	4295882.08	225.08	241.18
DISCCART	641234.49	4296882.08	198.33	247.75
DISCCART	641234.49	4297882.08	181.25	244.94
DISCCART	641234.49	4298882.08	218.04	239.06
DISCCART	641234.49	4299882.08	218.27	237.92
DISCCART	641234.49	4300882.08	245.21	245.21
DISCCART	641234.49	4301882.08	229.18	257.73
DISCCART	641234.49	4302882.08	250.51	254.82
DISCCART	641234.49	4303882.08	273.80	273.80
DISCCART	641234.49	4304882.08	266.59	266.59
DISCCART	641234.49	4305882.08	264.06	264.06
DISCCART	641234.49	4306882.08	250.04	250.04
DISCCART	641234.49	4307882.08	257.94	257.94
DISCCART	641234.49	4308882.08	250.21	250.21
DISCCART	641234.49	4309882.08	255.74	255.74
DISCCART	641234.49	4310882.08	243.81	243.81
DISCCART	641234.49	4311882.08	230.91	230.91
DISCCART	641234.49	4312882.08	228.27	228.27
DISCCART	641234.49	4313882.08	237.00	237.00
DISCCART	641234.49	4314882.08	240.88	240.88
DISCCART	641234.49	4315882.08	238.40	238.40
DISCCART	641234.49	4316882.08	234.48	234.48
DISCCART	641234.49	4317882.08	232.48	232.48
DISCCART	641234.49	4318882.08	234.95	234.95
DISCCART	641234.49	4319882.08	232.09	232.09
DISCCART	640234.49	4258882.08	243.18	249.36
DISCCART	640234.49	4257882.08	235.50	239.13
DISCCART	640234.49	4256882.08	242.52	247.31
DISCCART	640234.49	4255882.08	244.77	244.77
DISCCART	640234.49	4254882.08	222.52	226.32
DISCCART	640234.49	4253882.08	220.47	248.01
DISCCART	640234.49	4252882.08	248.67	254.02
DISCCART	640234.49	4251882.08	235.75	265.19
DISCCART	640234.49	4250882.08	268.94	274.48
DISCCART	640234.49	4249882.08	271.21	271.21
DISCCART	640234.49	4248882.08	255.31	264.27
DISCCART	640234.49	4247882.08	246.22	275.22
DISCCART	640234.49	4246882.08	218.00	257.31
DISCCART	640234.49	4245882.08	230.12	265.10
DISCCART	640234.49	4244882.08	239.26	252.81
DISCCART	640234.49	4243882.08	248.19	261.60
DISCCART	640234.49	4242882.08	262.05	262.05
DISCCART	640234.49	4241882.08	233.34	238.98
DISCCART	640234.49	4240882.08	224.94	224.94
DISCCART	640234.49	4239882.08	214.14	214.14
DISCCART	640234.49	4238882.08	238.99	238.99
DISCCART	640234.49	4237882.08	252.65	263.51
DISCCART	640234.49	4236882.08	257.80	280.44
DISCCART	640234.49	4235882.08	241.29	254.27
DISCCART	640234.49	4234882.08	250.50	250.50
DISCCART	640234.49	4233882.08	261.99	289.08
DISCCART	640234.49	4232882.08	294.02	294.02

DISCCART	640234.49	4231882.08	285.14	285.14
DISCCART	640234.49	4230882.08	271.54	271.54
DISCCART	640234.49	4229882.08	262.81	262.81
DISCCART	640234.49	4228882.08	275.22	287.02
DISCCART	640234.49	4227882.08	269.49	274.72
DISCCART	640234.49	4226882.08	289.04	289.04
DISCCART	640234.49	4225882.08	272.80	292.31
DISCCART	640234.49	4224882.08	298.78	298.78
DISCCART	640234.49	4223882.08	304.40	304.40
DISCCART	640234.49	4222882.08	310.06	310.06
DISCCART	640234.49	4221882.08	304.49	304.49
DISCCART	640234.49	4220882.08	268.99	268.99
DISCCART	640234.49	4259882.08	225.66	260.54
DISCCART	640234.49	4259882.08	225.66	260.54
DISCCART	640234.49	4260882.08	226.80	226.80
DISCCART	640234.49	4261882.08	210.73	235.34
DISCCART	640234.49	4262882.08	200.65	200.65
DISCCART	640234.49	4263882.08	233.02	239.38
DISCCART	640234.49	4264882.08	223.34	251.34
DISCCART	640234.49	4265882.08	261.71	261.71
DISCCART	640234.49	4266882.08	250.25	252.50
DISCCART	640234.49	4267882.08	200.89	257.59
DISCCART	640234.49	4268882.08	192.16	196.98
DISCCART	640234.49	4269882.08	194.95	226.68
DISCCART	640234.49	4270882.08	228.61	245.21
DISCCART	640234.49	4271882.08	220.53	226.98
DISCCART	640234.49	4272882.08	205.92	205.92
DISCCART	640234.49	4273882.08	196.59	202.66
DISCCART	640234.49	4274882.08	198.21	198.21
DISCCART	640234.49	4275882.08	222.80	222.80
DISCCART	640234.49	4276882.08	232.78	232.78
DISCCART	640234.49	4277882.08	195.29	239.80
DISCCART	640234.49	4278882.08	198.74	201.27
DISCCART	640234.49	4279882.08	164.59	164.59
DISCCART	640234.49	4280882.08	158.79	158.79
DISCCART	640234.49	4281882.08	177.68	177.68
DISCCART	640234.49	4282882.08	162.56	162.56
DISCCART	640234.49	4283882.08	195.09	251.43
DISCCART	640234.49	4284882.08	168.91	251.43
DISCCART	640234.49	4285882.08	152.43	152.43
DISCCART	640234.49	4286882.08	152.30	152.30
DISCCART	640234.49	4287882.08	153.34	153.34
DISCCART	640234.49	4288882.08	182.80	182.80
DISCCART	640234.49	4289882.08	170.40	182.67
DISCCART	640234.49	4290882.08	202.20	280.39
DISCCART	640234.49	4291882.08	259.94	272.47
DISCCART	640234.49	4292882.08	223.45	277.17
DISCCART	640234.49	4293882.08	272.57	272.57
DISCCART	640234.49	4294882.08	214.38	260.19
DISCCART	640234.49	4295882.08	215.09	254.07
DISCCART	640234.49	4296882.08	212.12	244.97
DISCCART	640234.49	4297882.08	199.15	222.32
DISCCART	640234.49	4298882.08	188.90	215.88
DISCCART	640234.49	4299882.08	196.11	250.01
DISCCART	640234.49	4300882.08	236.50	249.91
DISCCART	640234.49	4301882.08	229.18	258.26
DISCCART	640234.49	4302882.08	237.75	261.27
DISCCART	640234.49	4303882.08	262.86	269.01
DISCCART	640234.49	4304882.08	271.74	271.74
DISCCART	640234.49	4305882.08	268.03	268.03
DISCCART	640234.49	4306882.08	265.11	265.11
DISCCART	640234.49	4307882.08	257.36	257.36
DISCCART	640234.49	4308882.08	247.38	247.38
DISCCART	640234.49	4309882.08	237.78	237.78
DISCCART	640234.49	4310882.08	241.48	241.48
DISCCART	640234.49	4311882.08	234.27	234.27

DISCCART	640234.49	4312882.08	246.59	246.59
DISCCART	640234.49	4313882.08	246.12	246.12
DISCCART	640234.49	4314882.08	241.29	241.29
DISCCART	640234.49	4315882.08	238.05	238.05
DISCCART	640234.49	4316882.08	236.07	236.07
DISCCART	640234.49	4317882.08	235.29	235.29
DISCCART	640234.49	4318882.08	233.72	233.72
DISCCART	640234.49	4319882.08	231.38	231.38
DISCCART	639234.49	4258882.08	236.34	250.70
DISCCART	639234.49	4257882.08	262.86	262.86
DISCCART	639234.49	4256882.08	229.41	229.41
DISCCART	639234.49	4255882.08	238.15	238.15
DISCCART	639234.49	4254882.08	242.11	242.11
DISCCART	639234.49	4253882.08	247.46	263.73
DISCCART	639234.49	4252882.08	258.82	262.75
DISCCART	639234.49	4251882.08	269.50	269.50
DISCCART	639234.49	4250882.08	248.09	268.16
DISCCART	639234.49	4249882.08	278.12	278.12
DISCCART	639234.49	4248882.08	266.55	266.55
DISCCART	639234.49	4247882.08	237.99	237.99
DISCCART	639234.49	4246882.08	235.82	262.92
DISCCART	639234.49	4245882.08	231.61	248.94
DISCCART	639234.49	4244882.08	221.55	221.55
DISCCART	639234.49	4243882.08	252.28	252.28
DISCCART	639234.49	4242882.08	254.94	254.94
DISCCART	639234.49	4241882.08	251.65	269.01
DISCCART	639234.49	4240882.08	244.19	247.45
DISCCART	639234.49	4239882.08	226.35	226.35
DISCCART	639234.49	4238882.08	217.87	217.87
DISCCART	639234.49	4237882.08	241.57	248.20
DISCCART	639234.49	4236882.08	215.45	280.55
DISCCART	639234.49	4235882.08	253.73	272.07
DISCCART	639234.49	4234882.08	253.73	259.85
DISCCART	639234.49	4233882.08	272.11	291.30
DISCCART	639234.49	4232882.08	292.23	293.26
DISCCART	639234.49	4231882.08	233.86	269.53
DISCCART	639234.49	4230882.08	249.86	249.86
DISCCART	639234.49	4229882.08	269.35	269.35
DISCCART	639234.49	4228882.08	240.89	252.79
DISCCART	639234.49	4227882.08	253.19	262.52
DISCCART	639234.49	4226882.08	242.92	262.75
DISCCART	639234.49	4225882.08	282.07	282.07
DISCCART	639234.49	4224882.08	300.81	300.81
DISCCART	639234.49	4223882.08	299.55	299.55
DISCCART	639234.49	4222882.08	299.66	299.66
DISCCART	639234.49	4221882.08	275.13	293.07
DISCCART	639234.49	4220882.08	269.63	269.63
DISCCART	639234.49	4259882.08	253.32	255.36
DISCCART	639234.49	4259882.08	253.32	255.36
DISCCART	639234.49	4260882.08	250.42	262.39
DISCCART	639234.49	4261882.08	252.28	252.28
DISCCART	639234.49	4262882.08	208.68	231.28
DISCCART	639234.49	4263882.08	212.39	238.25
DISCCART	639234.49	4264882.08	229.79	245.14
DISCCART	639234.49	4265882.08	249.41	249.41
DISCCART	639234.49	4266882.08	243.90	258.09
DISCCART	639234.49	4267882.08	221.63	262.33
DISCCART	639234.49	4268882.08	213.87	244.87
DISCCART	639234.49	4269882.08	197.84	226.71
DISCCART	639234.49	4270882.08	248.61	249.81
DISCCART	639234.49	4271882.08	217.81	225.73
DISCCART	639234.49	4272882.08	184.83	214.25
DISCCART	639234.49	4273882.08	219.27	231.51
DISCCART	639234.49	4274882.08	221.46	233.47
DISCCART	639234.49	4275882.08	233.07	233.07
DISCCART	639234.49	4276882.08	221.69	233.72

DISCCART	639234.49	4277882.08	190.62	225.90
DISCCART	639234.49	4278882.08	167.36	209.13
DISCCART	639234.49	4279882.08	189.38	239.47
DISCCART	639234.49	4280882.08	163.99	163.99
DISCCART	639234.49	4281882.08	196.72	276.22
DISCCART	639234.49	4282882.08	212.09	276.76
DISCCART	639234.49	4283882.08	180.34	279.19
DISCCART	639234.49	4284882.08	190.01	256.39
DISCCART	639234.49	4285882.08	152.32	152.32
DISCCART	639234.49	4286882.08	153.79	153.79
DISCCART	639234.49	4287882.08	153.32	153.32
DISCCART	639234.49	4288882.08	166.20	177.99
DISCCART	639234.49	4289882.08	205.09	250.61
DISCCART	639234.49	4290882.08	245.19	275.41
DISCCART	639234.49	4291882.08	254.30	277.14
DISCCART	639234.49	4292882.08	268.72	272.95
DISCCART	639234.49	4293882.08	236.20	276.92
DISCCART	639234.49	4294882.08	215.90	251.66
DISCCART	639234.49	4295882.08	239.09	249.85
DISCCART	639234.49	4296882.08	228.64	240.06
DISCCART	639234.49	4297882.08	179.00	239.38
DISCCART	639234.49	4298882.08	183.95	228.07
DISCCART	639234.49	4299882.08	240.40	251.42
DISCCART	639234.49	4300882.08	240.68	255.40
DISCCART	639234.49	4301882.08	248.17	252.90
DISCCART	639234.49	4302882.08	228.62	258.89
DISCCART	639234.49	4303882.08	248.55	263.19
DISCCART	639234.49	4304882.08	273.91	273.91
DISCCART	639234.49	4305882.08	265.58	265.58
DISCCART	639234.49	4306882.08	260.97	260.97
DISCCART	639234.49	4307882.08	259.93	259.93
DISCCART	639234.49	4308882.08	249.81	249.81
DISCCART	639234.49	4309882.08	250.21	250.21
DISCCART	639234.49	4310882.08	248.16	248.16
DISCCART	639234.49	4311882.08	254.59	254.59
DISCCART	639234.49	4312882.08	243.25	243.25
DISCCART	639234.49	4313882.08	248.51	248.51
DISCCART	639234.49	4314882.08	243.17	243.17
DISCCART	639234.49	4315882.08	238.70	238.70
DISCCART	639234.49	4316882.08	237.81	237.81
DISCCART	639234.49	4317882.08	237.88	237.88
DISCCART	639234.49	4318882.08	234.53	234.53
DISCCART	639234.49	4319882.08	232.59	232.59
DISCCART	638234.49	4258882.08	235.94	265.57
DISCCART	638234.49	4257882.08	263.99	263.99
DISCCART	638234.49	4256882.08	238.81	238.81
DISCCART	638234.49	4255882.08	252.93	256.45
DISCCART	638234.49	4254882.08	271.01	271.01
DISCCART	638234.49	4253882.08	262.00	269.65
DISCCART	638234.49	4252882.08	233.07	257.25
DISCCART	638234.49	4251882.08	252.19	252.19
DISCCART	638234.49	4250882.08	276.98	276.98
DISCCART	638234.49	4249882.08	264.35	264.88
DISCCART	638234.49	4248882.08	264.50	264.50
DISCCART	638234.49	4247882.08	227.61	227.61
DISCCART	638234.49	4246882.08	264.84	269.95
DISCCART	638234.49	4245882.08	265.63	265.63
DISCCART	638234.49	4244882.08	261.13	261.13
DISCCART	638234.49	4243882.08	228.39	237.41
DISCCART	638234.49	4242882.08	243.34	269.24
DISCCART	638234.49	4241882.08	264.46	275.47
DISCCART	638234.49	4240882.08	239.45	239.45
DISCCART	638234.49	4239882.08	239.41	247.38
DISCCART	638234.49	4238882.08	230.41	232.38
DISCCART	638234.49	4237882.08	223.17	233.46
DISCCART	638234.49	4236882.08	231.10	231.10

DISCCART	638234.49	4235882.08	231.13	239.35
DISCCART	638234.49	4234882.08	226.60	226.60
DISCCART	638234.49	4233882.08	256.86	293.29
DISCCART	638234.49	4232882.08	248.98	248.98
DISCCART	638234.49	4231882.08	234.58	237.76
DISCCART	638234.49	4230882.08	247.67	247.67
DISCCART	638234.49	4229882.08	228.05	263.54
DISCCART	638234.49	4228882.08	238.03	238.03
DISCCART	638234.49	4227882.08	231.21	231.21
DISCCART	638234.49	4226882.08	250.50	250.50
DISCCART	638234.49	4225882.08	268.39	268.39
DISCCART	638234.49	4224882.08	266.84	266.84
DISCCART	638234.49	4223882.08	287.89	292.54
DISCCART	638234.49	4222882.08	275.77	283.65
DISCCART	638234.49	4221882.08	260.31	260.31
DISCCART	638234.49	4220882.08	282.17	282.17
DISCCART	638234.49	4259882.08	260.80	260.80
DISCCART	638234.49	4259882.08	260.80	260.80
DISCCART	638234.49	4260882.08	238.69	242.45
DISCCART	638234.49	4261882.08	247.44	247.44
DISCCART	638234.49	4262882.08	221.83	239.38
DISCCART	638234.49	4263882.08	237.43	244.91
DISCCART	638234.49	4264882.08	238.40	253.00
DISCCART	638234.49	4265882.08	261.66	261.66
DISCCART	638234.49	4266882.08	259.87	264.79
DISCCART	638234.49	4267882.08	243.76	256.68
DISCCART	638234.49	4268882.08	236.99	259.95
DISCCART	638234.49	4269882.08	201.39	227.39
DISCCART	638234.49	4270882.08	234.37	237.48
DISCCART	638234.49	4271882.08	196.89	214.52
DISCCART	638234.49	4272882.08	217.66	219.13
DISCCART	638234.49	4273882.08	244.38	244.38
DISCCART	638234.49	4274882.08	232.25	274.67
DISCCART	638234.49	4275882.08	216.56	251.09
DISCCART	638234.49	4276882.08	218.18	232.80
DISCCART	638234.49	4277882.08	200.85	200.85
DISCCART	638234.49	4278882.08	194.84	201.09
DISCCART	638234.49	4279882.08	198.46	280.98
DISCCART	638234.49	4280882.08	189.45	280.98
DISCCART	638234.49	4281882.08	181.23	276.76
DISCCART	638234.49	4282882.08	244.84	281.83
DISCCART	638234.49	4283882.08	249.52	288.06
DISCCART	638234.49	4284882.08	188.40	280.07
DISCCART	638234.49	4285882.08	152.49	209.71
DISCCART	638234.49	4286882.08	153.86	153.86
DISCCART	638234.49	4287882.08	153.95	153.95
DISCCART	638234.49	4288882.08	155.59	175.32
DISCCART	638234.49	4289882.08	173.42	269.51
DISCCART	638234.49	4290882.08	192.39	275.10
DISCCART	638234.49	4291882.08	238.15	277.43
DISCCART	638234.49	4292882.08	234.49	280.60
DISCCART	638234.49	4293882.08	249.58	257.60
DISCCART	638234.49	4294882.08	192.75	247.64
DISCCART	638234.49	4295882.08	198.23	242.25
DISCCART	638234.49	4296882.08	165.69	165.69
DISCCART	638234.49	4297882.08	181.65	231.97
DISCCART	638234.49	4298882.08	219.95	220.52
DISCCART	638234.49	4299882.08	227.23	236.59
DISCCART	638234.49	4300882.08	256.21	256.21
DISCCART	638234.49	4301882.08	258.97	258.97
DISCCART	638234.49	4302882.08	253.77	259.34
DISCCART	638234.49	4303882.08	260.84	260.84
DISCCART	638234.49	4304882.08	271.92	271.92
DISCCART	638234.49	4305882.08	270.56	270.56
DISCCART	638234.49	4306882.08	268.85	268.85
DISCCART	638234.49	4307882.08	261.72	261.72

DISCCART	638234.49	4308882.08	261.90	261.90
DISCCART	638234.49	4309882.08	260.91	260.91
DISCCART	638234.49	4310882.08	259.21	259.21
DISCCART	638234.49	4311882.08	256.85	256.85
DISCCART	638234.49	4312882.08	253.48	253.48
DISCCART	638234.49	4313882.08	248.31	248.31
DISCCART	638234.49	4314882.08	241.86	241.86
DISCCART	638234.49	4315882.08	238.68	238.68
DISCCART	638234.49	4316882.08	237.11	237.11
DISCCART	638234.49	4317882.08	238.10	238.10
DISCCART	638234.49	4318882.08	233.32	233.32
DISCCART	638234.49	4319882.08	226.24	226.24
DISCCART	679234.49	4257882.08	155.08	190.06
DISCCART	679234.49	4256882.08	152.38	152.38
DISCCART	679234.49	4255882.08	163.26	202.73
DISCCART	679234.49	4254882.08	185.11	185.11
DISCCART	679234.49	4253882.08	166.76	166.76
DISCCART	679234.49	4252882.08	161.34	178.67
DISCCART	679234.49	4251882.08	180.85	185.48
DISCCART	679234.49	4250882.08	201.13	208.72
DISCCART	679234.49	4249882.08	219.41	219.41
DISCCART	679234.49	4248882.08	199.75	220.53
DISCCART	679234.49	4247882.08	194.93	203.35
DISCCART	679234.49	4246882.08	177.59	177.59
DISCCART	679234.49	4245882.08	183.16	183.16
DISCCART	679234.49	4244882.08	189.18	207.19
DISCCART	679234.49	4243882.08	201.35	208.78
DISCCART	679234.49	4242882.08	203.12	213.76
DISCCART	679234.49	4241882.08	158.42	233.57
DISCCART	679234.49	4240882.08	165.04	219.98
DISCCART	679234.49	4239882.08	158.46	219.43
DISCCART	679234.49	4238882.08	211.85	226.74
DISCCART	679234.49	4237882.08	185.15	226.86
DISCCART	679234.49	4236882.08	212.44	226.74
DISCCART	679234.49	4235882.08	174.41	214.33
DISCCART	679234.49	4234882.08	168.20	213.87
DISCCART	679234.49	4233882.08	168.42	239.58
DISCCART	679234.49	4232882.08	207.74	228.59
DISCCART	679234.49	4231882.08	212.76	246.08
DISCCART	679234.49	4230882.08	218.15	244.95
DISCCART	679234.49	4229882.08	243.54	257.73
DISCCART	679234.49	4228882.08	256.04	280.83
DISCCART	679234.49	4227882.08	260.67	275.02
DISCCART	679234.49	4226882.08	208.35	269.56
DISCCART	679234.49	4225882.08	203.28	276.48
DISCCART	679234.49	4224882.08	231.14	263.57
DISCCART	679234.49	4223882.08	273.12	282.31
DISCCART	679234.49	4222882.08	264.09	288.38
DISCCART	679234.49	4221882.08	268.25	269.17
DISCCART	679234.49	4220882.08	211.58	280.82
DISCCART	679234.49	4280882.08	256.37	256.37
DISCCART	679234.49	4281882.08	246.39	251.47
DISCCART	679234.49	4282882.08	255.50	255.50
DISCCART	679234.49	4283882.08	250.57	250.57
DISCCART	679234.49	4284882.08	237.65	237.65
DISCCART	679234.49	4285882.08	242.40	242.40
DISCCART	679234.49	4286882.08	237.17	237.17
DISCCART	679234.49	4287882.08	229.01	229.01
DISCCART	679234.49	4288882.08	220.81	220.81
DISCCART	679234.49	4289882.08	239.08	239.08
DISCCART	679234.49	4290882.08	229.36	229.36
DISCCART	679234.49	4291882.08	233.56	233.56
DISCCART	679234.49	4292882.08	226.82	226.82
DISCCART	679234.49	4293882.08	197.64	197.64
DISCCART	679234.49	4294882.08	206.46	206.46
DISCCART	679234.49	4295882.08	208.85	208.85

DISCCART	679234.49	4296882.08	183.10	183.10
DISCCART	679234.49	4297882.08	211.59	211.59
DISCCART	679234.49	4298882.08	196.39	200.96
DISCCART	679234.49	4299882.08	199.10	201.67
DISCCART	679234.49	4300882.08	173.46	189.76
DISCCART	679234.49	4301882.08	183.91	183.91
DISCCART	679234.49	4302882.08	189.49	189.49
DISCCART	679234.49	4303882.08	171.15	171.34
DISCCART	679234.49	4304882.08	142.60	170.76
DISCCART	679234.49	4305882.08	140.46	140.46
DISCCART	679234.49	4306882.08	150.11	150.11
DISCCART	679234.49	4307882.08	158.38	158.38
DISCCART	679234.49	4308882.08	177.62	177.62
DISCCART	679234.49	4309882.08	169.24	169.24
DISCCART	679234.49	4310882.08	145.99	145.99
DISCCART	679234.49	4311882.08	162.17	162.17
DISCCART	679234.49	4312882.08	146.28	146.28
DISCCART	679234.49	4313882.08	152.99	152.99
DISCCART	679234.49	4314882.08	142.50	159.01
DISCCART	679234.49	4315882.08	139.18	140.94
DISCCART	679234.49	4316882.08	141.27	141.27
DISCCART	679234.49	4317882.08	142.74	164.50
DISCCART	679234.49	4318882.08	143.09	143.09
DISCCART	679234.49	4319882.08	145.50	202.57
DISCCART	680234.49	4257882.08	179.88	214.98
DISCCART	680234.49	4256882.08	183.08	202.90
DISCCART	680234.49	4255882.08	189.12	189.12
DISCCART	680234.49	4254882.08	191.14	200.33
DISCCART	680234.49	4253882.08	170.03	202.87
DISCCART	680234.49	4252882.08	164.13	195.81
DISCCART	680234.49	4251882.08	197.23	197.23
DISCCART	680234.49	4250882.08	201.46	201.46
DISCCART	680234.49	4249882.08	214.63	214.63
DISCCART	680234.49	4248882.08	203.09	205.04
DISCCART	680234.49	4247882.08	189.55	189.55
DISCCART	680234.49	4246882.08	183.71	196.16
DISCCART	680234.49	4245882.08	152.66	195.04
DISCCART	680234.49	4244882.08	174.10	197.02
DISCCART	680234.49	4243882.08	196.41	203.23
DISCCART	680234.49	4242882.08	169.31	214.60
DISCCART	680234.49	4241882.08	223.24	225.24
DISCCART	680234.49	4240882.08	195.02	227.42
DISCCART	680234.49	4239882.08	177.42	220.95
DISCCART	680234.49	4238882.08	158.46	215.39
DISCCART	680234.49	4237882.08	160.49	221.22
DISCCART	680234.49	4236882.08	166.08	232.17
DISCCART	680234.49	4235882.08	164.28	234.02
DISCCART	680234.49	4234882.08	201.02	231.91
DISCCART	680234.49	4233882.08	164.98	238.93
DISCCART	680234.49	4232882.08	188.73	246.01
DISCCART	680234.49	4231882.08	232.16	250.12
DISCCART	680234.49	4230882.08	239.53	258.23
DISCCART	680234.49	4229882.08	227.39	251.98
DISCCART	680234.49	4228882.08	241.73	253.94
DISCCART	680234.49	4227882.08	281.16	281.16
DISCCART	680234.49	4226882.08	213.57	281.78
DISCCART	680234.49	4225882.08	276.17	276.17
DISCCART	680234.49	4224882.08	212.66	282.24
DISCCART	680234.49	4223882.08	268.93	270.88
DISCCART	680234.49	4222882.08	255.29	293.01
DISCCART	680234.49	4221882.08	277.02	299.28
DISCCART	680234.49	4220882.08	240.23	288.11
DISCCART	680234.49	4280882.08	228.47	245.39
DISCCART	680234.49	4281882.08	207.76	252.15
DISCCART	680234.49	4282882.08	256.02	256.02
DISCCART	680234.49	4283882.08	244.50	244.50

DISCCART	680234.49	4284882.08	237.67	237.67
DISCCART	680234.49	4285882.08	240.23	240.23
DISCCART	680234.49	4286882.08	237.97	237.97
DISCCART	680234.49	4287882.08	215.94	215.94
DISCCART	680234.49	4288882.08	216.58	222.91
DISCCART	680234.49	4289882.08	235.37	235.37
DISCCART	680234.49	4290882.08	237.77	237.77
DISCCART	680234.49	4291882.08	217.56	217.56
DISCCART	680234.49	4292882.08	219.15	219.15
DISCCART	680234.49	4293882.08	220.62	220.62
DISCCART	680234.49	4294882.08	184.04	213.20
DISCCART	680234.49	4295882.08	190.17	209.43
DISCCART	680234.49	4296882.08	189.91	189.91
DISCCART	680234.49	4297882.08	203.63	203.63
DISCCART	680234.49	4298882.08	202.29	202.29
DISCCART	680234.49	4299882.08	186.24	195.91
DISCCART	680234.49	4300882.08	190.87	190.87
DISCCART	680234.49	4301882.08	164.11	178.35
DISCCART	680234.49	4302882.08	170.48	170.48
DISCCART	680234.49	4303882.08	165.32	178.28
DISCCART	680234.49	4304882.08	164.97	164.97
DISCCART	680234.49	4305882.08	145.33	160.01
DISCCART	680234.49	4306882.08	141.98	165.76
DISCCART	680234.49	4307882.08	176.12	176.12
DISCCART	680234.49	4308882.08	177.34	177.34
DISCCART	680234.49	4309882.08	165.08	165.08
DISCCART	680234.49	4310882.08	145.23	145.23
DISCCART	680234.49	4311882.08	156.78	156.78
DISCCART	680234.49	4312882.08	158.43	158.43
DISCCART	680234.49	4313882.08	151.55	158.47
DISCCART	680234.49	4314882.08	140.06	140.06
DISCCART	680234.49	4315882.08	145.06	166.28
DISCCART	680234.49	4316882.08	165.42	172.11
DISCCART	680234.49	4317882.08	172.76	172.76
DISCCART	680234.49	4318882.08	154.66	174.23
DISCCART	680234.49	4319882.08	189.79	189.79
DISCCART	681234.49	4257882.08	162.55	195.35
DISCCART	681234.49	4256882.08	146.21	177.07
DISCCART	681234.49	4255882.08	151.59	161.21
DISCCART	681234.49	4254882.08	152.03	202.49
DISCCART	681234.49	4253882.08	193.72	193.72
DISCCART	681234.49	4252882.08	208.69	208.69
DISCCART	681234.49	4251882.08	175.07	202.71
DISCCART	681234.49	4250882.08	208.97	208.97
DISCCART	681234.49	4249882.08	212.03	212.96
DISCCART	681234.49	4248882.08	202.22	202.58
DISCCART	681234.49	4247882.08	207.46	207.46
DISCCART	681234.49	4246882.08	166.49	196.35
DISCCART	681234.49	4245882.08	151.59	208.28
DISCCART	681234.49	4244882.08	156.49	156.49
DISCCART	681234.49	4243882.08	179.91	190.32
DISCCART	681234.49	4242882.08	154.69	208.87
DISCCART	681234.49	4241882.08	205.01	220.20
DISCCART	681234.49	4240882.08	217.32	226.41
DISCCART	681234.49	4239882.08	192.09	204.05
DISCCART	681234.49	4238882.08	161.84	219.89
DISCCART	681234.49	4237882.08	190.26	233.14
DISCCART	681234.49	4236882.08	220.89	220.89
DISCCART	681234.49	4235882.08	220.38	220.38
DISCCART	681234.49	4234882.08	216.41	226.06
DISCCART	681234.49	4233882.08	228.75	228.75
DISCCART	681234.49	4232882.08	175.23	252.28
DISCCART	681234.49	4231882.08	181.67	246.89
DISCCART	681234.49	4230882.08	190.97	240.03
DISCCART	681234.49	4229882.08	240.00	243.83
DISCCART	681234.49	4228882.08	257.43	264.14

DISCCART	681234.49	4227882.08	273.63	274.17
DISCCART	681234.49	4226882.08	227.61	282.81
DISCCART	681234.49	4225882.08	281.81	288.35
DISCCART	681234.49	4224882.08	253.40	282.20
DISCCART	681234.49	4223882.08	270.83	281.31
DISCCART	681234.49	4222882.08	300.29	311.36
DISCCART	681234.49	4221882.08	287.00	293.84
DISCCART	681234.49	4220882.08	247.20	288.54
DISCCART	681234.49	4280882.08	200.78	251.46
DISCCART	681234.49	4281882.08	219.61	250.54
DISCCART	681234.49	4282882.08	251.22	251.22
DISCCART	681234.49	4283882.08	237.18	237.18
DISCCART	681234.49	4284882.08	218.51	218.51
DISCCART	681234.49	4285882.08	222.61	222.61
DISCCART	681234.49	4286882.08	208.90	208.90
DISCCART	681234.49	4287882.08	210.74	219.33
DISCCART	681234.49	4288882.08	209.43	209.43
DISCCART	681234.49	4289882.08	217.16	217.16
DISCCART	681234.49	4290882.08	228.30	228.30
DISCCART	681234.49	4291882.08	221.51	221.51
DISCCART	681234.49	4292882.08	209.66	209.66
DISCCART	681234.49	4293882.08	212.99	212.99
DISCCART	681234.49	4294882.08	179.24	179.24
DISCCART	681234.49	4295882.08	179.34	179.34
DISCCART	681234.49	4296882.08	196.35	196.35
DISCCART	681234.49	4297882.08	203.64	206.97
DISCCART	681234.49	4298882.08	194.18	194.18
DISCCART	681234.49	4299882.08	194.27	194.27
DISCCART	681234.49	4300882.08	170.35	184.19
DISCCART	681234.49	4301882.08	172.34	184.21
DISCCART	681234.49	4302882.08	165.35	171.50
DISCCART	681234.49	4303882.08	175.77	175.77
DISCCART	681234.49	4304882.08	170.97	170.97
DISCCART	681234.49	4305882.08	153.80	158.95
DISCCART	681234.49	4306882.08	149.05	154.03
DISCCART	681234.49	4307882.08	176.22	176.22
DISCCART	681234.49	4308882.08	177.45	177.45
DISCCART	681234.49	4309882.08	153.88	153.88
DISCCART	681234.49	4310882.08	140.56	140.56
DISCCART	681234.49	4311882.08	152.94	152.94
DISCCART	681234.49	4312882.08	134.16	145.79
DISCCART	681234.49	4313882.08	140.22	140.22
DISCCART	681234.49	4314882.08	140.33	140.33
DISCCART	681234.49	4315882.08	159.62	159.62
DISCCART	681234.49	4316882.08	160.98	166.07
DISCCART	681234.49	4317882.08	171.62	171.62
DISCCART	681234.49	4318882.08	171.06	181.91
DISCCART	681234.49	4319882.08	180.20	183.32
DISCCART	682234.49	4257882.08	195.31	195.31
DISCCART	682234.49	4256882.08	146.23	170.52
DISCCART	682234.49	4255882.08	171.41	196.71
DISCCART	682234.49	4254882.08	174.75	190.52
DISCCART	682234.49	4253882.08	184.52	184.52
DISCCART	682234.49	4252882.08	146.76	196.62
DISCCART	682234.49	4251882.08	190.78	194.87
DISCCART	682234.49	4250882.08	189.39	203.98
DISCCART	682234.49	4249882.08	179.47	207.79
DISCCART	682234.49	4248882.08	185.10	207.93
DISCCART	682234.49	4247882.08	158.73	180.78
DISCCART	682234.49	4246882.08	155.74	201.77
DISCCART	682234.49	4245882.08	170.55	195.94
DISCCART	682234.49	4244882.08	182.53	182.53
DISCCART	682234.49	4243882.08	152.92	219.93
DISCCART	682234.49	4242882.08	179.48	203.39
DISCCART	682234.49	4241882.08	174.43	220.04
DISCCART	682234.49	4240882.08	169.85	208.27

DISCCART	682234.49	4239882.08	154.72	227.64
DISCCART	682234.49	4238882.08	188.26	226.00
DISCCART	682234.49	4237882.08	180.06	232.51
DISCCART	682234.49	4236882.08	196.87	208.85
DISCCART	682234.49	4235882.08	213.18	227.70
DISCCART	682234.49	4234882.08	221.76	226.77
DISCCART	682234.49	4233882.08	219.65	257.15
DISCCART	682234.49	4232882.08	185.56	257.03
DISCCART	682234.49	4231882.08	225.78	225.78
DISCCART	682234.49	4230882.08	228.63	245.78
DISCCART	682234.49	4229882.08	225.88	263.33
DISCCART	682234.49	4228882.08	240.95	262.83
DISCCART	682234.49	4227882.08	269.87	293.84
DISCCART	682234.49	4226882.08	272.13	281.47
DISCCART	682234.49	4225882.08	273.37	300.51
DISCCART	682234.49	4224882.08	232.94	287.27
DISCCART	682234.49	4223882.08	242.84	300.33
DISCCART	682234.49	4222882.08	249.89	307.00
DISCCART	682234.49	4221882.08	287.97	291.49
DISCCART	682234.49	4220882.08	287.70	287.70
DISCCART	682234.49	4280882.08	213.84	249.98
DISCCART	682234.49	4281882.08	219.76	251.17
DISCCART	682234.49	4282882.08	218.31	251.64
DISCCART	682234.49	4283882.08	244.90	244.90
DISCCART	682234.49	4284882.08	223.24	239.49
DISCCART	682234.49	4285882.08	241.55	241.55
DISCCART	682234.49	4286882.08	217.06	227.82
DISCCART	682234.49	4287882.08	219.01	226.12
DISCCART	682234.49	4288882.08	205.80	205.80
DISCCART	682234.49	4289882.08	210.37	210.37
DISCCART	682234.49	4290882.08	220.75	220.75
DISCCART	682234.49	4291882.08	214.84	214.84
DISCCART	682234.49	4292882.08	202.74	202.74
DISCCART	682234.49	4293882.08	213.40	213.40
DISCCART	682234.49	4294882.08	207.47	207.47
DISCCART	682234.49	4295882.08	174.93	174.93
DISCCART	682234.49	4296882.08	202.48	202.48
DISCCART	682234.49	4297882.08	190.46	190.46
DISCCART	682234.49	4298882.08	182.50	182.75
DISCCART	682234.49	4299882.08	190.52	190.52
DISCCART	682234.49	4300882.08	172.94	183.20
DISCCART	682234.49	4301882.08	175.32	177.82
DISCCART	682234.49	4302882.08	157.56	157.56
DISCCART	682234.49	4303882.08	170.47	170.47
DISCCART	682234.49	4304882.08	167.07	167.07
DISCCART	682234.49	4305882.08	152.44	152.44
DISCCART	682234.49	4306882.08	141.74	141.74
DISCCART	682234.49	4307882.08	162.04	177.36
DISCCART	682234.49	4308882.08	159.44	159.44
DISCCART	682234.49	4309882.08	157.07	157.07
DISCCART	682234.49	4310882.08	142.12	142.12
DISCCART	682234.49	4311882.08	148.97	148.97
DISCCART	682234.49	4312882.08	139.90	139.90
DISCCART	682234.49	4313882.08	145.66	145.66
DISCCART	682234.49	4314882.08	165.70	165.70
DISCCART	682234.49	4315882.08	162.84	164.53
DISCCART	682234.49	4316882.08	160.18	178.04
DISCCART	682234.49	4317882.08	185.27	189.66
DISCCART	682234.49	4318882.08	188.70	194.04
DISCCART	682234.49	4319882.08	179.08	185.19
DISCCART	683234.49	4257882.08	162.49	196.18
DISCCART	683234.49	4256882.08	186.30	186.30
DISCCART	683234.49	4255882.08	147.14	147.14
DISCCART	683234.49	4254882.08	147.26	147.26
DISCCART	683234.49	4253882.08	163.35	163.72
DISCCART	683234.49	4252882.08	171.83	171.83

DISCCART	683234.49	4251882.08	185.48	195.63
DISCCART	683234.49	4250882.08	171.58	190.33
DISCCART	683234.49	4249882.08	165.11	192.23
DISCCART	683234.49	4248882.08	183.74	215.14
DISCCART	683234.49	4247882.08	192.93	221.12
DISCCART	683234.49	4246882.08	151.00	151.00
DISCCART	683234.49	4245882.08	198.69	198.69
DISCCART	683234.49	4244882.08	199.39	209.14
DISCCART	683234.49	4243882.08	214.95	214.95
DISCCART	683234.49	4242882.08	190.51	214.56
DISCCART	683234.49	4241882.08	152.86	225.69
DISCCART	683234.49	4240882.08	195.05	220.75
DISCCART	683234.49	4239882.08	203.66	225.56
DISCCART	683234.49	4238882.08	208.73	214.50
DISCCART	683234.49	4237882.08	229.14	229.14
DISCCART	683234.49	4236882.08	206.06	240.09
DISCCART	683234.49	4235882.08	204.17	244.83
DISCCART	683234.49	4234882.08	226.28	232.66
DISCCART	683234.49	4233882.08	245.55	250.36
DISCCART	683234.49	4232882.08	229.96	244.11
DISCCART	683234.49	4231882.08	177.33	244.23
DISCCART	683234.49	4230882.08	228.15	228.15
DISCCART	683234.49	4229882.08	239.97	239.97
DISCCART	683234.49	4228882.08	222.68	264.66
DISCCART	683234.49	4227882.08	246.00	274.92
DISCCART	683234.49	4226882.08	274.02	274.02
DISCCART	683234.49	4225882.08	297.68	299.33
DISCCART	683234.49	4224882.08	282.25	294.61
DISCCART	683234.49	4223882.08	289.77	292.77
DISCCART	683234.49	4222882.08	258.87	319.35
DISCCART	683234.49	4221882.08	295.73	305.71
DISCCART	683234.49	4220882.08	302.23	320.35
DISCCART	683234.49	4280882.08	171.17	171.17
DISCCART	683234.49	4281882.08	177.40	243.78
DISCCART	683234.49	4282882.08	231.12	250.31
DISCCART	683234.49	4283882.08	247.17	247.17
DISCCART	683234.49	4284882.08	214.41	245.79
DISCCART	683234.49	4285882.08	231.89	231.89
DISCCART	683234.49	4286882.08	232.08	232.08
DISCCART	683234.49	4287882.08	200.84	207.92
DISCCART	683234.49	4288882.08	185.03	185.03
DISCCART	683234.49	4289882.08	208.74	208.74
DISCCART	683234.49	4290882.08	216.26	216.26
DISCCART	683234.49	4291882.08	207.88	207.88
DISCCART	683234.49	4292882.08	199.81	199.81
DISCCART	683234.49	4293882.08	208.17	208.17
DISCCART	683234.49	4294882.08	182.30	204.25
DISCCART	683234.49	4295882.08	183.67	183.67
DISCCART	683234.49	4296882.08	194.01	194.01
DISCCART	683234.49	4297882.08	189.82	189.82
DISCCART	683234.49	4298882.08	183.82	183.82
DISCCART	683234.49	4299882.08	183.54	183.54
DISCCART	683234.49	4300882.08	183.57	183.57
DISCCART	683234.49	4301882.08	166.92	166.92
DISCCART	683234.49	4302882.08	168.63	168.63
DISCCART	683234.49	4303882.08	165.43	165.43
DISCCART	683234.49	4304882.08	155.64	155.64
DISCCART	683234.49	4305882.08	152.71	152.71
DISCCART	683234.49	4306882.08	140.78	140.78
DISCCART	683234.49	4307882.08	157.50	157.97
DISCCART	683234.49	4308882.08	170.14	170.14
DISCCART	683234.49	4309882.08	164.18	164.18
DISCCART	683234.49	4310882.08	147.52	147.52
DISCCART	683234.49	4311882.08	134.12	139.66
DISCCART	683234.49	4312882.08	145.16	145.16
DISCCART	683234.49	4313882.08	152.25	152.25

DISCCART	683234.49	4314882.08	170.73	170.73
DISCCART	683234.49	4315882.08	166.63	166.63
DISCCART	683234.49	4316882.08	187.92	187.92
DISCCART	683234.49	4317882.08	183.60	183.60
DISCCART	683234.49	4318882.08	188.60	196.08
DISCCART	683234.49	4319882.08	194.69	194.69
DISCCART	684234.49	4257882.08	187.87	208.86
DISCCART	684234.49	4256882.08	162.07	204.23
DISCCART	684234.49	4255882.08	148.92	202.13
DISCCART	684234.49	4254882.08	141.07	220.46
DISCCART	684234.49	4253882.08	167.93	189.94
DISCCART	684234.49	4252882.08	160.70	166.09
DISCCART	684234.49	4251882.08	141.34	189.95
DISCCART	684234.49	4250882.08	142.09	195.86
DISCCART	684234.49	4249882.08	174.07	207.98
DISCCART	684234.49	4248882.08	161.98	216.58
DISCCART	684234.49	4247882.08	173.65	220.49
DISCCART	684234.49	4246882.08	157.26	157.26
DISCCART	684234.49	4245882.08	149.09	197.16
DISCCART	684234.49	4244882.08	180.85	203.15
DISCCART	684234.49	4243882.08	215.47	218.35
DISCCART	684234.49	4242882.08	206.31	206.31
DISCCART	684234.49	4241882.08	179.07	202.82
DISCCART	684234.49	4240882.08	164.95	184.51
DISCCART	684234.49	4239882.08	192.27	210.51
DISCCART	684234.49	4238882.08	203.36	203.36
DISCCART	684234.49	4237882.08	197.28	214.20
DISCCART	684234.49	4236882.08	213.02	224.12
DISCCART	684234.49	4235882.08	243.22	257.24
DISCCART	684234.49	4234882.08	249.80	256.18
DISCCART	684234.49	4233882.08	236.41	256.82
DISCCART	684234.49	4232882.08	209.60	245.53
DISCCART	684234.49	4231882.08	202.85	250.71
DISCCART	684234.49	4230882.08	186.43	245.81
DISCCART	684234.49	4229882.08	202.44	244.29
DISCCART	684234.49	4228882.08	212.57	244.13
DISCCART	684234.49	4227882.08	251.04	262.39
DISCCART	684234.49	4226882.08	260.03	262.85
DISCCART	684234.49	4225882.08	262.86	287.00
DISCCART	684234.49	4224882.08	301.70	312.80
DISCCART	684234.49	4223882.08	311.34	311.34
DISCCART	684234.49	4222882.08	304.17	330.50
DISCCART	684234.49	4221882.08	306.08	309.10
DISCCART	684234.49	4220882.08	322.88	345.11
DISCCART	684234.49	4280882.08	197.16	226.97
DISCCART	684234.49	4281882.08	189.51	227.14
DISCCART	684234.49	4282882.08	182.91	239.25
DISCCART	684234.49	4283882.08	235.19	244.47
DISCCART	684234.49	4284882.08	234.37	238.94
DISCCART	684234.49	4285882.08	229.68	232.68
DISCCART	684234.49	4286882.08	226.31	226.31
DISCCART	684234.49	4287882.08	220.20	225.14
DISCCART	684234.49	4288882.08	208.61	208.61
DISCCART	684234.49	4289882.08	188.32	188.32
DISCCART	684234.49	4290882.08	210.42	210.42
DISCCART	684234.49	4291882.08	183.51	208.59
DISCCART	684234.49	4292882.08	205.68	205.68
DISCCART	684234.49	4293882.08	198.54	200.36
DISCCART	684234.49	4294882.08	191.79	195.60
DISCCART	684234.49	4295882.08	182.07	182.07
DISCCART	684234.49	4296882.08	200.26	200.26
DISCCART	684234.49	4297882.08	195.89	195.89
DISCCART	684234.49	4298882.08	193.25	193.25
DISCCART	684234.49	4299882.08	185.83	185.83
DISCCART	684234.49	4300882.08	164.28	171.92
DISCCART	684234.49	4301882.08	151.21	172.49

DISCCART	684234.49	4302882.08	149.29	166.32
DISCCART	684234.49	4303882.08	163.78	163.78
DISCCART	684234.49	4304882.08	145.38	145.38
DISCCART	684234.49	4305882.08	145.11	145.11
DISCCART	684234.49	4306882.08	137.27	137.27
DISCCART	684234.49	4307882.08	156.14	164.95
DISCCART	684234.49	4308882.08	150.12	150.12
DISCCART	684234.49	4309882.08	151.76	151.76
DISCCART	684234.49	4310882.08	145.78	145.78
DISCCART	684234.49	4311882.08	135.41	135.41
DISCCART	684234.49	4312882.08	140.13	140.13
DISCCART	684234.49	4313882.08	145.24	145.24
DISCCART	684234.49	4314882.08	157.81	165.46
DISCCART	684234.49	4315882.08	177.53	177.53
DISCCART	684234.49	4316882.08	192.56	196.64
DISCCART	684234.49	4317882.08	170.46	170.46
DISCCART	684234.49	4318882.08	190.06	198.12
DISCCART	684234.49	4319882.08	186.95	186.95
DISCCART	685234.49	4257882.08	195.54	215.96
DISCCART	685234.49	4256882.08	178.61	211.50
DISCCART	685234.49	4255882.08	174.55	184.29
DISCCART	685234.49	4254882.08	176.84	222.68
DISCCART	685234.49	4253882.08	184.60	184.60
DISCCART	685234.49	4252882.08	142.49	189.64
DISCCART	685234.49	4251882.08	145.35	145.35
DISCCART	685234.49	4250882.08	144.38	189.38
DISCCART	685234.49	4249882.08	169.36	170.59
DISCCART	685234.49	4248882.08	171.08	185.85
DISCCART	685234.49	4247882.08	195.03	195.03
DISCCART	685234.49	4246882.08	165.80	165.80
DISCCART	685234.49	4245882.08	164.31	185.26
DISCCART	685234.49	4244882.08	182.14	182.14
DISCCART	685234.49	4243882.08	205.65	205.65
DISCCART	685234.49	4242882.08	191.16	208.92
DISCCART	685234.49	4241882.08	218.53	218.53
DISCCART	685234.49	4240882.08	196.52	196.52
DISCCART	685234.49	4239882.08	184.86	188.91
DISCCART	685234.49	4238882.08	203.90	203.90
DISCCART	685234.49	4237882.08	205.67	205.67
DISCCART	685234.49	4236882.08	197.29	197.29
DISCCART	685234.49	4235882.08	216.14	216.14
DISCCART	685234.49	4234882.08	238.66	238.66
DISCCART	685234.49	4233882.08	224.51	224.51
DISCCART	685234.49	4232882.08	237.70	241.27
DISCCART	685234.49	4231882.08	237.21	237.51
DISCCART	685234.49	4230882.08	220.56	243.65
DISCCART	685234.49	4229882.08	194.76	239.70
DISCCART	685234.49	4228882.08	208.21	226.32
DISCCART	685234.49	4227882.08	217.20	257.52
DISCCART	685234.49	4226882.08	242.27	262.54
DISCCART	685234.49	4225882.08	258.25	276.30
DISCCART	685234.49	4224882.08	262.86	294.88
DISCCART	685234.49	4223882.08	268.20	299.28
DISCCART	685234.49	4222882.08	315.68	317.43
DISCCART	685234.49	4221882.08	286.02	331.61
DISCCART	685234.49	4220882.08	349.35	349.35
DISCCART	685234.49	4280882.08	170.03	227.12
DISCCART	685234.49	4281882.08	170.62	219.98
DISCCART	685234.49	4282882.08	236.17	240.89
DISCCART	685234.49	4283882.08	232.09	241.89
DISCCART	685234.49	4284882.08	237.12	242.26
DISCCART	685234.49	4285882.08	224.99	230.48
DISCCART	685234.49	4286882.08	232.87	232.87
DISCCART	685234.49	4287882.08	226.65	226.65
DISCCART	685234.49	4288882.08	220.40	220.40
DISCCART	685234.49	4289882.08	186.03	186.03

DISCCART	685234.49	4290882.08	200.29	200.29
DISCCART	685234.49	4291882.08	184.28	189.16
DISCCART	685234.49	4292882.08	207.27	207.27
DISCCART	685234.49	4293882.08	201.50	201.50
DISCCART	685234.49	4294882.08	181.45	181.45
DISCCART	685234.49	4295882.08	166.05	191.84
DISCCART	685234.49	4296882.08	186.57	186.57
DISCCART	685234.49	4297882.08	195.10	195.10
DISCCART	685234.49	4298882.08	179.34	179.34
DISCCART	685234.49	4299882.08	184.93	184.93
DISCCART	685234.49	4300882.08	171.58	175.70
DISCCART	685234.49	4301882.08	153.19	164.57
DISCCART	685234.49	4302882.08	161.06	161.06
DISCCART	685234.49	4303882.08	156.21	161.21
DISCCART	685234.49	4304882.08	142.01	156.43
DISCCART	685234.49	4305882.08	134.76	134.76
DISCCART	685234.49	4306882.08	145.17	145.17
DISCCART	685234.49	4307882.08	166.67	166.67
DISCCART	685234.49	4308882.08	146.09	146.09
DISCCART	685234.49	4309882.08	152.00	152.00
DISCCART	685234.49	4310882.08	137.23	154.71
DISCCART	685234.49	4311882.08	139.62	139.62
DISCCART	685234.49	4312882.08	141.03	141.03
DISCCART	685234.49	4313882.08	166.17	166.17
DISCCART	685234.49	4314882.08	177.79	177.79
DISCCART	685234.49	4315882.08	184.45	184.45
DISCCART	685234.49	4316882.08	172.89	183.39
DISCCART	685234.49	4317882.08	176.84	191.39
DISCCART	685234.49	4318882.08	184.17	196.36
DISCCART	685234.49	4319882.08	201.48	201.48
DISCCART	686234.49	4257882.08	200.33	233.58
DISCCART	686234.49	4256882.08	209.35	217.44
DISCCART	686234.49	4255882.08	207.81	216.69
DISCCART	686234.49	4254882.08	180.68	207.84
DISCCART	686234.49	4253882.08	167.39	189.16
DISCCART	686234.49	4252882.08	170.89	178.19
DISCCART	686234.49	4251882.08	158.05	158.05
DISCCART	686234.49	4250882.08	175.57	195.46
DISCCART	686234.49	4249882.08	158.50	158.50
DISCCART	686234.49	4248882.08	145.94	145.94
DISCCART	686234.49	4247882.08	147.76	195.33
DISCCART	686234.49	4246882.08	162.80	162.80
DISCCART	686234.49	4245882.08	170.31	186.69
DISCCART	686234.49	4244882.08	171.58	189.83
DISCCART	686234.49	4243882.08	175.68	192.54
DISCCART	686234.49	4242882.08	180.26	180.26
DISCCART	686234.49	4241882.08	193.44	202.01
DISCCART	686234.49	4240882.08	202.30	207.59
DISCCART	686234.49	4239882.08	208.76	208.76
DISCCART	686234.49	4238882.08	213.68	213.68
DISCCART	686234.49	4237882.08	221.25	221.25
DISCCART	686234.49	4236882.08	214.69	221.39
DISCCART	686234.49	4235882.08	229.28	229.28
DISCCART	686234.49	4234882.08	244.03	244.03
DISCCART	686234.49	4233882.08	250.96	250.96
DISCCART	686234.49	4232882.08	232.05	232.05
DISCCART	686234.49	4231882.08	229.83	263.64
DISCCART	686234.49	4230882.08	236.15	257.81
DISCCART	686234.49	4229882.08	228.78	251.11
DISCCART	686234.49	4228882.08	231.47	251.17
DISCCART	686234.49	4227882.08	198.59	258.21
DISCCART	686234.49	4226882.08	222.04	250.86
DISCCART	686234.49	4225882.08	265.27	269.24
DISCCART	686234.49	4224882.08	280.92	280.92
DISCCART	686234.49	4223882.08	270.84	287.79
DISCCART	686234.49	4222882.08	258.08	306.59

DISCCART	686234.49	4221882.08	277.95	324.35
DISCCART	686234.49	4220882.08	323.95	330.68
DISCCART	686234.49	4280882.08	161.08	208.97
DISCCART	686234.49	4281882.08	225.92	229.30
DISCCART	686234.49	4282882.08	230.20	241.19
DISCCART	686234.49	4283882.08	240.07	240.07
DISCCART	686234.49	4284882.08	206.57	239.49
DISCCART	686234.49	4285882.08	212.37	227.23
DISCCART	686234.49	4286882.08	202.66	202.66
DISCCART	686234.49	4287882.08	218.48	219.23
DISCCART	686234.49	4288882.08	212.75	212.75
DISCCART	686234.49	4289882.08	190.43	204.01
DISCCART	686234.49	4290882.08	185.46	185.46
DISCCART	686234.49	4291882.08	182.68	182.68
DISCCART	686234.49	4292882.08	189.02	196.26
DISCCART	686234.49	4293882.08	197.69	197.69
DISCCART	686234.49	4294882.08	195.61	195.61
DISCCART	686234.49	4295882.08	190.84	190.84
DISCCART	686234.49	4296882.08	160.07	183.84
DISCCART	686234.49	4297882.08	190.35	190.35
DISCCART	686234.49	4298882.08	176.57	185.17
DISCCART	686234.49	4299882.08	177.47	177.47
DISCCART	686234.49	4300882.08	164.24	164.24
DISCCART	686234.49	4301882.08	165.53	165.53
DISCCART	686234.49	4302882.08	170.67	170.67
DISCCART	686234.49	4303882.08	163.04	163.04
DISCCART	686234.49	4304882.08	151.22	151.22
DISCCART	686234.49	4305882.08	134.06	134.06
DISCCART	686234.49	4306882.08	139.37	139.37
DISCCART	686234.49	4307882.08	152.48	152.48
DISCCART	686234.49	4308882.08	146.66	146.66
DISCCART	686234.49	4309882.08	134.84	134.84
DISCCART	686234.49	4310882.08	134.68	134.68
DISCCART	686234.49	4311882.08	145.23	145.23
DISCCART	686234.49	4312882.08	153.06	153.06
DISCCART	686234.49	4313882.08	157.87	157.87
DISCCART	686234.49	4314882.08	169.87	182.24
DISCCART	686234.49	4315882.08	175.81	175.81
DISCCART	686234.49	4316882.08	152.00	152.00
DISCCART	686234.49	4317882.08	165.96	191.39
DISCCART	686234.49	4318882.08	196.78	196.78
DISCCART	686234.49	4319882.08	185.87	190.01
DISCCART	687234.49	4257882.08	214.58	214.58
DISCCART	687234.49	4256882.08	173.77	215.32
DISCCART	687234.49	4255882.08	188.60	202.97
DISCCART	687234.49	4254882.08	180.65	228.83
DISCCART	687234.49	4253882.08	153.20	165.67
DISCCART	687234.49	4252882.08	150.29	150.29
DISCCART	687234.49	4251882.08	190.65	203.47
DISCCART	687234.49	4250882.08	202.36	202.36
DISCCART	687234.49	4249882.08	145.84	244.94
DISCCART	687234.49	4248882.08	164.64	191.59
DISCCART	687234.49	4247882.08	184.37	204.82
DISCCART	687234.49	4246882.08	146.54	189.73
DISCCART	687234.49	4245882.08	157.12	183.21
DISCCART	687234.49	4244882.08	186.89	190.34
DISCCART	687234.49	4243882.08	184.17	184.17
DISCCART	687234.49	4242882.08	184.57	184.57
DISCCART	687234.49	4241882.08	163.61	192.40
DISCCART	687234.49	4240882.08	188.76	188.76
DISCCART	687234.49	4239882.08	180.87	201.58
DISCCART	687234.49	4238882.08	204.27	209.53
DISCCART	687234.49	4237882.08	206.45	213.86
DISCCART	687234.49	4236882.08	228.31	232.17
DISCCART	687234.49	4235882.08	225.12	225.12
DISCCART	687234.49	4234882.08	224.40	224.40

DISCCART	687234.49	4233882.08	242.07	242.07
DISCCART	687234.49	4232882.08	255.29	255.29
DISCCART	687234.49	4231882.08	263.95	266.77
DISCCART	687234.49	4230882.08	263.18	263.18
DISCCART	687234.49	4229882.08	228.57	256.58
DISCCART	687234.49	4228882.08	237.43	257.20
DISCCART	687234.49	4227882.08	223.85	286.39
DISCCART	687234.49	4226882.08	211.60	244.07
DISCCART	687234.49	4225882.08	272.47	282.48
DISCCART	687234.49	4224882.08	264.31	289.53
DISCCART	687234.49	4223882.08	235.71	275.01
DISCCART	687234.49	4222882.08	281.62	285.61
DISCCART	687234.49	4221882.08	289.10	319.17
DISCCART	687234.49	4220882.08	300.59	348.64
DISCCART	687234.49	4280882.08	233.39	233.39
DISCCART	687234.49	4281882.08	181.40	232.73
DISCCART	687234.49	4282882.08	227.56	232.10
DISCCART	687234.49	4283882.08	162.76	238.12
DISCCART	687234.49	4284882.08	224.01	233.40
DISCCART	687234.49	4285882.08	200.11	200.11
DISCCART	687234.49	4286882.08	190.22	222.38
DISCCART	687234.49	4287882.08	195.87	213.98
DISCCART	687234.49	4288882.08	211.04	212.09
DISCCART	687234.49	4289882.08	188.09	188.91
DISCCART	687234.49	4290882.08	183.45	183.45
DISCCART	687234.49	4291882.08	182.27	182.27
DISCCART	687234.49	4292882.08	195.03	195.03
DISCCART	687234.49	4293882.08	195.28	195.28
DISCCART	687234.49	4294882.08	182.54	182.54
DISCCART	687234.49	4295882.08	187.19	187.19
DISCCART	687234.49	4296882.08	165.00	177.13
DISCCART	687234.49	4297882.08	189.01	189.01
DISCCART	687234.49	4298882.08	182.90	182.90
DISCCART	687234.49	4299882.08	183.63	183.63
DISCCART	687234.49	4300882.08	179.24	179.24
DISCCART	687234.49	4301882.08	178.46	178.46
DISCCART	687234.49	4302882.08	158.05	158.05
DISCCART	687234.49	4303882.08	157.27	157.27
DISCCART	687234.49	4304882.08	133.78	133.78
DISCCART	687234.49	4305882.08	133.19	133.19
DISCCART	687234.49	4306882.08	139.28	139.28
DISCCART	687234.49	4307882.08	139.58	139.58
DISCCART	687234.49	4308882.08	134.16	134.16
DISCCART	687234.49	4309882.08	137.77	137.77
DISCCART	687234.49	4310882.08	140.08	140.08
DISCCART	687234.49	4311882.08	146.24	146.24
DISCCART	687234.49	4312882.08	149.52	149.52
DISCCART	687234.49	4313882.08	155.67	155.67
DISCCART	687234.49	4314882.08	178.27	178.27
DISCCART	687234.49	4315882.08	171.93	178.26
DISCCART	687234.49	4316882.08	163.64	176.33
DISCCART	687234.49	4317882.08	172.53	172.53
DISCCART	687234.49	4318882.08	181.67	182.87
DISCCART	687234.49	4319882.08	182.81	182.81
DISCCART	688234.49	4257882.08	207.45	227.45
DISCCART	688234.49	4256882.08	199.98	213.91
DISCCART	688234.49	4255882.08	152.87	204.74
DISCCART	688234.49	4254882.08	180.89	193.33
DISCCART	688234.49	4253882.08	147.53	147.53
DISCCART	688234.49	4252882.08	193.92	214.35
DISCCART	688234.49	4251882.08	172.12	236.04
DISCCART	688234.49	4250882.08	174.12	246.09
DISCCART	688234.49	4249882.08	192.68	246.09
DISCCART	688234.49	4248882.08	182.37	182.37
DISCCART	688234.49	4247882.08	205.86	205.86
DISCCART	688234.49	4246882.08	202.20	202.20

DISCCART	688234.49	4245882.08	160.34	165.11
DISCCART	688234.49	4244882.08	164.08	195.75
DISCCART	688234.49	4243882.08	209.81	215.06
DISCCART	688234.49	4242882.08	188.69	195.50
DISCCART	688234.49	4241882.08	184.12	184.12
DISCCART	688234.49	4240882.08	197.96	197.96
DISCCART	688234.49	4239882.08	202.03	202.03
DISCCART	688234.49	4238882.08	177.83	195.79
DISCCART	688234.49	4237882.08	185.67	185.67
DISCCART	688234.49	4236882.08	205.73	206.43
DISCCART	688234.49	4235882.08	214.97	214.97
DISCCART	688234.49	4234882.08	219.18	219.18
DISCCART	688234.49	4233882.08	224.05	237.78
DISCCART	688234.49	4232882.08	240.45	251.42
DISCCART	688234.49	4231882.08	260.63	269.02
DISCCART	688234.49	4230882.08	265.50	289.89
DISCCART	688234.49	4229882.08	259.29	275.73
DISCCART	688234.49	4228882.08	284.91	284.91
DISCCART	688234.49	4227882.08	245.94	294.26
DISCCART	688234.49	4226882.08	269.79	280.73
DISCCART	688234.49	4225882.08	221.16	221.16
DISCCART	688234.49	4224882.08	237.51	263.66
DISCCART	688234.49	4223882.08	250.83	274.92
DISCCART	688234.49	4222882.08	270.90	294.07
DISCCART	688234.49	4221882.08	265.19	294.00
DISCCART	688234.49	4220882.08	300.32	300.32
DISCCART	688234.49	4280882.08	231.19	232.53
DISCCART	688234.49	4281882.08	199.44	227.90
DISCCART	688234.49	4282882.08	190.49	226.24
DISCCART	688234.49	4283882.08	190.71	227.25
DISCCART	688234.49	4284882.08	229.32	234.47
DISCCART	688234.49	4285882.08	223.91	223.91
DISCCART	688234.49	4286882.08	215.51	215.51
DISCCART	688234.49	4287882.08	208.11	208.11
DISCCART	688234.49	4288882.08	196.74	196.74
DISCCART	688234.49	4289882.08	190.65	190.65
DISCCART	688234.49	4290882.08	169.17	169.17
DISCCART	688234.49	4291882.08	190.17	190.17
DISCCART	688234.49	4292882.08	201.88	201.88
DISCCART	688234.49	4293882.08	178.19	178.19
DISCCART	688234.49	4294882.08	182.71	182.71
DISCCART	688234.49	4295882.08	157.22	183.32
DISCCART	688234.49	4296882.08	164.58	184.10
DISCCART	688234.49	4297882.08	193.27	193.27
DISCCART	688234.49	4298882.08	194.57	194.57
DISCCART	688234.49	4299882.08	189.20	189.20
DISCCART	688234.49	4300882.08	177.23	177.23
DISCCART	688234.49	4301882.08	168.13	168.13
DISCCART	688234.49	4302882.08	163.94	163.94
DISCCART	688234.49	4303882.08	135.77	155.07
DISCCART	688234.49	4304882.08	156.51	166.14
DISCCART	688234.49	4305882.08	140.44	140.44
DISCCART	688234.49	4306882.08	135.72	135.72
DISCCART	688234.49	4307882.08	134.06	134.06
DISCCART	688234.49	4308882.08	135.66	135.66
DISCCART	688234.49	4309882.08	137.76	165.35
DISCCART	688234.49	4310882.08	160.82	160.82
DISCCART	688234.49	4311882.08	143.89	165.81
DISCCART	688234.49	4312882.08	152.09	152.09
DISCCART	688234.49	4313882.08	167.23	167.23
DISCCART	688234.49	4314882.08	175.13	175.13
DISCCART	688234.49	4315882.08	161.82	161.82
DISCCART	688234.49	4316882.08	169.71	169.71
DISCCART	688234.49	4317882.08	187.60	187.60
DISCCART	688234.49	4318882.08	164.50	164.50
DISCCART	688234.49	4319882.08	188.74	188.74

DISCCART	689234.49	4257882.08	177.91	177.91
DISCCART	689234.49	4256882.08	186.90	196.97
DISCCART	689234.49	4255882.08	145.51	204.82
DISCCART	689234.49	4254882.08	142.02	142.02
DISCCART	689234.49	4253882.08	143.54	166.11
DISCCART	689234.49	4252882.08	153.49	197.93
DISCCART	689234.49	4251882.08	171.74	236.04
DISCCART	689234.49	4250882.08	210.47	221.19
DISCCART	689234.49	4249882.08	187.55	239.47
DISCCART	689234.49	4248882.08	200.05	226.44
DISCCART	689234.49	4247882.08	233.05	256.96
DISCCART	689234.49	4246882.08	176.34	222.43
DISCCART	689234.49	4245882.08	189.20	189.20
DISCCART	689234.49	4244882.08	207.08	207.08
DISCCART	689234.49	4243882.08	215.91	233.83
DISCCART	689234.49	4242882.08	188.40	194.65
DISCCART	689234.49	4241882.08	180.29	189.63
DISCCART	689234.49	4240882.08	202.58	203.63
DISCCART	689234.49	4239882.08	201.90	213.67
DISCCART	689234.49	4238882.08	202.82	202.82
DISCCART	689234.49	4237882.08	212.37	212.37
DISCCART	689234.49	4236882.08	221.08	221.08
DISCCART	689234.49	4235882.08	228.05	228.05
DISCCART	689234.49	4234882.08	206.62	206.62
DISCCART	689234.49	4233882.08	238.06	238.06
DISCCART	689234.49	4232882.08	234.67	251.27
DISCCART	689234.49	4231882.08	251.21	280.19
DISCCART	689234.49	4230882.08	291.48	292.20
DISCCART	689234.49	4229882.08	299.90	299.90
DISCCART	689234.49	4228882.08	248.67	306.27
DISCCART	689234.49	4227882.08	262.79	300.01
DISCCART	689234.49	4226882.08	252.94	276.10
DISCCART	689234.49	4225882.08	232.08	256.34
DISCCART	689234.49	4224882.08	244.35	269.85
DISCCART	689234.49	4223882.08	262.44	262.44
DISCCART	689234.49	4222882.08	293.98	299.75
DISCCART	689234.49	4221882.08	312.42	312.42
DISCCART	689234.49	4220882.08	278.48	305.41
DISCCART	689234.49	4280882.08	214.10	222.07
DISCCART	689234.49	4281882.08	215.94	226.52
DISCCART	689234.49	4282882.08	196.43	223.27
DISCCART	689234.49	4283882.08	210.63	210.63
DISCCART	689234.49	4284882.08	213.54	223.05
DISCCART	689234.49	4285882.08	217.37	217.37
DISCCART	689234.49	4286882.08	210.90	210.90
DISCCART	689234.49	4287882.08	193.24	193.24
DISCCART	689234.49	4288882.08	170.60	192.05
DISCCART	689234.49	4289882.08	166.58	166.58
DISCCART	689234.49	4290882.08	188.79	188.79
DISCCART	689234.49	4291882.08	180.46	180.46
DISCCART	689234.49	4292882.08	183.98	183.98
DISCCART	689234.49	4293882.08	165.00	178.28
DISCCART	689234.49	4294882.08	173.77	173.77
DISCCART	689234.49	4295882.08	171.93	178.49
DISCCART	689234.49	4296882.08	183.07	183.07
DISCCART	689234.49	4297882.08	180.07	180.07
DISCCART	689234.49	4298882.08	188.04	188.04
DISCCART	689234.49	4299882.08	175.25	175.25
DISCCART	689234.49	4300882.08	168.76	170.86
DISCCART	689234.49	4301882.08	175.49	175.49
DISCCART	689234.49	4302882.08	170.79	170.79
DISCCART	689234.49	4303882.08	144.03	144.03
DISCCART	689234.49	4304882.08	141.86	141.86
DISCCART	689234.49	4305882.08	134.06	134.06
DISCCART	689234.49	4306882.08	138.10	138.10
DISCCART	689234.49	4307882.08	145.23	145.23

DISCCART	689234.49	4308882.08	146.75	146.75
DISCCART	689234.49	4309882.08	154.44	154.44
DISCCART	689234.49	4310882.08	161.15	161.15
DISCCART	689234.49	4311882.08	165.02	165.02
DISCCART	689234.49	4312882.08	167.15	167.15
DISCCART	689234.49	4313882.08	163.96	163.96
DISCCART	689234.49	4314882.08	173.20	173.20
DISCCART	689234.49	4315882.08	161.80	166.64
DISCCART	689234.49	4316882.08	157.29	164.96
DISCCART	689234.49	4317882.08	183.54	183.54
DISCCART	689234.49	4318882.08	165.13	171.34
DISCCART	689234.49	4319882.08	166.33	190.45
DISCCART	690234.49	4257882.08	140.13	187.82
DISCCART	690234.49	4256882.08	160.74	184.82
DISCCART	690234.49	4255882.08	142.54	142.54
DISCCART	690234.49	4254882.08	149.70	149.70
DISCCART	690234.49	4253882.08	158.21	158.21
DISCCART	690234.49	4252882.08	182.06	205.21
DISCCART	690234.49	4251882.08	217.77	222.75
DISCCART	690234.49	4250882.08	170.21	170.21
DISCCART	690234.49	4249882.08	173.53	178.48
DISCCART	690234.49	4248882.08	187.52	208.68
DISCCART	690234.49	4247882.08	201.85	215.88
DISCCART	690234.49	4246882.08	206.83	239.40
DISCCART	690234.49	4245882.08	187.10	196.91
DISCCART	690234.49	4244882.08	183.12	211.84
DISCCART	690234.49	4243882.08	216.60	227.09
DISCCART	690234.49	4242882.08	185.05	185.05
DISCCART	690234.49	4241882.08	187.20	196.58
DISCCART	690234.49	4240882.08	190.18	210.82
DISCCART	690234.49	4239882.08	208.59	231.74
DISCCART	690234.49	4238882.08	213.28	213.28
DISCCART	690234.49	4237882.08	221.99	221.99
DISCCART	690234.49	4236882.08	216.74	225.93
DISCCART	690234.49	4235882.08	226.09	236.10
DISCCART	690234.49	4234882.08	241.64	241.64
DISCCART	690234.49	4233882.08	222.63	243.68
DISCCART	690234.49	4232882.08	257.26	257.26
DISCCART	690234.49	4231882.08	266.96	276.02
DISCCART	690234.49	4230882.08	255.66	293.44
DISCCART	690234.49	4229882.08	266.63	299.71
DISCCART	690234.49	4228882.08	281.24	313.01
DISCCART	690234.49	4227882.08	292.65	317.24
DISCCART	690234.49	4226882.08	252.39	252.39
DISCCART	690234.49	4225882.08	250.36	250.36
DISCCART	690234.49	4224882.08	250.88	250.88
DISCCART	690234.49	4223882.08	247.67	259.04
DISCCART	690234.49	4222882.08	276.26	276.26
DISCCART	690234.49	4221882.08	280.09	280.09
DISCCART	690234.49	4220882.08	283.15	283.15
DISCCART	690234.49	4280882.08	148.31	226.29
DISCCART	690234.49	4281882.08	164.62	228.28
DISCCART	690234.49	4282882.08	223.37	223.37
DISCCART	690234.49	4283882.08	189.63	221.02
DISCCART	690234.49	4284882.08	223.39	223.39
DISCCART	690234.49	4285882.08	220.00	220.00
DISCCART	690234.49	4286882.08	205.17	205.17
DISCCART	690234.49	4287882.08	188.12	196.36
DISCCART	690234.49	4288882.08	170.56	170.56
DISCCART	690234.49	4289882.08	159.46	190.03
DISCCART	690234.49	4290882.08	178.19	193.65
DISCCART	690234.49	4291882.08	195.61	195.61
DISCCART	690234.49	4292882.08	192.78	192.78
DISCCART	690234.49	4293882.08	191.13	191.13
DISCCART	690234.49	4294882.08	169.95	178.88
DISCCART	690234.49	4295882.08	177.04	177.04

DISCCART	690234.49	4296882.08	171.50	171.50
DISCCART	690234.49	4297882.08	166.89	170.45
DISCCART	690234.49	4298882.08	187.50	187.50
DISCCART	690234.49	4299882.08	189.26	189.26
DISCCART	690234.49	4300882.08	190.27	190.27
DISCCART	690234.49	4301882.08	182.84	182.84
DISCCART	690234.49	4302882.08	163.44	163.44
DISCCART	690234.49	4303882.08	169.37	169.37
DISCCART	690234.49	4304882.08	133.88	140.31
DISCCART	690234.49	4305882.08	133.83	154.68
DISCCART	690234.49	4306882.08	144.70	147.09
DISCCART	690234.49	4307882.08	134.06	134.06
DISCCART	690234.49	4308882.08	133.36	133.36
DISCCART	690234.49	4309882.08	157.79	157.79
DISCCART	690234.49	4310882.08	151.20	151.20
DISCCART	690234.49	4311882.08	152.69	160.44
DISCCART	690234.49	4312882.08	162.67	162.67
DISCCART	690234.49	4313882.08	178.65	178.65
DISCCART	690234.49	4314882.08	166.25	169.54
DISCCART	690234.49	4315882.08	146.22	146.22
DISCCART	690234.49	4316882.08	169.37	171.32
DISCCART	690234.49	4317882.08	156.12	178.56
DISCCART	690234.49	4318882.08	182.66	182.66
DISCCART	690234.49	4319882.08	173.50	178.08
DISCCART	691234.49	4257882.08	164.94	166.37
DISCCART	691234.49	4256882.08	142.25	142.25
DISCCART	691234.49	4255882.08	142.63	183.73
DISCCART	691234.49	4254882.08	165.24	183.87
DISCCART	691234.49	4253882.08	152.98	207.73
DISCCART	691234.49	4252882.08	177.50	204.00
DISCCART	691234.49	4251882.08	189.23	198.10
DISCCART	691234.49	4250882.08	177.65	196.18
DISCCART	691234.49	4249882.08	197.58	201.36
DISCCART	691234.49	4248882.08	172.36	196.78
DISCCART	691234.49	4247882.08	197.91	215.67
DISCCART	691234.49	4246882.08	218.40	253.36
DISCCART	691234.49	4245882.08	227.77	227.77
DISCCART	691234.49	4244882.08	221.59	221.96
DISCCART	691234.49	4243882.08	208.82	208.82
DISCCART	691234.49	4242882.08	183.65	183.65
DISCCART	691234.49	4241882.08	180.30	180.50
DISCCART	691234.49	4240882.08	191.13	195.27
DISCCART	691234.49	4239882.08	195.66	225.02
DISCCART	691234.49	4238882.08	222.73	222.73
DISCCART	691234.49	4237882.08	222.35	225.09
DISCCART	691234.49	4236882.08	235.81	235.81
DISCCART	691234.49	4235882.08	238.90	238.90
DISCCART	691234.49	4234882.08	248.15	248.15
DISCCART	691234.49	4233882.08	255.75	255.75
DISCCART	691234.49	4232882.08	257.16	257.16
DISCCART	691234.49	4231882.08	216.43	263.62
DISCCART	691234.49	4230882.08	257.33	275.26
DISCCART	691234.49	4229882.08	273.26	273.26
DISCCART	691234.49	4228882.08	251.06	281.61
DISCCART	691234.49	4227882.08	263.37	263.37
DISCCART	691234.49	4226882.08	260.78	260.78
DISCCART	691234.49	4225882.08	263.61	263.61
DISCCART	691234.49	4224882.08	268.81	268.81
DISCCART	691234.49	4223882.08	256.17	256.17
DISCCART	691234.49	4222882.08	265.55	274.64
DISCCART	691234.49	4221882.08	284.53	285.16
DISCCART	691234.49	4220882.08	248.44	274.77
DISCCART	691234.49	4280882.08	200.49	226.98
DISCCART	691234.49	4281882.08	190.75	228.55
DISCCART	691234.49	4282882.08	213.72	219.65
DISCCART	691234.49	4283882.08	208.25	209.07

DISCCART	691234.49	4284882.08	221.75	223.73
DISCCART	691234.49	4285882.08	212.45	212.45
DISCCART	691234.49	4286882.08	186.10	208.84
DISCCART	691234.49	4287882.08	181.78	183.05
DISCCART	691234.49	4288882.08	178.01	181.17
DISCCART	691234.49	4289882.08	190.86	191.70
DISCCART	691234.49	4290882.08	186.62	189.57
DISCCART	691234.49	4291882.08	194.53	194.53
DISCCART	691234.49	4292882.08	190.48	190.48
DISCCART	691234.49	4293882.08	181.36	181.36
DISCCART	691234.49	4294882.08	180.05	180.05
DISCCART	691234.49	4295882.08	152.85	179.03
DISCCART	691234.49	4296882.08	165.18	165.18
DISCCART	691234.49	4297882.08	172.53	172.53
DISCCART	691234.49	4298882.08	182.17	182.17
DISCCART	691234.49	4299882.08	194.58	194.58
DISCCART	691234.49	4300882.08	189.19	189.19
DISCCART	691234.49	4301882.08	182.46	182.46
DISCCART	691234.49	4302882.08	162.10	178.41
DISCCART	691234.49	4303882.08	183.61	183.61
DISCCART	691234.49	4304882.08	159.07	168.44
DISCCART	691234.49	4305882.08	154.70	154.70
DISCCART	691234.49	4306882.08	146.06	146.06
DISCCART	691234.49	4307882.08	146.52	146.52
DISCCART	691234.49	4308882.08	141.03	141.03
DISCCART	691234.49	4309882.08	133.95	133.95
DISCCART	691234.49	4310882.08	136.78	136.78
DISCCART	691234.49	4311882.08	146.40	153.27
DISCCART	691234.49	4312882.08	159.85	159.85
DISCCART	691234.49	4313882.08	155.57	155.57
DISCCART	691234.49	4314882.08	165.60	165.60
DISCCART	691234.49	4315882.08	159.21	159.21
DISCCART	691234.49	4316882.08	158.11	158.11
DISCCART	691234.49	4317882.08	146.50	159.47
DISCCART	691234.49	4318882.08	156.74	156.74
DISCCART	691234.49	4319882.08	176.73	176.73
DISCCART	692234.49	4257882.08	172.01	190.76
DISCCART	692234.49	4256882.08	173.54	204.06
DISCCART	692234.49	4255882.08	158.69	210.72
DISCCART	692234.49	4254882.08	140.93	140.93
DISCCART	692234.49	4253882.08	142.82	142.82
DISCCART	692234.49	4252882.08	151.08	205.36
DISCCART	692234.49	4251882.08	157.49	220.90
DISCCART	692234.49	4250882.08	177.41	209.25
DISCCART	692234.49	4249882.08	204.06	215.03
DISCCART	692234.49	4248882.08	228.38	232.19
DISCCART	692234.49	4247882.08	194.58	215.50
DISCCART	692234.49	4246882.08	187.59	227.75
DISCCART	692234.49	4245882.08	207.09	207.09
DISCCART	692234.49	4244882.08	268.01	270.84
DISCCART	692234.49	4243882.08	216.70	278.24
DISCCART	692234.49	4242882.08	204.23	207.59
DISCCART	692234.49	4241882.08	201.18	215.12
DISCCART	692234.49	4240882.08	197.72	200.89
DISCCART	692234.49	4239882.08	197.93	197.93
DISCCART	692234.49	4238882.08	200.62	200.62
DISCCART	692234.49	4237882.08	213.72	213.72
DISCCART	692234.49	4236882.08	229.53	229.53
DISCCART	692234.49	4235882.08	217.83	234.52
DISCCART	692234.49	4234882.08	229.55	239.18
DISCCART	692234.49	4233882.08	241.77	250.21
DISCCART	692234.49	4232882.08	257.40	257.40
DISCCART	692234.49	4231882.08	206.42	232.70
DISCCART	692234.49	4230882.08	215.37	256.19
DISCCART	692234.49	4229882.08	247.80	250.52
DISCCART	692234.49	4228882.08	244.39	244.39

DISCCART	692234.49	4227882.08	259.11	259.11
DISCCART	692234.49	4226882.08	265.00	265.00
DISCCART	692234.49	4225882.08	273.87	273.87
DISCCART	692234.49	4224882.08	275.88	275.88
DISCCART	692234.49	4223882.08	260.92	260.92
DISCCART	692234.49	4222882.08	260.34	260.34
DISCCART	692234.49	4221882.08	270.46	279.65
DISCCART	692234.49	4220882.08	258.67	270.08
DISCCART	692234.49	4280882.08	190.14	205.00
DISCCART	692234.49	4281882.08	214.29	221.72
DISCCART	692234.49	4282882.08	207.33	220.06
DISCCART	692234.49	4283882.08	175.26	214.34
DISCCART	692234.49	4284882.08	213.72	213.72
DISCCART	692234.49	4285882.08	206.40	206.40
DISCCART	692234.49	4286882.08	185.27	189.09
DISCCART	692234.49	4287882.08	185.34	188.50
DISCCART	692234.49	4288882.08	175.95	175.95
DISCCART	692234.49	4289882.08	156.03	185.91
DISCCART	692234.49	4290882.08	189.08	189.08
DISCCART	692234.49	4291882.08	185.98	185.98
DISCCART	692234.49	4292882.08	178.98	180.80
DISCCART	692234.49	4293882.08	189.35	189.35
DISCCART	692234.49	4294882.08	184.63	184.63
DISCCART	692234.49	4295882.08	166.77	166.77
DISCCART	692234.49	4296882.08	165.42	165.42
DISCCART	692234.49	4297882.08	169.52	169.52
DISCCART	692234.49	4298882.08	180.89	182.99
DISCCART	692234.49	4299882.08	182.22	182.22
DISCCART	692234.49	4300882.08	177.35	177.35
DISCCART	692234.49	4301882.08	184.78	184.78
DISCCART	692234.49	4302882.08	184.29	184.29
DISCCART	692234.49	4303882.08	177.54	177.54
DISCCART	692234.49	4304882.08	173.79	173.79
DISCCART	692234.49	4305882.08	167.69	167.69
DISCCART	692234.49	4306882.08	153.12	153.12
DISCCART	692234.49	4307882.08	152.21	152.21
DISCCART	692234.49	4308882.08	142.87	142.87
DISCCART	692234.49	4309882.08	138.62	140.42
DISCCART	692234.49	4310882.08	142.99	145.26
DISCCART	692234.49	4311882.08	152.62	152.62
DISCCART	692234.49	4312882.08	148.67	148.67
DISCCART	692234.49	4313882.08	157.84	157.84
DISCCART	692234.49	4314882.08	156.83	156.83
DISCCART	692234.49	4315882.08	143.54	153.89
DISCCART	692234.49	4316882.08	161.52	164.92
DISCCART	692234.49	4317882.08	157.33	167.03
DISCCART	692234.49	4318882.08	157.40	157.40
DISCCART	692234.49	4319882.08	154.51	154.51
DISCCART	693234.49	4257882.08	153.18	197.82
DISCCART	693234.49	4256882.08	172.09	190.69
DISCCART	693234.49	4255882.08	163.86	163.86
DISCCART	693234.49	4254882.08	182.98	202.13
DISCCART	693234.49	4253882.08	152.28	211.61
DISCCART	693234.49	4252882.08	169.20	215.60
DISCCART	693234.49	4251882.08	148.24	148.24
DISCCART	693234.49	4250882.08	162.50	204.32
DISCCART	693234.49	4249882.08	190.89	194.99
DISCCART	693234.49	4248882.08	193.19	216.75
DISCCART	693234.49	4247882.08	223.43	239.84
DISCCART	693234.49	4246882.08	255.04	255.04
DISCCART	693234.49	4245882.08	213.69	227.55
DISCCART	693234.49	4244882.08	240.49	240.49
DISCCART	693234.49	4243882.08	238.18	238.18
DISCCART	693234.49	4242882.08	235.06	252.32
DISCCART	693234.49	4241882.08	204.99	206.98
DISCCART	693234.49	4240882.08	218.89	232.75

DISCCART	693234.49	4239882.08	216.84	216.84
DISCCART	693234.49	4238882.08	214.10	214.10
DISCCART	693234.49	4237882.08	214.02	214.02
DISCCART	693234.49	4236882.08	256.42	256.42
DISCCART	693234.49	4235882.08	209.24	221.79
DISCCART	693234.49	4234882.08	206.69	227.43
DISCCART	693234.49	4233882.08	197.73	243.66
DISCCART	693234.49	4232882.08	247.82	252.82
DISCCART	693234.49	4231882.08	213.79	243.78
DISCCART	693234.49	4230882.08	219.85	227.45
DISCCART	693234.49	4229882.08	219.43	262.48
DISCCART	693234.49	4228882.08	238.14	262.30
DISCCART	693234.49	4227882.08	218.96	239.20
DISCCART	693234.49	4226882.08	231.48	257.42
DISCCART	693234.49	4225882.08	265.95	265.95
DISCCART	693234.49	4224882.08	265.57	265.57
DISCCART	693234.49	4223882.08	258.38	258.38
DISCCART	693234.49	4222882.08	284.09	284.09
DISCCART	693234.49	4221882.08	280.04	280.04
DISCCART	693234.49	4220882.08	239.59	269.84
DISCCART	693234.49	4280882.08	166.92	196.81
DISCCART	693234.49	4281882.08	169.62	220.76
DISCCART	693234.49	4282882.08	164.89	218.30
DISCCART	693234.49	4283882.08	187.01	213.30
DISCCART	693234.49	4284882.08	188.14	188.95
DISCCART	693234.49	4285882.08	204.19	204.19
DISCCART	693234.49	4286882.08	195.06	195.06
DISCCART	693234.49	4287882.08	181.37	181.37
DISCCART	693234.49	4288882.08	170.92	170.92
DISCCART	693234.49	4289882.08	152.24	178.67
DISCCART	693234.49	4290882.08	183.44	183.44
DISCCART	693234.49	4291882.08	170.10	170.10
DISCCART	693234.49	4292882.08	180.55	180.55
DISCCART	693234.49	4293882.08	188.95	188.95
DISCCART	693234.49	4294882.08	169.88	169.88
DISCCART	693234.49	4295882.08	153.29	166.80
DISCCART	693234.49	4296882.08	149.38	149.38
DISCCART	693234.49	4297882.08	164.80	171.70
DISCCART	693234.49	4298882.08	172.80	172.80
DISCCART	693234.49	4299882.08	168.94	170.14
DISCCART	693234.49	4300882.08	156.47	170.37
DISCCART	693234.49	4301882.08	172.45	172.45
DISCCART	693234.49	4302882.08	172.46	172.46
DISCCART	693234.49	4303882.08	178.12	178.12
DISCCART	693234.49	4304882.08	163.94	163.94
DISCCART	693234.49	4305882.08	152.89	152.89
DISCCART	693234.49	4306882.08	152.37	152.37
DISCCART	693234.49	4307882.08	144.28	144.28
DISCCART	693234.49	4308882.08	143.07	143.07
DISCCART	693234.49	4309882.08	142.65	142.65
DISCCART	693234.49	4310882.08	140.65	140.65
DISCCART	693234.49	4311882.08	144.82	144.82
DISCCART	693234.49	4312882.08	152.13	152.13
DISCCART	693234.49	4313882.08	169.23	169.23
DISCCART	693234.49	4314882.08	152.42	152.42
DISCCART	693234.49	4315882.08	158.53	158.53
DISCCART	693234.49	4316882.08	137.04	166.05
DISCCART	693234.49	4317882.08	151.66	165.97
DISCCART	693234.49	4318882.08	172.64	172.64
DISCCART	693234.49	4319882.08	157.12	158.18
DISCCART	694234.49	4257882.08	141.42	141.42
DISCCART	694234.49	4256882.08	152.10	152.10
DISCCART	694234.49	4255882.08	145.39	145.39
DISCCART	694234.49	4254882.08	158.26	158.26
DISCCART	694234.49	4253882.08	161.41	195.12
DISCCART	694234.49	4252882.08	173.13	213.50

DISCCART	694234.49	4251882.08	161.97	210.02
DISCCART	694234.49	4250882.08	160.78	204.27
DISCCART	694234.49	4249882.08	185.54	208.35
DISCCART	694234.49	4248882.08	175.41	177.58
DISCCART	694234.49	4247882.08	199.64	215.07
DISCCART	694234.49	4246882.08	215.41	232.50
DISCCART	694234.49	4245882.08	223.22	233.92
DISCCART	694234.49	4244882.08	222.70	233.79
DISCCART	694234.49	4243882.08	216.47	232.39
DISCCART	694234.49	4242882.08	237.39	263.32
DISCCART	694234.49	4241882.08	220.66	220.66
DISCCART	694234.49	4240882.08	215.39	215.39
DISCCART	694234.49	4239882.08	243.08	243.08
DISCCART	694234.49	4238882.08	235.43	235.43
DISCCART	694234.49	4237882.08	230.15	230.15
DISCCART	694234.49	4236882.08	224.81	224.81
DISCCART	694234.49	4235882.08	212.38	220.29
DISCCART	694234.49	4234882.08	186.18	209.32
DISCCART	694234.49	4233882.08	214.42	232.64
DISCCART	694234.49	4232882.08	249.80	253.17
DISCCART	694234.49	4231882.08	206.16	230.21
DISCCART	694234.49	4230882.08	183.51	233.64
DISCCART	694234.49	4229882.08	220.45	244.19
DISCCART	694234.49	4228882.08	245.88	245.88
DISCCART	694234.49	4227882.08	225.11	238.18
DISCCART	694234.49	4226882.08	235.22	237.93
DISCCART	694234.49	4225882.08	248.38	248.38
DISCCART	694234.49	4224882.08	250.54	250.54
DISCCART	694234.49	4223882.08	255.54	255.54
DISCCART	694234.49	4222882.08	247.00	247.00
DISCCART	694234.49	4221882.08	279.81	279.81
DISCCART	694234.49	4220882.08	260.38	288.62
DISCCART	694234.49	4280882.08	165.65	165.65
DISCCART	694234.49	4281882.08	160.58	208.28
DISCCART	694234.49	4282882.08	156.03	215.08
DISCCART	694234.49	4283882.08	190.46	216.41
DISCCART	694234.49	4284882.08	214.18	214.18
DISCCART	694234.49	4285882.08	203.81	203.81
DISCCART	694234.49	4286882.08	189.80	189.80
DISCCART	694234.49	4287882.08	169.91	169.91
DISCCART	694234.49	4288882.08	174.44	174.44
DISCCART	694234.49	4289882.08	152.66	152.66
DISCCART	694234.49	4290882.08	159.11	159.11
DISCCART	694234.49	4291882.08	179.24	179.24
DISCCART	694234.49	4292882.08	180.75	180.75
DISCCART	694234.49	4293882.08	180.48	180.48
DISCCART	694234.49	4294882.08	172.81	172.81
DISCCART	694234.49	4295882.08	164.07	165.25
DISCCART	694234.49	4296882.08	149.38	170.92
DISCCART	694234.49	4297882.08	143.43	168.59
DISCCART	694234.49	4298882.08	167.87	167.87
DISCCART	694234.49	4299882.08	139.84	171.87
DISCCART	694234.49	4300882.08	170.79	170.79
DISCCART	694234.49	4301882.08	166.84	167.85
DISCCART	694234.49	4302882.08	176.76	176.76
DISCCART	694234.49	4303882.08	165.76	165.76
DISCCART	694234.49	4304882.08	166.50	166.50
DISCCART	694234.49	4305882.08	170.36	170.36
DISCCART	694234.49	4306882.08	157.66	157.66
DISCCART	694234.49	4307882.08	141.69	141.69
DISCCART	694234.49	4308882.08	143.04	143.04
DISCCART	694234.49	4309882.08	144.10	144.10
DISCCART	694234.49	4310882.08	138.75	138.75
DISCCART	694234.49	4311882.08	146.06	146.06
DISCCART	694234.49	4312882.08	154.63	154.63
DISCCART	694234.49	4313882.08	169.57	169.57

DISCCART	694234.49	4314882.08	153.42	153.42
DISCCART	694234.49	4315882.08	136.65	136.65
DISCCART	694234.49	4316882.08	155.97	165.95
DISCCART	694234.49	4317882.08	162.51	162.51
DISCCART	694234.49	4318882.08	151.11	151.11
DISCCART	694234.49	4319882.08	159.64	159.64
DISCCART	695234.49	4257882.08	139.52	139.52
DISCCART	695234.49	4256882.08	156.47	189.50
DISCCART	695234.49	4255882.08	175.92	196.64
DISCCART	695234.49	4254882.08	174.80	184.62
DISCCART	695234.49	4253882.08	196.05	210.93
DISCCART	695234.49	4252882.08	188.96	217.11
DISCCART	695234.49	4251882.08	208.77	209.93
DISCCART	695234.49	4250882.08	203.03	212.21
DISCCART	695234.49	4249882.08	179.79	183.74
DISCCART	695234.49	4248882.08	213.30	213.30
DISCCART	695234.49	4247882.08	208.44	221.93
DISCCART	695234.49	4246882.08	241.67	244.40
DISCCART	695234.49	4245882.08	218.37	219.47
DISCCART	695234.49	4244882.08	210.34	210.34
DISCCART	695234.49	4243882.08	195.03	226.62
DISCCART	695234.49	4242882.08	203.78	225.43
DISCCART	695234.49	4241882.08	229.93	238.97
DISCCART	695234.49	4240882.08	222.79	224.58
DISCCART	695234.49	4239882.08	242.09	243.44
DISCCART	695234.49	4238882.08	233.63	233.63
DISCCART	695234.49	4237882.08	207.76	232.30
DISCCART	695234.49	4236882.08	210.93	210.93
DISCCART	695234.49	4235882.08	190.80	215.17
DISCCART	695234.49	4234882.08	180.46	195.24
DISCCART	695234.49	4233882.08	214.58	221.31
DISCCART	695234.49	4232882.08	187.03	231.70
DISCCART	695234.49	4231882.08	214.13	214.13
DISCCART	695234.49	4230882.08	202.43	233.20
DISCCART	695234.49	4229882.08	203.64	232.64
DISCCART	695234.49	4228882.08	194.15	194.15
DISCCART	695234.49	4227882.08	204.61	219.67
DISCCART	695234.49	4226882.08	242.69	242.69
DISCCART	695234.49	4225882.08	241.27	241.27
DISCCART	695234.49	4224882.08	233.44	233.44
DISCCART	695234.49	4223882.08	244.34	244.34
DISCCART	695234.49	4222882.08	246.50	246.50
DISCCART	695234.49	4221882.08	259.16	259.16
DISCCART	695234.49	4220882.08	238.86	276.39
DISCCART	695234.49	4280882.08	140.26	140.26
DISCCART	695234.49	4281882.08	140.91	185.86
DISCCART	695234.49	4282882.08	159.84	214.87
DISCCART	695234.49	4283882.08	199.79	217.60
DISCCART	695234.49	4284882.08	213.55	213.55
DISCCART	695234.49	4285882.08	193.11	193.11
DISCCART	695234.49	4286882.08	194.54	194.54
DISCCART	695234.49	4287882.08	179.76	179.76
DISCCART	695234.49	4288882.08	164.42	164.42
DISCCART	695234.49	4289882.08	152.36	152.36
DISCCART	695234.49	4290882.08	172.41	172.41
DISCCART	695234.49	4291882.08	174.17	174.17
DISCCART	695234.49	4292882.08	182.75	182.75
DISCCART	695234.49	4293882.08	195.43	195.43
DISCCART	695234.49	4294882.08	175.68	193.15
DISCCART	695234.49	4295882.08	171.70	191.69
DISCCART	695234.49	4296882.08	189.32	189.32
DISCCART	695234.49	4297882.08	176.77	176.77
DISCCART	695234.49	4298882.08	173.15	177.33
DISCCART	695234.49	4299882.08	140.04	165.42
DISCCART	695234.49	4300882.08	157.54	171.73
DISCCART	695234.49	4301882.08	164.22	164.22

DISCCART	695234.49	4302882.08	173.75	173.75
DISCCART	695234.49	4303882.08	162.52	162.52
DISCCART	695234.49	4304882.08	163.83	163.83
DISCCART	695234.49	4305882.08	159.02	159.02
DISCCART	695234.49	4306882.08	146.89	146.89
DISCCART	695234.49	4307882.08	155.05	155.05
DISCCART	695234.49	4308882.08	153.23	153.23
DISCCART	695234.49	4309882.08	144.51	144.51
DISCCART	695234.49	4310882.08	133.33	134.83
DISCCART	695234.49	4311882.08	136.74	137.39
DISCCART	695234.49	4312882.08	148.85	157.12
DISCCART	695234.49	4313882.08	154.35	154.53
DISCCART	695234.49	4314882.08	149.46	149.46
DISCCART	695234.49	4315882.08	145.68	145.68
DISCCART	695234.49	4316882.08	146.20	146.20
DISCCART	695234.49	4317882.08	158.02	158.02
DISCCART	695234.49	4318882.08	150.07	153.37
DISCCART	695234.49	4319882.08	158.78	158.78
DISCCART	696234.49	4257882.08	137.03	137.03
DISCCART	696234.49	4256882.08	172.31	172.31
DISCCART	696234.49	4255882.08	168.87	186.12
DISCCART	696234.49	4254882.08	168.62	185.84
DISCCART	696234.49	4253882.08	197.23	197.23
DISCCART	696234.49	4252882.08	210.74	237.86
DISCCART	696234.49	4251882.08	196.69	214.38
DISCCART	696234.49	4250882.08	164.30	193.12
DISCCART	696234.49	4249882.08	175.62	175.62
DISCCART	696234.49	4248882.08	192.20	202.09
DISCCART	696234.49	4247882.08	198.03	198.03
DISCCART	696234.49	4246882.08	214.47	238.25
DISCCART	696234.49	4245882.08	200.10	232.86
DISCCART	696234.49	4244882.08	191.01	238.85
DISCCART	696234.49	4243882.08	223.81	229.73
DISCCART	696234.49	4242882.08	263.62	263.62
DISCCART	696234.49	4241882.08	225.26	225.26
DISCCART	696234.49	4240882.08	255.01	270.20
DISCCART	696234.49	4239882.08	256.13	260.90
DISCCART	696234.49	4238882.08	222.27	226.29
DISCCART	696234.49	4237882.08	192.93	227.43
DISCCART	696234.49	4236882.08	178.43	222.62
DISCCART	696234.49	4235882.08	193.06	202.90
DISCCART	696234.49	4234882.08	184.80	190.97
DISCCART	696234.49	4233882.08	212.42	213.49
DISCCART	696234.49	4232882.08	165.38	215.23
DISCCART	696234.49	4231882.08	164.70	215.92
DISCCART	696234.49	4230882.08	198.82	209.25
DISCCART	696234.49	4229882.08	210.74	213.85
DISCCART	696234.49	4228882.08	219.12	219.12
DISCCART	696234.49	4227882.08	241.33	241.33
DISCCART	696234.49	4226882.08	247.77	247.77
DISCCART	696234.49	4225882.08	237.54	237.54
DISCCART	696234.49	4224882.08	243.29	243.29
DISCCART	696234.49	4223882.08	237.98	257.19
DISCCART	696234.49	4222882.08	225.35	257.64
DISCCART	696234.49	4221882.08	262.94	262.94
DISCCART	696234.49	4220882.08	244.71	244.71
DISCCART	696234.49	4280882.08	140.13	140.13
DISCCART	696234.49	4281882.08	152.17	183.87
DISCCART	696234.49	4282882.08	162.18	208.26
DISCCART	696234.49	4283882.08	193.29	205.51
DISCCART	696234.49	4284882.08	199.25	207.38
DISCCART	696234.49	4285882.08	193.21	193.21
DISCCART	696234.49	4286882.08	182.93	182.93
DISCCART	696234.49	4287882.08	168.53	168.53
DISCCART	696234.49	4288882.08	177.75	177.75
DISCCART	696234.49	4289882.08	147.41	147.41

DISCCART	696234.49	4290882.08	162.80	168.08
DISCCART	696234.49	4291882.08	175.34	175.34
DISCCART	696234.49	4292882.08	186.64	186.64
DISCCART	696234.49	4293882.08	200.59	200.59
DISCCART	696234.49	4294882.08	192.27	192.27
DISCCART	696234.49	4295882.08	185.86	185.86
DISCCART	696234.49	4296882.08	185.50	189.15
DISCCART	696234.49	4297882.08	169.41	172.76
DISCCART	696234.49	4298882.08	168.05	168.05
DISCCART	696234.49	4299882.08	148.83	168.61
DISCCART	696234.49	4300882.08	177.07	177.07
DISCCART	696234.49	4301882.08	165.54	165.54
DISCCART	696234.49	4302882.08	155.94	155.94
DISCCART	696234.49	4303882.08	148.28	148.28
DISCCART	696234.49	4304882.08	159.61	159.61
DISCCART	696234.49	4305882.08	158.40	158.40
DISCCART	696234.49	4306882.08	156.16	156.16
DISCCART	696234.49	4307882.08	134.86	134.86
DISCCART	696234.49	4308882.08	132.19	132.19
DISCCART	696234.49	4309882.08	132.88	132.88
DISCCART	696234.49	4310882.08	133.74	133.74
DISCCART	696234.49	4311882.08	132.50	132.50
DISCCART	696234.49	4312882.08	131.52	131.52
DISCCART	696234.49	4313882.08	131.51	131.51
DISCCART	696234.49	4314882.08	133.21	133.21
DISCCART	696234.49	4315882.08	133.53	133.53
DISCCART	696234.49	4316882.08	131.92	131.92
DISCCART	696234.49	4317882.08	132.05	132.05
DISCCART	696234.49	4318882.08	133.54	133.54
DISCCART	696234.49	4319882.08	132.83	132.83
DISCCART	697234.49	4257882.08	148.69	242.41
DISCCART	697234.49	4256882.08	147.57	147.57
DISCCART	697234.49	4255882.08	170.05	184.09
DISCCART	697234.49	4254882.08	199.52	199.52
DISCCART	697234.49	4253882.08	198.40	245.62
DISCCART	697234.49	4252882.08	242.05	260.24
DISCCART	697234.49	4251882.08	205.19	216.10
DISCCART	697234.49	4250882.08	168.78	221.14
DISCCART	697234.49	4249882.08	188.74	219.82
DISCCART	697234.49	4248882.08	175.45	175.45
DISCCART	697234.49	4247882.08	169.50	169.50
DISCCART	697234.49	4246882.08	190.99	206.31
DISCCART	697234.49	4245882.08	192.60	221.92
DISCCART	697234.49	4244882.08	206.64	209.68
DISCCART	697234.49	4243882.08	216.41	228.75
DISCCART	697234.49	4242882.08	260.30	260.30
DISCCART	697234.49	4241882.08	242.75	262.91
DISCCART	697234.49	4240882.08	256.13	262.15
DISCCART	697234.49	4239882.08	231.98	247.05
DISCCART	697234.49	4238882.08	208.06	215.59
DISCCART	697234.49	4237882.08	219.79	219.79
DISCCART	697234.49	4236882.08	200.09	218.10
DISCCART	697234.49	4235882.08	171.33	215.04
DISCCART	697234.49	4234882.08	159.02	214.67
DISCCART	697234.49	4233882.08	164.42	198.65
DISCCART	697234.49	4232882.08	195.51	195.51
DISCCART	697234.49	4231882.08	215.87	215.87
DISCCART	697234.49	4230882.08	207.53	238.19
DISCCART	697234.49	4229882.08	232.38	238.94
DISCCART	697234.49	4228882.08	235.53	244.83
DISCCART	697234.49	4227882.08	217.14	232.58
DISCCART	697234.49	4226882.08	232.32	232.32
DISCCART	697234.49	4225882.08	232.25	232.25
DISCCART	697234.49	4224882.08	194.34	243.79
DISCCART	697234.49	4223882.08	229.69	251.62
DISCCART	697234.49	4222882.08	261.51	261.51

DISCCART	697234.49	4221882.08	261.76	261.76
DISCCART	697234.49	4220882.08	236.19	256.70
DISCCART	697234.49	4280882.08	136.33	136.33
DISCCART	697234.49	4281882.08	140.49	186.20
DISCCART	697234.49	4282882.08	178.83	184.45
DISCCART	697234.49	4283882.08	180.19	206.66
DISCCART	697234.49	4284882.08	197.81	201.50
DISCCART	697234.49	4285882.08	193.26	193.26
DISCCART	697234.49	4286882.08	173.84	177.34
DISCCART	697234.49	4287882.08	171.64	171.64
DISCCART	697234.49	4288882.08	157.28	157.28
DISCCART	697234.49	4289882.08	147.01	147.01
DISCCART	697234.49	4290882.08	156.07	156.07
DISCCART	697234.49	4291882.08	182.36	182.36
DISCCART	697234.49	4292882.08	175.44	176.49
DISCCART	697234.49	4293882.08	191.96	191.96
DISCCART	697234.49	4294882.08	190.34	190.34
DISCCART	697234.49	4295882.08	182.06	182.06
DISCCART	697234.49	4296882.08	174.83	174.83
DISCCART	697234.49	4297882.08	187.04	187.04
DISCCART	697234.49	4298882.08	149.74	174.48
DISCCART	697234.49	4299882.08	156.25	171.03
DISCCART	697234.49	4300882.08	161.05	161.05
DISCCART	697234.49	4301882.08	152.48	155.64
DISCCART	697234.49	4302882.08	154.36	154.36
DISCCART	697234.49	4303882.08	154.53	154.53
DISCCART	697234.49	4304882.08	150.13	150.13
DISCCART	697234.49	4305882.08	134.53	134.53
DISCCART	697234.49	4306882.08	131.75	131.75
DISCCART	697234.49	4307882.08	132.12	132.12
DISCCART	697234.49	4308882.08	130.92	130.92
DISCCART	697234.49	4309882.08	132.29	132.29
DISCCART	697234.49	4310882.08	131.90	133.76
DISCCART	697234.49	4311882.08	132.08	132.08
DISCCART	697234.49	4312882.08	131.42	131.42
DISCCART	697234.49	4313882.08	131.70	131.70
DISCCART	697234.49	4314882.08	131.83	131.83
DISCCART	697234.49	4315882.08	134.09	134.09
DISCCART	697234.49	4316882.08	131.36	131.36
DISCCART	697234.49	4317882.08	131.24	131.24
DISCCART	697234.49	4318882.08	130.98	130.98
DISCCART	697234.49	4319882.08	131.19	131.19
DISCCART	698234.49	4257882.08	221.16	242.41
DISCCART	698234.49	4256882.08	180.52	235.00
DISCCART	698234.49	4255882.08	168.73	250.42
DISCCART	698234.49	4254882.08	204.58	250.58
DISCCART	698234.49	4253882.08	224.26	259.97
DISCCART	698234.49	4252882.08	247.45	261.60
DISCCART	698234.49	4251882.08	211.87	211.87
DISCCART	698234.49	4250882.08	182.76	220.29
DISCCART	698234.49	4249882.08	223.67	223.67
DISCCART	698234.49	4248882.08	178.09	204.60
DISCCART	698234.49	4247882.08	181.53	181.53
DISCCART	698234.49	4246882.08	183.14	203.85
DISCCART	698234.49	4245882.08	211.12	221.12
DISCCART	698234.49	4244882.08	188.67	206.66
DISCCART	698234.49	4243882.08	210.20	210.20
DISCCART	698234.49	4242882.08	233.09	254.12
DISCCART	698234.49	4241882.08	248.14	251.16
DISCCART	698234.49	4240882.08	212.21	244.26
DISCCART	698234.49	4239882.08	226.13	245.96
DISCCART	698234.49	4238882.08	235.93	235.93
DISCCART	698234.49	4237882.08	193.03	211.37
DISCCART	698234.49	4236882.08	195.36	195.36
DISCCART	698234.49	4235882.08	159.49	191.75
DISCCART	698234.49	4234882.08	175.08	219.50

DISCCART	698234.49	4233882.08	185.78	220.90
DISCCART	698234.49	4232882.08	202.63	202.63
DISCCART	698234.49	4231882.08	208.63	208.63
DISCCART	698234.49	4230882.08	224.65	226.98
DISCCART	698234.49	4229882.08	205.86	244.31
DISCCART	698234.49	4228882.08	215.97	215.97
DISCCART	698234.49	4227882.08	209.02	227.35
DISCCART	698234.49	4226882.08	192.28	192.28
DISCCART	698234.49	4225882.08	185.78	202.89
DISCCART	698234.49	4224882.08	225.86	225.86
DISCCART	698234.49	4223882.08	207.98	246.55
DISCCART	698234.49	4222882.08	243.79	249.64
DISCCART	698234.49	4221882.08	255.49	255.49
DISCCART	698234.49	4220882.08	256.75	256.75
DISCCART	698234.49	4280882.08	139.75	139.75
DISCCART	698234.49	4281882.08	142.13	142.13
DISCCART	698234.49	4282882.08	170.46	172.04
DISCCART	698234.49	4283882.08	150.24	201.97
DISCCART	698234.49	4284882.08	187.92	198.93
DISCCART	698234.49	4285882.08	194.50	194.50
DISCCART	698234.49	4286882.08	189.26	189.26
DISCCART	698234.49	4287882.08	179.28	179.28
DISCCART	698234.49	4288882.08	175.45	175.45
DISCCART	698234.49	4289882.08	147.64	147.64
DISCCART	698234.49	4290882.08	157.79	157.79
DISCCART	698234.49	4291882.08	168.27	168.27
DISCCART	698234.49	4292882.08	179.60	179.60
DISCCART	698234.49	4293882.08	163.14	177.35
DISCCART	698234.49	4294882.08	186.87	186.87
DISCCART	698234.49	4295882.08	176.86	176.86
DISCCART	698234.49	4296882.08	188.46	188.46
DISCCART	698234.49	4297882.08	170.19	181.62
DISCCART	698234.49	4298882.08	161.45	175.34
DISCCART	698234.49	4299882.08	139.37	139.37
DISCCART	698234.49	4300882.08	151.55	152.61
DISCCART	698234.49	4301882.08	146.40	153.50
DISCCART	698234.49	4302882.08	147.14	152.68
DISCCART	698234.49	4303882.08	151.31	151.31
DISCCART	698234.49	4304882.08	132.12	132.12
DISCCART	698234.49	4305882.08	131.75	131.75
DISCCART	698234.49	4306882.08	132.03	132.03
DISCCART	698234.49	4307882.08	132.37	132.37
DISCCART	698234.49	4308882.08	131.39	131.39
DISCCART	698234.49	4309882.08	130.82	130.82
DISCCART	698234.49	4310882.08	131.75	131.75
DISCCART	698234.49	4311882.08	131.09	131.09
DISCCART	698234.49	4312882.08	131.40	131.40
DISCCART	698234.49	4313882.08	131.37	131.37
DISCCART	698234.49	4314882.08	131.47	131.47
DISCCART	698234.49	4315882.08	130.97	130.97
DISCCART	698234.49	4316882.08	132.75	134.54
DISCCART	698234.49	4317882.08	130.42	134.78
DISCCART	698234.49	4318882.08	131.40	131.40
DISCCART	698234.49	4319882.08	131.82	131.82
DISCCART	699234.49	4257882.08	191.40	231.85
DISCCART	699234.49	4256882.08	182.32	186.54
DISCCART	699234.49	4255882.08	203.31	242.23
DISCCART	699234.49	4254882.08	201.98	249.07
DISCCART	699234.49	4253882.08	206.25	255.26
DISCCART	699234.49	4252882.08	205.33	262.85
DISCCART	699234.49	4251882.08	197.87	208.49
DISCCART	699234.49	4250882.08	207.29	207.29
DISCCART	699234.49	4249882.08	219.86	225.50
DISCCART	699234.49	4248882.08	233.31	239.47
DISCCART	699234.49	4247882.08	199.28	229.00
DISCCART	699234.49	4246882.08	229.59	229.59

DISCCART	699234.49	4245882.08	214.45	238.13
DISCCART	699234.49	4244882.08	212.69	234.89
DISCCART	699234.49	4243882.08	207.01	236.04
DISCCART	699234.49	4242882.08	219.78	242.31
DISCCART	699234.49	4241882.08	223.79	225.35
DISCCART	699234.49	4240882.08	199.25	251.04
DISCCART	699234.49	4239882.08	230.52	250.21
DISCCART	699234.49	4238882.08	231.63	231.63
DISCCART	699234.49	4237882.08	200.42	203.77
DISCCART	699234.49	4236882.08	173.71	214.37
DISCCART	699234.49	4235882.08	181.00	181.00
DISCCART	699234.49	4234882.08	178.07	183.98
DISCCART	699234.49	4233882.08	205.35	205.35
DISCCART	699234.49	4232882.08	159.36	203.59
DISCCART	699234.49	4231882.08	185.73	213.30
DISCCART	699234.49	4230882.08	185.88	220.77
DISCCART	699234.49	4229882.08	195.17	221.21
DISCCART	699234.49	4228882.08	168.92	168.92
DISCCART	699234.49	4227882.08	194.47	194.97
DISCCART	699234.49	4226882.08	183.76	208.61
DISCCART	699234.49	4225882.08	216.77	216.77
DISCCART	699234.49	4224882.08	219.83	219.83
DISCCART	699234.49	4223882.08	224.90	245.68
DISCCART	699234.49	4222882.08	224.65	244.76
DISCCART	699234.49	4221882.08	233.54	245.19
DISCCART	699234.49	4220882.08	250.14	263.90
DISCCART	699234.49	4280882.08	141.08	141.08
DISCCART	699234.49	4281882.08	140.31	140.31
DISCCART	699234.49	4282882.08	139.53	139.53
DISCCART	699234.49	4283882.08	192.25	192.25
DISCCART	699234.49	4284882.08	195.67	195.67
DISCCART	699234.49	4285882.08	197.28	197.28
DISCCART	699234.49	4286882.08	182.25	182.25
DISCCART	699234.49	4287882.08	164.67	171.48
DISCCART	699234.49	4288882.08	161.37	161.37
DISCCART	699234.49	4289882.08	153.87	153.87
DISCCART	699234.49	4290882.08	146.98	146.98
DISCCART	699234.49	4291882.08	171.69	171.69
DISCCART	699234.49	4292882.08	154.21	154.21
DISCCART	699234.49	4293882.08	174.01	174.01
DISCCART	699234.49	4294882.08	184.59	186.31
DISCCART	699234.49	4295882.08	168.04	177.68
DISCCART	699234.49	4296882.08	179.77	179.77
DISCCART	699234.49	4297882.08	171.67	174.41
DISCCART	699234.49	4298882.08	159.37	159.37
DISCCART	699234.49	4299882.08	148.95	153.43
DISCCART	699234.49	4300882.08	135.69	151.12
DISCCART	699234.49	4301882.08	137.17	137.17
DISCCART	699234.49	4302882.08	134.96	149.43
DISCCART	699234.49	4303882.08	132.65	132.65
DISCCART	699234.49	4304882.08	131.41	131.41
DISCCART	699234.49	4305882.08	131.14	131.14
DISCCART	699234.49	4306882.08	131.62	131.62
DISCCART	699234.49	4307882.08	131.32	131.32
DISCCART	699234.49	4308882.08	128.92	131.02
DISCCART	699234.49	4309882.08	132.10	132.10
DISCCART	699234.49	4310882.08	129.75	129.75
DISCCART	699234.49	4311882.08	131.37	131.37
DISCCART	699234.49	4312882.08	129.60	131.13
DISCCART	699234.49	4313882.08	131.22	131.22
DISCCART	699234.49	4314882.08	130.40	130.40
DISCCART	699234.49	4315882.08	131.01	131.01
DISCCART	699234.49	4316882.08	130.84	130.84
DISCCART	699234.49	4317882.08	131.12	131.12
DISCCART	699234.49	4318882.08	131.47	131.47
DISCCART	699234.49	4319882.08	131.96	131.96

DISCCART	700234.49	4257882.08	152.34	152.34
DISCCART	700234.49	4256882.08	165.03	237.46
DISCCART	700234.49	4255882.08	222.40	227.56
DISCCART	700234.49	4254882.08	173.15	210.76
DISCCART	700234.49	4253882.08	198.94	251.22
DISCCART	700234.49	4252882.08	215.23	256.76
DISCCART	700234.49	4251882.08	215.31	265.51
DISCCART	700234.49	4250882.08	192.57	265.53
DISCCART	700234.49	4249882.08	176.24	236.12
DISCCART	700234.49	4248882.08	188.93	204.73
DISCCART	700234.49	4247882.08	197.73	208.27
DISCCART	700234.49	4246882.08	208.20	208.20
DISCCART	700234.49	4245882.08	194.02	229.92
DISCCART	700234.49	4244882.08	231.77	231.77
DISCCART	700234.49	4243882.08	239.80	239.80
DISCCART	700234.49	4242882.08	219.75	241.08
DISCCART	700234.49	4241882.08	193.24	221.96
DISCCART	700234.49	4240882.08	214.74	233.29
DISCCART	700234.49	4239882.08	191.51	222.85
DISCCART	700234.49	4238882.08	220.60	230.41
DISCCART	700234.49	4237882.08	186.75	197.32
DISCCART	700234.49	4236882.08	186.14	186.14
DISCCART	700234.49	4235882.08	152.09	202.79
DISCCART	700234.49	4234882.08	179.99	179.99
DISCCART	700234.49	4233882.08	154.15	207.52
DISCCART	700234.49	4232882.08	162.29	213.61
DISCCART	700234.49	4231882.08	169.77	196.11
DISCCART	700234.49	4230882.08	161.88	161.88
DISCCART	700234.49	4229882.08	197.15	206.28
DISCCART	700234.49	4228882.08	229.64	231.39
DISCCART	700234.49	4227882.08	169.53	233.01
DISCCART	700234.49	4226882.08	202.77	202.77
DISCCART	700234.49	4225882.08	185.61	185.61
DISCCART	700234.49	4224882.08	205.31	214.49
DISCCART	700234.49	4223882.08	174.02	233.51
DISCCART	700234.49	4222882.08	184.89	252.18
DISCCART	700234.49	4221882.08	223.21	236.39
DISCCART	700234.49	4220882.08	258.02	258.02
DISCCART	700234.49	4280882.08	139.78	139.78
DISCCART	700234.49	4281882.08	140.31	140.31
DISCCART	700234.49	4282882.08	139.51	139.51
DISCCART	700234.49	4283882.08	140.96	197.60
DISCCART	700234.49	4284882.08	191.49	191.49
DISCCART	700234.49	4285882.08	182.75	182.75
DISCCART	700234.49	4286882.08	186.31	186.31
DISCCART	700234.49	4287882.08	172.31	172.31
DISCCART	700234.49	4288882.08	170.51	170.51
DISCCART	700234.49	4289882.08	154.75	154.75
DISCCART	700234.49	4290882.08	144.55	144.55
DISCCART	700234.49	4291882.08	148.70	148.70
DISCCART	700234.49	4292882.08	149.83	149.83
DISCCART	700234.49	4293882.08	163.83	167.89
DISCCART	700234.49	4294882.08	180.85	180.85
DISCCART	700234.49	4295882.08	168.74	170.91
DISCCART	700234.49	4296882.08	163.61	172.07
DISCCART	700234.49	4297882.08	166.12	166.12
DISCCART	700234.49	4298882.08	161.89	161.89
DISCCART	700234.49	4299882.08	155.87	155.87
DISCCART	700234.49	4300882.08	149.62	149.62
DISCCART	700234.49	4301882.08	134.54	134.54
DISCCART	700234.49	4302882.08	132.75	132.75
DISCCART	700234.49	4303882.08	131.98	131.98
DISCCART	700234.49	4304882.08	131.42	131.42
DISCCART	700234.49	4305882.08	131.71	131.71
DISCCART	700234.49	4306882.08	132.04	132.04
DISCCART	700234.49	4307882.08	131.71	131.71

DISCCART	700234.49	4308882.08	134.95	134.95
DISCCART	700234.49	4309882.08	130.28	130.28
DISCCART	700234.49	4310882.08	129.27	129.27
DISCCART	700234.49	4311882.08	130.96	130.96
DISCCART	700234.49	4312882.08	130.03	130.03
DISCCART	700234.49	4313882.08	128.26	131.95
DISCCART	700234.49	4314882.08	131.89	131.89
DISCCART	700234.49	4315882.08	130.51	130.51
DISCCART	700234.49	4316882.08	130.84	130.84
DISCCART	700234.49	4317882.08	129.99	129.99
DISCCART	700234.49	4318882.08	131.50	131.97
DISCCART	700234.49	4319882.08	131.48	131.48
DISCCART	701234.49	4258882.08	134.22	134.22
DISCCART	701234.49	4257882.08	145.17	230.93
DISCCART	701234.49	4256882.08	175.46	238.24
DISCCART	701234.49	4255882.08	187.39	242.87
DISCCART	701234.49	4254882.08	179.89	242.50
DISCCART	701234.49	4253882.08	188.41	225.18
DISCCART	701234.49	4252882.08	166.68	238.41
DISCCART	701234.49	4251882.08	228.36	236.95
DISCCART	701234.49	4250882.08	189.65	250.66
DISCCART	701234.49	4249882.08	173.64	195.98
DISCCART	701234.49	4248882.08	188.17	196.18
DISCCART	701234.49	4247882.08	167.64	182.63
DISCCART	701234.49	4246882.08	169.28	169.28
DISCCART	701234.49	4245882.08	200.75	200.75
DISCCART	701234.49	4244882.08	210.20	225.84
DISCCART	701234.49	4243882.08	217.47	220.59
DISCCART	701234.49	4242882.08	210.71	230.08
DISCCART	701234.49	4241882.08	198.42	230.83
DISCCART	701234.49	4240882.08	188.24	188.24
DISCCART	701234.49	4239882.08	231.19	234.86
DISCCART	701234.49	4238882.08	209.99	246.16
DISCCART	701234.49	4237882.08	168.17	260.80
DISCCART	701234.49	4236882.08	176.06	204.36
DISCCART	701234.49	4235882.08	177.33	183.77
DISCCART	701234.49	4234882.08	177.74	183.11
DISCCART	701234.49	4233882.08	151.32	209.27
DISCCART	701234.49	4232882.08	183.28	203.07
DISCCART	701234.49	4231882.08	189.24	213.74
DISCCART	701234.49	4230882.08	202.08	202.08
DISCCART	701234.49	4229882.08	181.89	181.89
DISCCART	701234.49	4228882.08	190.59	202.91
DISCCART	701234.49	4227882.08	230.35	230.35
DISCCART	701234.49	4226882.08	198.51	221.50
DISCCART	701234.49	4225882.08	161.22	220.91
DISCCART	701234.49	4224882.08	165.73	209.49
DISCCART	701234.49	4223882.08	210.45	214.27
DISCCART	701234.49	4222882.08	191.67	217.80
DISCCART	701234.49	4221882.08	213.13	213.13
DISCCART	701234.49	4220882.08	251.90	251.90
DISCCART	701234.49	4259882.08	132.99	132.99
DISCCART	701234.49	4259882.08	132.99	132.99
DISCCART	701234.49	4260882.08	155.71	171.85
DISCCART	701234.49	4261882.08	167.40	167.40
DISCCART	701234.49	4262882.08	138.74	226.60
DISCCART	701234.49	4263882.08	144.47	215.84
DISCCART	701234.49	4264882.08	162.86	230.57
DISCCART	701234.49	4265882.08	204.43	259.49
DISCCART	701234.49	4266882.08	259.48	267.38
DISCCART	701234.49	4267882.08	256.50	262.85
DISCCART	701234.49	4268882.08	227.30	236.07
DISCCART	701234.49	4269882.08	233.69	248.15
DISCCART	701234.49	4270882.08	241.73	251.63
DISCCART	701234.49	4271882.08	226.00	230.55
DISCCART	701234.49	4272882.08	217.28	245.64

DISCCART	701234.49	4273882.08	239.67	239.67
DISCCART	701234.49	4274882.08	216.23	236.62
DISCCART	701234.49	4275882.08	225.73	225.73
DISCCART	701234.49	4276882.08	219.61	219.61
DISCCART	701234.49	4277882.08	205.88	216.44
DISCCART	701234.49	4278882.08	179.12	194.56
DISCCART	701234.49	4279882.08	179.12	207.24
DISCCART	701234.49	4280882.08	139.99	139.99
DISCCART	701234.49	4281882.08	135.58	141.19
DISCCART	701234.49	4282882.08	138.18	138.18
DISCCART	701234.49	4283882.08	135.39	135.39
DISCCART	701234.49	4284882.08	182.92	182.92
DISCCART	701234.49	4285882.08	161.81	186.29
DISCCART	701234.49	4286882.08	182.67	182.67
DISCCART	701234.49	4287882.08	157.49	157.49
DISCCART	701234.49	4288882.08	147.77	147.77
DISCCART	701234.49	4289882.08	154.38	154.38
DISCCART	701234.49	4290882.08	140.15	151.79
DISCCART	701234.49	4291882.08	154.13	154.13
DISCCART	701234.49	4292882.08	156.61	156.61
DISCCART	701234.49	4293882.08	176.75	183.55
DISCCART	701234.49	4294882.08	175.10	175.10
DISCCART	701234.49	4295882.08	159.25	164.95
DISCCART	701234.49	4296882.08	164.06	167.81
DISCCART	701234.49	4297882.08	154.96	154.96
DISCCART	701234.49	4298882.08	155.55	155.55
DISCCART	701234.49	4299882.08	157.48	157.48
DISCCART	701234.49	4300882.08	146.80	146.80
DISCCART	701234.49	4301882.08	133.83	133.83
DISCCART	701234.49	4302882.08	134.61	134.61
DISCCART	701234.49	4303882.08	132.12	132.12
DISCCART	701234.49	4304882.08	131.72	131.72
DISCCART	701234.49	4305882.08	131.01	131.01
DISCCART	701234.49	4306882.08	131.23	131.23
DISCCART	701234.49	4307882.08	131.43	131.43
DISCCART	701234.49	4308882.08	133.37	133.37
DISCCART	701234.49	4309882.08	132.12	132.12
DISCCART	701234.49	4310882.08	130.19	130.19
DISCCART	701234.49	4311882.08	130.37	130.37
DISCCART	701234.49	4312882.08	131.96	131.96
DISCCART	701234.49	4313882.08	131.55	131.55
DISCCART	701234.49	4314882.08	128.28	128.28
DISCCART	701234.49	4315882.08	128.28	128.28
DISCCART	701234.49	4316882.08	128.29	128.29
DISCCART	701234.49	4317882.08	128.29	209.22
DISCCART	701234.49	4318882.08	129.65	206.29
DISCCART	701234.49	4319882.08	130.24	197.19
DISCCART	702234.49	4258882.08	129.09	180.45
DISCCART	702234.49	4257882.08	128.43	230.93
DISCCART	702234.49	4256882.08	202.25	215.89
DISCCART	702234.49	4255882.08	155.70	214.06
DISCCART	702234.49	4254882.08	146.84	232.82
DISCCART	702234.49	4253882.08	166.42	255.09
DISCCART	702234.49	4252882.08	204.29	254.40
DISCCART	702234.49	4251882.08	224.71	260.36
DISCCART	702234.49	4250882.08	188.90	259.66
DISCCART	702234.49	4249882.08	167.61	189.35
DISCCART	702234.49	4248882.08	189.80	189.80
DISCCART	702234.49	4247882.08	187.43	201.52
DISCCART	702234.49	4246882.08	166.74	186.70
DISCCART	702234.49	4245882.08	200.19	200.19
DISCCART	702234.49	4244882.08	203.00	211.10
DISCCART	702234.49	4243882.08	205.11	205.11
DISCCART	702234.49	4242882.08	216.28	216.28
DISCCART	702234.49	4241882.08	182.64	211.16
DISCCART	702234.49	4240882.08	180.53	207.64

DISCCART	702234.49	4239882.08	180.27	238.08
DISCCART	702234.49	4238882.08	182.93	198.85
DISCCART	702234.49	4237882.08	146.21	203.07
DISCCART	702234.49	4236882.08	148.75	148.75
DISCCART	702234.49	4235882.08	154.17	190.09
DISCCART	702234.49	4234882.08	165.25	191.30
DISCCART	702234.49	4233882.08	152.96	203.44
DISCCART	702234.49	4232882.08	209.90	212.61
DISCCART	702234.49	4231882.08	213.73	213.73
DISCCART	702234.49	4230882.08	217.39	218.50
DISCCART	702234.49	4229882.08	203.96	203.96
DISCCART	702234.49	4228882.08	203.87	209.19
DISCCART	702234.49	4227882.08	214.51	214.51
DISCCART	702234.49	4226882.08	205.35	221.27
DISCCART	702234.49	4225882.08	198.07	245.78
DISCCART	702234.49	4224882.08	195.44	221.20
DISCCART	702234.49	4223882.08	171.64	209.68
DISCCART	702234.49	4222882.08	194.85	202.64
DISCCART	702234.49	4221882.08	220.12	225.06
DISCCART	702234.49	4220882.08	215.60	246.74
DISCCART	702234.49	4259882.08	170.78	170.78
DISCCART	702234.49	4259882.08	170.78	170.78
DISCCART	702234.49	4260882.08	134.04	193.34
DISCCART	702234.49	4261882.08	135.64	238.25
DISCCART	702234.49	4262882.08	137.71	238.25
DISCCART	702234.49	4263882.08	170.51	215.67
DISCCART	702234.49	4264882.08	166.94	167.47
DISCCART	702234.49	4265882.08	223.79	269.25
DISCCART	702234.49	4266882.08	232.56	276.07
DISCCART	702234.49	4267882.08	249.23	267.54
DISCCART	702234.49	4268882.08	195.95	258.35
DISCCART	702234.49	4269882.08	239.08	258.41
DISCCART	702234.49	4270882.08	200.94	251.81
DISCCART	702234.49	4271882.08	225.59	247.63
DISCCART	702234.49	4272882.08	243.01	246.97
DISCCART	702234.49	4273882.08	221.96	245.72
DISCCART	702234.49	4274882.08	216.80	220.91
DISCCART	702234.49	4275882.08	178.53	231.02
DISCCART	702234.49	4276882.08	169.19	220.40
DISCCART	702234.49	4277882.08	207.84	207.84
DISCCART	702234.49	4278882.08	173.98	205.74
DISCCART	702234.49	4279882.08	180.24	206.69
DISCCART	702234.49	4280882.08	140.96	140.96
DISCCART	702234.49	4281882.08	140.22	140.22
DISCCART	702234.49	4282882.08	140.04	144.12
DISCCART	702234.49	4283882.08	134.79	134.79
DISCCART	702234.49	4284882.08	179.86	181.06
DISCCART	702234.49	4285882.08	170.20	187.74
DISCCART	702234.49	4286882.08	186.49	186.49
DISCCART	702234.49	4287882.08	166.35	166.35
DISCCART	702234.49	4288882.08	165.17	171.11
DISCCART	702234.49	4289882.08	154.79	154.79
DISCCART	702234.49	4290882.08	141.25	141.25
DISCCART	702234.49	4291882.08	157.66	157.66
DISCCART	702234.49	4292882.08	170.83	170.83
DISCCART	702234.49	4293882.08	184.37	184.37
DISCCART	702234.49	4294882.08	170.70	170.70
DISCCART	702234.49	4295882.08	164.92	164.92
DISCCART	702234.49	4296882.08	144.76	156.78
DISCCART	702234.49	4297882.08	140.86	143.66
DISCCART	702234.49	4298882.08	148.68	148.68
DISCCART	702234.49	4299882.08	153.96	153.96
DISCCART	702234.49	4300882.08	132.05	132.05
DISCCART	702234.49	4301882.08	132.37	132.37
DISCCART	702234.49	4302882.08	133.22	133.22
DISCCART	702234.49	4303882.08	132.63	132.63

DISCCART	702234.49	4304882.08	131.68	132.30
DISCCART	702234.49	4305882.08	131.42	131.42
DISCCART	702234.49	4306882.08	130.68	130.68
DISCCART	702234.49	4307882.08	130.87	130.87
DISCCART	702234.49	4308882.08	131.25	131.25
DISCCART	702234.49	4309882.08	128.40	132.14
DISCCART	702234.49	4310882.08	130.28	130.28
DISCCART	702234.49	4311882.08	128.22	128.22
DISCCART	702234.49	4312882.08	128.22	128.22
DISCCART	702234.49	4313882.08	137.22	171.51
DISCCART	702234.49	4314882.08	168.83	168.83
DISCCART	702234.49	4315882.08	169.36	169.36
DISCCART	702234.49	4316882.08	164.27	173.71
DISCCART	702234.49	4317882.08	158.64	207.40
DISCCART	702234.49	4318882.08	193.55	193.55
DISCCART	702234.49	4319882.08	170.85	170.85
DISCCART	703234.49	4258882.08	136.40	136.40
DISCCART	703234.49	4257882.08	157.23	205.26
DISCCART	703234.49	4256882.08	142.37	231.08
DISCCART	703234.49	4255882.08	184.27	238.97
DISCCART	703234.49	4254882.08	229.45	247.90
DISCCART	703234.49	4253882.08	209.84	265.14
DISCCART	703234.49	4252882.08	216.52	270.44
DISCCART	703234.49	4251882.08	163.73	258.99
DISCCART	703234.49	4250882.08	182.65	195.96
DISCCART	703234.49	4249882.08	149.34	187.36
DISCCART	703234.49	4248882.08	172.06	183.57
DISCCART	703234.49	4247882.08	149.24	149.24
DISCCART	703234.49	4246882.08	174.21	193.41
DISCCART	703234.49	4245882.08	186.92	202.89
DISCCART	703234.49	4244882.08	187.69	190.07
DISCCART	703234.49	4243882.08	167.59	167.59
DISCCART	703234.49	4242882.08	203.97	203.97
DISCCART	703234.49	4241882.08	159.15	202.43
DISCCART	703234.49	4240882.08	191.87	212.36
DISCCART	703234.49	4239882.08	200.67	217.81
DISCCART	703234.49	4238882.08	146.07	186.89
DISCCART	703234.49	4237882.08	165.02	165.02
DISCCART	703234.49	4236882.08	185.26	196.30
DISCCART	703234.49	4235882.08	149.26	221.62
DISCCART	703234.49	4234882.08	158.39	158.39
DISCCART	703234.49	4233882.08	156.43	244.63
DISCCART	703234.49	4232882.08	193.66	244.63
DISCCART	703234.49	4231882.08	204.64	204.64
DISCCART	703234.49	4230882.08	192.18	192.18
DISCCART	703234.49	4229882.08	223.13	223.13
DISCCART	703234.49	4228882.08	224.70	224.70
DISCCART	703234.49	4227882.08	231.97	231.97
DISCCART	703234.49	4226882.08	230.49	230.98
DISCCART	703234.49	4225882.08	208.77	227.50
DISCCART	703234.49	4224882.08	206.14	258.98
DISCCART	703234.49	4223882.08	208.28	239.60
DISCCART	703234.49	4222882.08	210.23	216.03
DISCCART	703234.49	4221882.08	175.49	232.53
DISCCART	703234.49	4220882.08	200.23	231.87
DISCCART	703234.49	4259882.08	162.09	162.09
DISCCART	703234.49	4259882.08	162.09	162.09
DISCCART	703234.49	4260882.08	159.38	203.61
DISCCART	703234.49	4261882.08	185.21	239.13
DISCCART	703234.49	4262882.08	230.28	237.01
DISCCART	703234.49	4263882.08	165.52	208.08
DISCCART	703234.49	4264882.08	155.96	158.02
DISCCART	703234.49	4265882.08	201.89	269.01
DISCCART	703234.49	4266882.08	259.04	261.45
DISCCART	703234.49	4267882.08	248.36	269.56
DISCCART	703234.49	4268882.08	160.43	269.56

DISCCART	703234.49	4269882.08	201.80	258.06
DISCCART	703234.49	4270882.08	177.20	257.70
DISCCART	703234.49	4271882.08	235.12	246.24
DISCCART	703234.49	4272882.08	241.30	245.70
DISCCART	703234.49	4273882.08	223.94	238.14
DISCCART	703234.49	4274882.08	211.49	227.00
DISCCART	703234.49	4275882.08	205.57	234.86
DISCCART	703234.49	4276882.08	207.83	220.54
DISCCART	703234.49	4277882.08	215.53	215.53
DISCCART	703234.49	4278882.08	168.84	199.69
DISCCART	703234.49	4279882.08	204.77	206.18
DISCCART	703234.49	4280882.08	140.27	200.00
DISCCART	703234.49	4281882.08	140.28	140.28
DISCCART	703234.49	4282882.08	140.62	140.62
DISCCART	703234.49	4283882.08	139.39	139.39
DISCCART	703234.49	4284882.08	134.96	178.48
DISCCART	703234.49	4285882.08	165.48	177.23
DISCCART	703234.49	4286882.08	172.40	176.53
DISCCART	703234.49	4287882.08	173.17	180.96
DISCCART	703234.49	4288882.08	157.07	157.07
DISCCART	703234.49	4289882.08	167.83	167.83
DISCCART	703234.49	4290882.08	142.26	142.26
DISCCART	703234.49	4291882.08	143.56	143.56
DISCCART	703234.49	4292882.08	164.72	164.72
DISCCART	703234.49	4293882.08	166.41	171.70
DISCCART	703234.49	4294882.08	152.42	156.70
DISCCART	703234.49	4295882.08	162.04	162.04
DISCCART	703234.49	4296882.08	146.82	146.82
DISCCART	703234.49	4297882.08	153.16	153.16
DISCCART	703234.49	4298882.08	142.33	143.17
DISCCART	703234.49	4299882.08	134.26	134.26
DISCCART	703234.49	4300882.08	132.69	132.69
DISCCART	703234.49	4301882.08	131.52	131.52
DISCCART	703234.49	4302882.08	131.72	131.72
DISCCART	703234.49	4303882.08	131.67	131.67
DISCCART	703234.49	4304882.08	131.78	131.78
DISCCART	703234.49	4305882.08	131.24	131.24
DISCCART	703234.49	4306882.08	129.84	129.84
DISCCART	703234.49	4307882.08	131.88	131.88
DISCCART	703234.49	4308882.08	131.32	131.32
DISCCART	703234.49	4309882.08	128.40	128.40
DISCCART	703234.49	4310882.08	130.91	130.91
DISCCART	703234.49	4311882.08	130.69	170.06
DISCCART	703234.49	4312882.08	165.60	192.73
DISCCART	703234.49	4313882.08	158.12	196.71
DISCCART	703234.49	4314882.08	168.17	189.41
DISCCART	703234.49	4315882.08	156.34	159.03
DISCCART	703234.49	4316882.08	139.58	178.75
DISCCART	703234.49	4317882.08	177.14	177.14
DISCCART	703234.49	4318882.08	158.66	215.15
DISCCART	703234.49	4319882.08	161.35	214.86
DISCCART	704234.49	4258882.08	134.09	134.09
DISCCART	704234.49	4257882.08	142.19	230.01
DISCCART	704234.49	4256882.08	203.46	237.46
DISCCART	704234.49	4255882.08	182.73	241.71
DISCCART	704234.49	4254882.08	238.82	247.61
DISCCART	704234.49	4253882.08	261.59	269.54
DISCCART	704234.49	4252882.08	184.07	270.44
DISCCART	704234.49	4251882.08	145.42	152.56
DISCCART	704234.49	4250882.08	143.09	200.02
DISCCART	704234.49	4249882.08	142.93	142.93
DISCCART	704234.49	4248882.08	137.91	187.71
DISCCART	704234.49	4247882.08	147.37	191.14
DISCCART	704234.49	4246882.08	192.91	195.60
DISCCART	704234.49	4245882.08	165.95	190.61
DISCCART	704234.49	4244882.08	166.82	191.40

DISCCART	704234.49	4243882.08	199.57	201.13
DISCCART	704234.49	4242882.08	210.06	213.65
DISCCART	704234.49	4241882.08	156.23	195.16
DISCCART	704234.49	4240882.08	220.45	220.45
DISCCART	704234.49	4239882.08	177.03	192.85
DISCCART	704234.49	4238882.08	149.33	149.33
DISCCART	704234.49	4237882.08	144.52	215.69
DISCCART	704234.49	4236882.08	173.89	182.19
DISCCART	704234.49	4235882.08	194.76	194.76
DISCCART	704234.49	4234882.08	182.33	233.79
DISCCART	704234.49	4233882.08	181.53	221.04
DISCCART	704234.49	4232882.08	195.55	207.55
DISCCART	704234.49	4231882.08	187.83	196.56
DISCCART	704234.49	4230882.08	188.89	206.51
DISCCART	704234.49	4229882.08	194.87	202.30
DISCCART	704234.49	4228882.08	194.45	204.05
DISCCART	704234.49	4227882.08	198.42	198.42
DISCCART	704234.49	4226882.08	207.47	207.47
DISCCART	704234.49	4225882.08	216.17	220.80
DISCCART	704234.49	4224882.08	211.80	226.22
DISCCART	704234.49	4223882.08	251.07	264.29
DISCCART	704234.49	4222882.08	192.68	245.41
DISCCART	704234.49	4221882.08	212.25	225.99
DISCCART	704234.49	4220882.08	201.24	257.71
DISCCART	704234.49	4259882.08	131.80	185.30
DISCCART	704234.49	4259882.08	131.80	185.30
DISCCART	704234.49	4260882.08	127.66	218.93
DISCCART	704234.49	4261882.08	129.65	233.72
DISCCART	704234.49	4262882.08	181.09	230.84
DISCCART	704234.49	4263882.08	150.60	209.72
DISCCART	704234.49	4264882.08	166.97	227.68
DISCCART	704234.49	4265882.08	177.23	235.99
DISCCART	704234.49	4266882.08	226.18	247.70
DISCCART	704234.49	4267882.08	173.04	263.33
DISCCART	704234.49	4268882.08	178.18	187.39
DISCCART	704234.49	4269882.08	201.57	201.57
DISCCART	704234.49	4270882.08	231.28	233.13
DISCCART	704234.49	4271882.08	210.44	240.08
DISCCART	704234.49	4272882.08	241.70	241.70
DISCCART	704234.49	4273882.08	232.29	232.29
DISCCART	704234.49	4274882.08	199.57	229.22
DISCCART	704234.49	4275882.08	224.44	225.84
DISCCART	704234.49	4276882.08	220.15	220.15
DISCCART	704234.49	4277882.08	217.74	221.05
DISCCART	704234.49	4278882.08	179.31	209.62
DISCCART	704234.49	4279882.08	176.54	196.53
DISCCART	704234.49	4280882.08	143.11	205.77
DISCCART	704234.49	4281882.08	140.17	140.17
DISCCART	704234.49	4282882.08	140.08	140.08
DISCCART	704234.49	4283882.08	139.41	139.41
DISCCART	704234.49	4284882.08	134.76	134.76
DISCCART	704234.49	4285882.08	140.88	178.68
DISCCART	704234.49	4286882.08	176.61	176.61
DISCCART	704234.49	4287882.08	184.65	184.65
DISCCART	704234.49	4288882.08	175.42	184.29
DISCCART	704234.49	4289882.08	173.12	178.04
DISCCART	704234.49	4290882.08	158.67	158.67
DISCCART	704234.49	4291882.08	140.45	140.45
DISCCART	704234.49	4292882.08	163.20	163.20
DISCCART	704234.49	4293882.08	139.79	160.66
DISCCART	704234.49	4294882.08	140.31	140.31
DISCCART	704234.49	4295882.08	144.58	146.69
DISCCART	704234.49	4296882.08	138.45	144.39
DISCCART	704234.49	4297882.08	150.12	150.12
DISCCART	704234.49	4298882.08	143.31	147.92
DISCCART	704234.49	4299882.08	133.19	133.19

DISCCART	704234.49	4300882.08	132.63	132.63
DISCCART	704234.49	4301882.08	131.62	131.62
DISCCART	704234.49	4302882.08	131.58	131.58
DISCCART	704234.49	4303882.08	131.06	131.06
DISCCART	704234.49	4304882.08	129.80	129.80
DISCCART	704234.49	4305882.08	130.79	130.79
DISCCART	704234.49	4306882.08	131.14	131.14
DISCCART	704234.49	4307882.08	128.69	128.69
DISCCART	704234.49	4308882.08	128.19	128.19
DISCCART	704234.49	4309882.08	128.20	167.75
DISCCART	704234.49	4310882.08	187.88	200.31
DISCCART	704234.49	4311882.08	153.22	200.07
DISCCART	704234.49	4312882.08	153.07	153.07
DISCCART	704234.49	4313882.08	164.48	190.78
DISCCART	704234.49	4314882.08	171.98	185.17
DISCCART	704234.49	4315882.08	170.14	189.81
DISCCART	704234.49	4316882.08	154.74	172.74
DISCCART	704234.49	4317882.08	166.48	226.31
DISCCART	704234.49	4318882.08	193.24	227.68
DISCCART	704234.49	4319882.08	198.24	232.09
DISCCART	705234.49	4258882.08	161.01	229.49
DISCCART	705234.49	4257882.08	191.18	194.45
DISCCART	705234.49	4256882.08	223.36	245.91
DISCCART	705234.49	4255882.08	231.33	247.91
DISCCART	705234.49	4254882.08	203.79	205.99
DISCCART	705234.49	4253882.08	160.90	271.33
DISCCART	705234.49	4252882.08	165.33	170.12
DISCCART	705234.49	4251882.08	146.19	146.19
DISCCART	705234.49	4250882.08	137.02	137.02
DISCCART	705234.49	4249882.08	135.33	145.89
DISCCART	705234.49	4248882.08	139.42	166.28
DISCCART	705234.49	4247882.08	144.91	144.91
DISCCART	705234.49	4246882.08	137.38	193.91
DISCCART	705234.49	4245882.08	159.10	166.38
DISCCART	705234.49	4244882.08	190.36	211.25
DISCCART	705234.49	4243882.08	205.94	226.00
DISCCART	705234.49	4242882.08	177.77	213.51
DISCCART	705234.49	4241882.08	149.68	149.68
DISCCART	705234.49	4240882.08	169.79	204.81
DISCCART	705234.49	4239882.08	164.29	175.08
DISCCART	705234.49	4238882.08	144.95	144.95
DISCCART	705234.49	4237882.08	179.71	212.01
DISCCART	705234.49	4236882.08	174.86	193.50
DISCCART	705234.49	4235882.08	149.92	197.36
DISCCART	705234.49	4234882.08	152.57	202.49
DISCCART	705234.49	4233882.08	160.97	221.00
DISCCART	705234.49	4232882.08	159.12	213.39
DISCCART	705234.49	4231882.08	195.24	201.20
DISCCART	705234.49	4230882.08	175.91	195.78
DISCCART	705234.49	4229882.08	193.38	193.38
DISCCART	705234.49	4228882.08	202.97	207.10
DISCCART	705234.49	4227882.08	215.88	215.88
DISCCART	705234.49	4226882.08	196.81	202.30
DISCCART	705234.49	4225882.08	211.95	211.95
DISCCART	705234.49	4224882.08	224.03	226.03
DISCCART	705234.49	4223882.08	239.14	257.53
DISCCART	705234.49	4222882.08	246.27	249.14
DISCCART	705234.49	4221882.08	227.84	244.71
DISCCART	705234.49	4220882.08	249.36	256.10
DISCCART	705234.49	4259882.08	145.57	231.78
DISCCART	705234.49	4259882.08	145.57	231.78
DISCCART	705234.49	4260882.08	140.03	140.03
DISCCART	705234.49	4261882.08	136.08	136.08
DISCCART	705234.49	4262882.08	179.60	230.22
DISCCART	705234.49	4263882.08	142.78	220.24
DISCCART	705234.49	4264882.08	172.45	191.28

DISCCART	705234.49	4265882.08	153.46	192.20
DISCCART	705234.49	4266882.08	180.23	263.23
DISCCART	705234.49	4267882.08	177.98	263.23
DISCCART	705234.49	4268882.08	147.13	190.51
DISCCART	705234.49	4269882.08	153.89	235.56
DISCCART	705234.49	4270882.08	219.15	236.08
DISCCART	705234.49	4271882.08	223.03	242.19
DISCCART	705234.49	4272882.08	214.48	229.18
DISCCART	705234.49	4273882.08	216.40	227.08
DISCCART	705234.49	4274882.08	229.21	236.19
DISCCART	705234.49	4275882.08	223.74	226.23
DISCCART	705234.49	4276882.08	200.15	220.97
DISCCART	705234.49	4277882.08	210.78	210.78
DISCCART	705234.49	4278882.08	197.02	210.95
DISCCART	705234.49	4279882.08	147.94	201.96
DISCCART	705234.49	4280882.08	170.22	170.22
DISCCART	705234.49	4281882.08	139.29	139.29
DISCCART	705234.49	4282882.08	140.42	140.42
DISCCART	705234.49	4283882.08	137.58	137.58
DISCCART	705234.49	4284882.08	139.76	139.76
DISCCART	705234.49	4285882.08	158.97	177.22
DISCCART	705234.49	4286882.08	158.95	177.86
DISCCART	705234.49	4287882.08	179.60	181.87
DISCCART	705234.49	4288882.08	152.22	168.29
DISCCART	705234.49	4289882.08	168.06	168.06
DISCCART	705234.49	4290882.08	158.84	158.84
DISCCART	705234.49	4291882.08	139.99	139.99
DISCCART	705234.49	4292882.08	143.59	153.02
DISCCART	705234.49	4293882.08	140.17	140.17
DISCCART	705234.49	4294882.08	137.63	139.48
DISCCART	705234.49	4295882.08	138.42	138.80
DISCCART	705234.49	4296882.08	143.78	143.78
DISCCART	705234.49	4297882.08	134.20	140.19
DISCCART	705234.49	4298882.08	133.11	133.11
DISCCART	705234.49	4299882.08	132.05	132.05
DISCCART	705234.49	4300882.08	131.91	131.91
DISCCART	705234.49	4301882.08	131.35	131.35
DISCCART	705234.49	4302882.08	131.19	131.19
DISCCART	705234.49	4303882.08	130.82	130.82
DISCCART	705234.49	4304882.08	131.16	131.16
DISCCART	705234.49	4305882.08	131.35	131.35
DISCCART	705234.49	4306882.08	130.37	130.37
DISCCART	705234.49	4307882.08	128.19	128.19
DISCCART	705234.49	4308882.08	128.19	166.25
DISCCART	705234.49	4309882.08	133.13	165.93
DISCCART	705234.49	4310882.08	158.08	185.08
DISCCART	705234.49	4311882.08	192.07	192.07
DISCCART	705234.49	4312882.08	169.56	184.33
DISCCART	705234.49	4313882.08	169.26	172.42
DISCCART	705234.49	4314882.08	152.26	152.26
DISCCART	705234.49	4315882.08	161.72	161.72
DISCCART	705234.49	4316882.08	169.06	204.61
DISCCART	705234.49	4317882.08	193.77	223.12
DISCCART	705234.49	4318882.08	222.91	234.11
DISCCART	705234.49	4319882.08	227.39	238.66
DISCCART	706234.49	4258882.08	207.27	234.61
DISCCART	706234.49	4257882.08	232.36	232.36
DISCCART	706234.49	4256882.08	179.81	250.46
DISCCART	706234.49	4255882.08	202.36	250.65
DISCCART	706234.49	4254882.08	166.07	244.86
DISCCART	706234.49	4253882.08	178.42	178.42
DISCCART	706234.49	4252882.08	136.85	186.43
DISCCART	706234.49	4251882.08	134.82	134.82
DISCCART	706234.49	4250882.08	137.12	137.12
DISCCART	706234.49	4249882.08	160.69	160.69
DISCCART	706234.49	4248882.08	165.27	165.27

DISCCART	706234.49	4247882.08	183.83	183.83
DISCCART	706234.49	4246882.08	142.80	142.80
DISCCART	706234.49	4245882.08	159.12	159.12
DISCCART	706234.49	4244882.08	148.01	223.86
DISCCART	706234.49	4243882.08	138.75	226.24
DISCCART	706234.49	4242882.08	193.24	206.30
DISCCART	706234.49	4241882.08	143.52	143.52
DISCCART	706234.49	4240882.08	154.71	155.07
DISCCART	706234.49	4239882.08	143.70	192.94
DISCCART	706234.49	4238882.08	143.93	143.93
DISCCART	706234.49	4237882.08	190.44	194.75
DISCCART	706234.49	4236882.08	178.55	219.55
DISCCART	706234.49	4235882.08	185.43	208.53
DISCCART	706234.49	4234882.08	186.47	191.20
DISCCART	706234.49	4233882.08	204.49	226.13
DISCCART	706234.49	4232882.08	216.13	218.90
DISCCART	706234.49	4231882.08	195.78	214.78
DISCCART	706234.49	4230882.08	182.29	182.29
DISCCART	706234.49	4229882.08	215.97	221.06
DISCCART	706234.49	4228882.08	212.25	212.25
DISCCART	706234.49	4227882.08	210.83	210.83
DISCCART	706234.49	4226882.08	222.23	224.74
DISCCART	706234.49	4225882.08	221.66	221.66
DISCCART	706234.49	4224882.08	219.70	219.70
DISCCART	706234.49	4223882.08	249.58	249.58
DISCCART	706234.49	4222882.08	230.26	239.05
DISCCART	706234.49	4221882.08	227.15	245.48
DISCCART	706234.49	4220882.08	251.51	262.83
DISCCART	706234.49	4259882.08	171.27	232.35
DISCCART	706234.49	4259882.08	171.27	232.35
DISCCART	706234.49	4260882.08	152.54	212.40
DISCCART	706234.49	4261882.08	131.02	215.62
DISCCART	706234.49	4262882.08	192.26	217.21
DISCCART	706234.49	4263882.08	135.92	135.92
DISCCART	706234.49	4264882.08	155.90	169.65
DISCCART	706234.49	4265882.08	138.05	209.43
DISCCART	706234.49	4266882.08	183.19	250.47
DISCCART	706234.49	4267882.08	178.59	247.75
DISCCART	706234.49	4268882.08	149.34	177.79
DISCCART	706234.49	4269882.08	180.85	220.78
DISCCART	706234.49	4270882.08	199.63	238.48
DISCCART	706234.49	4271882.08	195.49	242.79
DISCCART	706234.49	4272882.08	233.00	233.00
DISCCART	706234.49	4273882.08	200.45	225.53
DISCCART	706234.49	4274882.08	227.72	227.72
DISCCART	706234.49	4275882.08	209.71	230.99
DISCCART	706234.49	4276882.08	207.99	216.57
DISCCART	706234.49	4277882.08	197.94	205.92
DISCCART	706234.49	4278882.08	193.07	196.42
DISCCART	706234.49	4279882.08	165.61	198.43
DISCCART	706234.49	4280882.08	146.94	157.36
DISCCART	706234.49	4281882.08	138.16	138.16
DISCCART	706234.49	4282882.08	138.17	138.17
DISCCART	706234.49	4283882.08	137.22	137.22
DISCCART	706234.49	4284882.08	138.78	138.78
DISCCART	706234.49	4285882.08	138.25	180.84
DISCCART	706234.49	4286882.08	188.26	209.26
DISCCART	706234.49	4287882.08	168.16	179.86
DISCCART	706234.49	4288882.08	154.28	166.50
DISCCART	706234.49	4289882.08	145.97	145.97
DISCCART	706234.49	4290882.08	155.02	155.02
DISCCART	706234.49	4291882.08	140.92	140.92
DISCCART	706234.49	4292882.08	141.10	141.10
DISCCART	706234.49	4293882.08	147.16	153.59
DISCCART	706234.49	4294882.08	152.36	152.36
DISCCART	706234.49	4295882.08	142.07	142.07

DISCCART	706234.49	4296882.08	147.78	147.78
DISCCART	706234.49	4297882.08	133.61	133.61
DISCCART	706234.49	4298882.08	131.84	131.84
DISCCART	706234.49	4299882.08	131.12	131.12
DISCCART	706234.49	4300882.08	132.05	132.96
DISCCART	706234.49	4301882.08	131.64	131.64
DISCCART	706234.49	4302882.08	130.25	131.87
DISCCART	706234.49	4303882.08	130.73	130.73
DISCCART	706234.49	4304882.08	131.98	131.98
DISCCART	706234.49	4305882.08	134.11	134.11
DISCCART	706234.49	4306882.08	128.16	128.16
DISCCART	706234.49	4307882.08	165.86	200.11
DISCCART	706234.49	4308882.08	137.30	162.23
DISCCART	706234.49	4309882.08	158.55	190.91
DISCCART	706234.49	4310882.08	161.58	190.81
DISCCART	706234.49	4311882.08	193.62	193.62
DISCCART	706234.49	4312882.08	162.14	187.11
DISCCART	706234.49	4313882.08	152.55	152.55
DISCCART	706234.49	4314882.08	153.12	153.12
DISCCART	706234.49	4315882.08	149.53	149.53
DISCCART	706234.49	4316882.08	177.82	177.82
DISCCART	706234.49	4317882.08	170.11	222.43
DISCCART	706234.49	4318882.08	217.47	221.51
DISCCART	706234.49	4319882.08	180.54	238.71
DISCCART	707234.49	4258882.08	182.06	232.13
DISCCART	707234.49	4257882.08	203.00	214.49
DISCCART	707234.49	4256882.08	208.70	237.91
DISCCART	707234.49	4255882.08	180.07	246.01
DISCCART	707234.49	4254882.08	150.08	230.39
DISCCART	707234.49	4253882.08	136.62	235.63
DISCCART	707234.49	4252882.08	134.95	235.63
DISCCART	707234.49	4251882.08	138.85	257.72
DISCCART	707234.49	4250882.08	140.23	177.95
DISCCART	707234.49	4249882.08	149.58	152.77
DISCCART	707234.49	4248882.08	170.16	220.29
DISCCART	707234.49	4247882.08	163.69	168.41
DISCCART	707234.49	4246882.08	171.40	177.96
DISCCART	707234.49	4245882.08	140.22	140.22
DISCCART	707234.49	4244882.08	147.20	200.15
DISCCART	707234.49	4243882.08	171.03	177.38
DISCCART	707234.49	4242882.08	150.09	150.09
DISCCART	707234.49	4241882.08	147.15	147.15
DISCCART	707234.49	4240882.08	170.39	211.42
DISCCART	707234.49	4239882.08	207.32	214.74
DISCCART	707234.49	4238882.08	173.98	212.71
DISCCART	707234.49	4237882.08	205.81	205.81
DISCCART	707234.49	4236882.08	230.59	235.29
DISCCART	707234.49	4235882.08	214.99	215.10
DISCCART	707234.49	4234882.08	207.61	219.77
DISCCART	707234.49	4233882.08	191.85	233.64
DISCCART	707234.49	4232882.08	207.18	215.20
DISCCART	707234.49	4231882.08	185.14	233.64
DISCCART	707234.49	4230882.08	220.91	220.91
DISCCART	707234.49	4229882.08	207.20	231.85
DISCCART	707234.49	4228882.08	243.15	246.97
DISCCART	707234.49	4227882.08	221.31	221.31
DISCCART	707234.49	4226882.08	237.36	237.36
DISCCART	707234.49	4225882.08	204.38	216.07
DISCCART	707234.49	4224882.08	242.75	242.75
DISCCART	707234.49	4223882.08	242.62	242.62
DISCCART	707234.49	4222882.08	256.04	256.04
DISCCART	707234.49	4221882.08	243.87	243.87
DISCCART	707234.49	4220882.08	241.11	250.45
DISCCART	707234.49	4259882.08	132.40	230.49
DISCCART	707234.49	4259882.08	132.40	230.49
DISCCART	707234.49	4260882.08	132.52	219.81

DISCCART	707234.49	4261882.08	144.25	193.19
DISCCART	707234.49	4262882.08	180.17	184.37
DISCCART	707234.49	4263882.08	134.00	134.00
DISCCART	707234.49	4264882.08	150.04	161.78
DISCCART	707234.49	4265882.08	124.73	214.19
DISCCART	707234.49	4266882.08	131.21	247.77
DISCCART	707234.49	4267882.08	131.99	200.13
DISCCART	707234.49	4268882.08	131.87	208.36
DISCCART	707234.49	4269882.08	180.81	234.41
DISCCART	707234.49	4270882.08	182.55	238.78
DISCCART	707234.49	4271882.08	217.08	222.16
DISCCART	707234.49	4272882.08	216.13	222.64
DISCCART	707234.49	4273882.08	194.86	220.42
DISCCART	707234.49	4274882.08	208.98	224.30
DISCCART	707234.49	4275882.08	205.23	215.09
DISCCART	707234.49	4276882.08	167.40	212.72
DISCCART	707234.49	4277882.08	203.81	204.51
DISCCART	707234.49	4278882.08	191.03	199.54
DISCCART	707234.49	4279882.08	164.67	184.37
DISCCART	707234.49	4280882.08	156.50	181.01
DISCCART	707234.49	4281882.08	139.74	139.74
DISCCART	707234.49	4282882.08	137.37	143.73
DISCCART	707234.49	4283882.08	138.14	138.14
DISCCART	707234.49	4284882.08	134.49	134.49
DISCCART	707234.49	4285882.08	139.50	139.50
DISCCART	707234.49	4286882.08	165.77	166.52
DISCCART	707234.49	4287882.08	196.14	196.14
DISCCART	707234.49	4288882.08	169.80	169.80
DISCCART	707234.49	4289882.08	169.63	169.63
DISCCART	707234.49	4290882.08	142.71	142.71
DISCCART	707234.49	4291882.08	145.98	145.98
DISCCART	707234.49	4292882.08	162.35	162.35
DISCCART	707234.49	4293882.08	168.55	168.55
DISCCART	707234.49	4294882.08	158.39	164.20
DISCCART	707234.49	4295882.08	144.17	144.17
DISCCART	707234.49	4296882.08	145.91	145.91
DISCCART	707234.49	4297882.08	132.01	132.01
DISCCART	707234.49	4298882.08	132.41	132.41
DISCCART	707234.49	4299882.08	132.21	132.21
DISCCART	707234.49	4300882.08	131.18	131.18
DISCCART	707234.49	4301882.08	130.69	130.69
DISCCART	707234.49	4302882.08	131.08	133.13
DISCCART	707234.49	4303882.08	130.74	130.74
DISCCART	707234.49	4304882.08	131.37	131.37
DISCCART	707234.49	4305882.08	130.78	130.78
DISCCART	707234.49	4306882.08	132.33	160.62
DISCCART	707234.49	4307882.08	152.13	152.13
DISCCART	707234.49	4308882.08	161.41	190.34
DISCCART	707234.49	4309882.08	168.73	196.19
DISCCART	707234.49	4310882.08	178.53	192.42
DISCCART	707234.49	4311882.08	158.65	158.65
DISCCART	707234.49	4312882.08	168.45	184.38
DISCCART	707234.49	4313882.08	152.38	152.38
DISCCART	707234.49	4314882.08	139.03	140.24
DISCCART	707234.49	4315882.08	164.42	164.42
DISCCART	707234.49	4316882.08	147.48	178.25
DISCCART	707234.49	4317882.08	141.39	222.43
DISCCART	707234.49	4318882.08	172.09	204.83
DISCCART	707234.49	4319882.08	205.02	228.65
DISCCART	708234.49	4258882.08	130.93	228.23
DISCCART	708234.49	4257882.08	158.48	228.03
DISCCART	708234.49	4256882.08	166.87	237.14
DISCCART	708234.49	4255882.08	197.97	235.04
DISCCART	708234.49	4254882.08	138.67	234.17
DISCCART	708234.49	4253882.08	169.96	235.63
DISCCART	708234.49	4252882.08	167.36	257.72

DISCCART	708234.49	4251882.08	206.63	258.04
DISCCART	708234.49	4250882.08	174.46	266.70
DISCCART	708234.49	4249882.08	157.03	269.35
DISCCART	708234.49	4248882.08	173.16	214.21
DISCCART	708234.49	4247882.08	172.01	172.01
DISCCART	708234.49	4246882.08	152.27	187.65
DISCCART	708234.49	4245882.08	148.29	184.51
DISCCART	708234.49	4244882.08	184.00	189.73
DISCCART	708234.49	4243882.08	178.85	195.52
DISCCART	708234.49	4242882.08	143.41	199.65
DISCCART	708234.49	4241882.08	159.48	160.64
DISCCART	708234.49	4240882.08	165.05	178.03
DISCCART	708234.49	4239882.08	167.03	221.69
DISCCART	708234.49	4238882.08	206.36	232.00
DISCCART	708234.49	4237882.08	202.03	227.73
DISCCART	708234.49	4236882.08	208.97	239.79
DISCCART	708234.49	4235882.08	207.75	220.92
DISCCART	708234.49	4234882.08	211.25	227.29
DISCCART	708234.49	4233882.08	218.84	231.97
DISCCART	708234.49	4232882.08	220.18	220.18
DISCCART	708234.49	4231882.08	217.22	217.22
DISCCART	708234.49	4230882.08	240.67	240.67
DISCCART	708234.49	4229882.08	226.30	245.27
DISCCART	708234.49	4228882.08	243.10	256.38
DISCCART	708234.49	4227882.08	239.65	239.65
DISCCART	708234.49	4226882.08	224.30	225.33
DISCCART	708234.49	4225882.08	230.24	230.24
DISCCART	708234.49	4224882.08	242.87	251.20
DISCCART	708234.49	4223882.08	234.75	234.75
DISCCART	708234.49	4222882.08	263.03	263.03
DISCCART	708234.49	4221882.08	248.75	256.51
DISCCART	708234.49	4220882.08	250.39	250.39
DISCCART	708234.49	4259882.08	143.71	143.71
DISCCART	708234.49	4259882.08	143.71	143.71
DISCCART	708234.49	4260882.08	124.03	177.12
DISCCART	708234.49	4261882.08	135.24	135.24
DISCCART	708234.49	4262882.08	154.45	172.70
DISCCART	708234.49	4263882.08	147.25	159.29
DISCCART	708234.49	4264882.08	133.08	133.08
DISCCART	708234.49	4265882.08	131.32	131.32
DISCCART	708234.49	4266882.08	138.42	138.42
DISCCART	708234.49	4267882.08	131.01	131.01
DISCCART	708234.49	4268882.08	131.01	225.12
DISCCART	708234.49	4269882.08	213.01	227.01
DISCCART	708234.49	4270882.08	208.15	232.65
DISCCART	708234.49	4271882.08	220.79	220.79
DISCCART	708234.49	4272882.08	207.55	220.53
DISCCART	708234.49	4273882.08	200.82	216.45
DISCCART	708234.49	4274882.08	214.13	216.86
DISCCART	708234.49	4275882.08	191.34	217.37
DISCCART	708234.49	4276882.08	214.08	214.08
DISCCART	708234.49	4277882.08	164.45	201.61
DISCCART	708234.49	4278882.08	167.44	196.56
DISCCART	708234.49	4279882.08	155.26	181.33
DISCCART	708234.49	4280882.08	179.47	183.28
DISCCART	708234.49	4281882.08	160.96	167.06
DISCCART	708234.49	4282882.08	139.20	139.20
DISCCART	708234.49	4283882.08	137.89	137.89
DISCCART	708234.49	4284882.08	138.35	138.35
DISCCART	708234.49	4285882.08	139.35	139.35
DISCCART	708234.49	4286882.08	145.39	204.23
DISCCART	708234.49	4287882.08	184.09	193.05
DISCCART	708234.49	4288882.08	177.18	180.67
DISCCART	708234.49	4289882.08	173.77	173.77
DISCCART	708234.49	4290882.08	154.99	167.84
DISCCART	708234.49	4291882.08	166.41	166.41

DISCCART	708234.49	4292882.08	167.61	171.84
DISCCART	708234.49	4293882.08	177.05	180.94
DISCCART	708234.49	4294882.08	171.60	171.60
DISCCART	708234.49	4295882.08	151.44	153.94
DISCCART	708234.49	4296882.08	145.80	145.80
DISCCART	708234.49	4297882.08	132.14	132.14
DISCCART	708234.49	4298882.08	130.94	130.94
DISCCART	708234.49	4299882.08	130.98	130.98
DISCCART	708234.49	4300882.08	130.32	130.32
DISCCART	708234.49	4301882.08	130.21	130.21
DISCCART	708234.49	4302882.08	131.61	131.61
DISCCART	708234.49	4303882.08	131.03	131.03
DISCCART	708234.49	4304882.08	128.16	128.16
DISCCART	708234.49	4305882.08	128.16	200.08
DISCCART	708234.49	4306882.08	143.28	152.00
DISCCART	708234.49	4307882.08	176.21	199.79
DISCCART	708234.49	4308882.08	197.53	197.53
DISCCART	708234.49	4309882.08	185.31	195.87
DISCCART	708234.49	4310882.08	182.65	182.90
DISCCART	708234.49	4311882.08	162.57	189.36
DISCCART	708234.49	4312882.08	145.75	154.97
DISCCART	708234.49	4313882.08	139.30	139.30
DISCCART	708234.49	4314882.08	137.28	143.80
DISCCART	708234.49	4315882.08	158.70	158.70
DISCCART	708234.49	4316882.08	137.19	167.08
DISCCART	708234.49	4317882.08	134.34	134.34
DISCCART	708234.49	4318882.08	134.92	134.92
DISCCART	708234.49	4319882.08	135.28	218.51
DISCCART	709234.49	4258882.08	151.30	205.35
DISCCART	709234.49	4257882.08	149.95	149.95
DISCCART	709234.49	4256882.08	188.72	235.12
DISCCART	709234.49	4255882.08	170.66	235.89
DISCCART	709234.49	4254882.08	135.32	215.81
DISCCART	709234.49	4253882.08	214.26	223.50
DISCCART	709234.49	4252882.08	242.19	242.19
DISCCART	709234.49	4251882.08	234.22	247.73
DISCCART	709234.49	4250882.08	227.64	269.35
DISCCART	709234.49	4249882.08	211.89	269.02
DISCCART	709234.49	4248882.08	181.54	258.28
DISCCART	709234.49	4247882.08	196.14	196.14
DISCCART	709234.49	4246882.08	180.01	199.47
DISCCART	709234.49	4245882.08	183.67	201.51
DISCCART	709234.49	4244882.08	150.26	184.60
DISCCART	709234.49	4243882.08	182.00	187.02
DISCCART	709234.49	4242882.08	150.95	199.26
DISCCART	709234.49	4241882.08	171.78	208.72
DISCCART	709234.49	4240882.08	207.11	214.13
DISCCART	709234.49	4239882.08	196.38	215.66
DISCCART	709234.49	4238882.08	205.30	229.66
DISCCART	709234.49	4237882.08	192.41	229.69
DISCCART	709234.49	4236882.08	211.19	227.31
DISCCART	709234.49	4235882.08	238.20	238.20
DISCCART	709234.49	4234882.08	248.60	249.76
DISCCART	709234.49	4233882.08	234.77	257.52
DISCCART	709234.49	4232882.08	229.08	229.08
DISCCART	709234.49	4231882.08	215.62	224.94
DISCCART	709234.49	4230882.08	211.53	225.15
DISCCART	709234.49	4229882.08	219.97	219.97
DISCCART	709234.49	4228882.08	210.89	220.19
DISCCART	709234.49	4227882.08	235.93	262.89
DISCCART	709234.49	4226882.08	251.44	251.44
DISCCART	709234.49	4225882.08	252.18	255.72
DISCCART	709234.49	4224882.08	226.56	256.24
DISCCART	709234.49	4223882.08	238.15	243.77
DISCCART	709234.49	4222882.08	236.25	236.25
DISCCART	709234.49	4221882.08	211.96	211.96

DISCCART	709234.49	4220882.08	245.01	250.09
DISCCART	709234.49	4259882.08	136.05	136.05
DISCCART	709234.49	4259882.08	136.05	136.05
DISCCART	709234.49	4260882.08	156.23	195.73
DISCCART	709234.49	4261882.08	154.41	203.44
DISCCART	709234.49	4262882.08	131.24	220.38
DISCCART	709234.49	4263882.08	131.33	131.33
DISCCART	709234.49	4264882.08	133.20	240.44
DISCCART	709234.49	4265882.08	163.70	240.44
DISCCART	709234.49	4266882.08	154.01	154.01
DISCCART	709234.49	4267882.08	123.97	128.16
DISCCART	709234.49	4268882.08	189.60	198.59
DISCCART	709234.49	4269882.08	225.71	228.23
DISCCART	709234.49	4270882.08	220.01	232.97
DISCCART	709234.49	4271882.08	235.04	238.22
DISCCART	709234.49	4272882.08	220.76	220.76
DISCCART	709234.49	4273882.08	219.82	219.82
DISCCART	709234.49	4274882.08	226.47	226.47
DISCCART	709234.49	4275882.08	217.41	217.41
DISCCART	709234.49	4276882.08	183.57	214.02
DISCCART	709234.49	4277882.08	174.64	196.23
DISCCART	709234.49	4278882.08	172.74	190.47
DISCCART	709234.49	4279882.08	187.19	190.96
DISCCART	709234.49	4280882.08	162.85	175.92
DISCCART	709234.49	4281882.08	152.64	171.20
DISCCART	709234.49	4282882.08	138.71	138.71
DISCCART	709234.49	4283882.08	133.25	133.25
DISCCART	709234.49	4284882.08	137.35	137.35
DISCCART	709234.49	4285882.08	137.28	137.28
DISCCART	709234.49	4286882.08	138.83	191.71
DISCCART	709234.49	4287882.08	164.12	192.85
DISCCART	709234.49	4288882.08	185.76	185.76
DISCCART	709234.49	4289882.08	165.65	170.46
DISCCART	709234.49	4290882.08	170.24	170.24
DISCCART	709234.49	4291882.08	163.86	164.34
DISCCART	709234.49	4292882.08	176.64	183.01
DISCCART	709234.49	4293882.08	181.18	181.18
DISCCART	709234.49	4294882.08	157.43	157.43
DISCCART	709234.49	4295882.08	157.38	157.38
DISCCART	709234.49	4296882.08	158.65	158.65
DISCCART	709234.49	4297882.08	130.37	164.64
DISCCART	709234.49	4298882.08	130.21	130.21
DISCCART	709234.49	4299882.08	130.14	132.87
DISCCART	709234.49	4300882.08	130.39	130.39
DISCCART	709234.49	4301882.08	129.54	129.54
DISCCART	709234.49	4302882.08	129.90	129.90
DISCCART	709234.49	4303882.08	129.65	130.52
DISCCART	709234.49	4304882.08	128.35	128.35
DISCCART	709234.49	4305882.08	159.61	202.35
DISCCART	709234.49	4306882.08	149.74	197.31
DISCCART	709234.49	4307882.08	197.14	207.55
DISCCART	709234.49	4308882.08	161.49	186.74
DISCCART	709234.49	4309882.08	164.68	186.83
DISCCART	709234.49	4310882.08	167.38	190.10
DISCCART	709234.49	4311882.08	149.94	149.94
DISCCART	709234.49	4312882.08	155.30	167.29
DISCCART	709234.49	4313882.08	152.86	161.09
DISCCART	709234.49	4314882.08	134.13	134.13
DISCCART	709234.49	4315882.08	134.59	134.59
DISCCART	709234.49	4316882.08	134.56	134.56
DISCCART	709234.49	4317882.08	135.13	135.13
DISCCART	709234.49	4318882.08	129.55	129.55
DISCCART	709234.49	4319882.08	127.50	127.50
DISCCART	710234.49	4258882.08	132.54	162.61
DISCCART	710234.49	4257882.08	135.28	135.28
DISCCART	710234.49	4256882.08	136.33	217.98

DISCCART	710234.49	4255882.08	134.43	217.98
DISCCART	710234.49	4254882.08	133.01	239.35
DISCCART	710234.49	4253882.08	200.61	239.35
DISCCART	710234.49	4252882.08	159.28	246.05
DISCCART	710234.49	4251882.08	169.03	249.03
DISCCART	710234.49	4250882.08	222.97	254.89
DISCCART	710234.49	4249882.08	203.27	268.57
DISCCART	710234.49	4248882.08	225.74	266.77
DISCCART	710234.49	4247882.08	256.20	263.62
DISCCART	710234.49	4246882.08	190.03	202.47
DISCCART	710234.49	4245882.08	184.12	184.12
DISCCART	710234.49	4244882.08	169.26	171.78
DISCCART	710234.49	4243882.08	182.50	189.29
DISCCART	710234.49	4242882.08	172.79	198.97
DISCCART	710234.49	4241882.08	183.11	195.68
DISCCART	710234.49	4240882.08	180.84	192.71
DISCCART	710234.49	4239882.08	160.46	205.73
DISCCART	710234.49	4238882.08	174.40	215.90
DISCCART	710234.49	4237882.08	188.72	215.84
DISCCART	710234.49	4236882.08	220.87	236.29
DISCCART	710234.49	4235882.08	195.05	226.98
DISCCART	710234.49	4234882.08	215.20	238.90
DISCCART	710234.49	4233882.08	228.53	261.98
DISCCART	710234.49	4232882.08	232.13	237.39
DISCCART	710234.49	4231882.08	212.46	215.61
DISCCART	710234.49	4230882.08	213.71	219.71
DISCCART	710234.49	4229882.08	185.85	185.85
DISCCART	710234.49	4228882.08	214.29	218.39
DISCCART	710234.49	4227882.08	216.38	216.38
DISCCART	710234.49	4226882.08	207.41	233.04
DISCCART	710234.49	4225882.08	200.59	226.35
DISCCART	710234.49	4224882.08	201.35	201.35
DISCCART	710234.49	4223882.08	234.17	234.17
DISCCART	710234.49	4222882.08	219.54	219.54
DISCCART	710234.49	4221882.08	209.95	212.00
DISCCART	710234.49	4220882.08	222.77	222.77
DISCCART	710234.49	4259882.08	131.15	134.45
DISCCART	710234.49	4259882.08	131.15	134.45
DISCCART	710234.49	4260882.08	128.82	262.16
DISCCART	710234.49	4261882.08	179.30	254.74
DISCCART	710234.49	4262882.08	178.51	257.13
DISCCART	710234.49	4263882.08	184.97	245.44
DISCCART	710234.49	4264882.08	138.05	241.45
DISCCART	710234.49	4265882.08	219.08	220.31
DISCCART	710234.49	4266882.08	160.99	238.23
DISCCART	710234.49	4267882.08	121.41	212.77
DISCCART	710234.49	4268882.08	167.17	232.25
DISCCART	710234.49	4269882.08	218.53	230.25
DISCCART	710234.49	4270882.08	182.37	225.77
DISCCART	710234.49	4271882.08	193.28	221.05
DISCCART	710234.49	4272882.08	182.84	217.62
DISCCART	710234.49	4273882.08	204.37	215.64
DISCCART	710234.49	4274882.08	215.61	215.61
DISCCART	710234.49	4275882.08	212.53	212.53
DISCCART	710234.49	4276882.08	196.85	196.85
DISCCART	710234.49	4277882.08	180.46	180.46
DISCCART	710234.49	4278882.08	194.00	194.00
DISCCART	710234.49	4279882.08	175.23	181.88
DISCCART	710234.49	4280882.08	156.34	180.94
DISCCART	710234.49	4281882.08	160.12	162.01
DISCCART	710234.49	4282882.08	139.75	139.75
DISCCART	710234.49	4283882.08	138.39	138.39
DISCCART	710234.49	4284882.08	137.00	137.00
DISCCART	710234.49	4285882.08	137.43	137.43
DISCCART	710234.49	4286882.08	138.34	138.34
DISCCART	710234.49	4287882.08	162.79	189.68

DISCCART	710234.49	4288882.08	178.08	193.07
DISCCART	710234.49	4289882.08	177.12	180.58
DISCCART	710234.49	4290882.08	191.26	191.26
DISCCART	710234.49	4291882.08	182.33	182.33
DISCCART	710234.49	4292882.08	175.46	183.45
DISCCART	710234.49	4293882.08	158.43	158.43
DISCCART	710234.49	4294882.08	173.49	173.49
DISCCART	710234.49	4295882.08	163.58	163.58
DISCCART	710234.49	4296882.08	165.10	165.10
DISCCART	710234.49	4297882.08	131.38	167.64
DISCCART	710234.49	4298882.08	129.17	129.17
DISCCART	710234.49	4299882.08	129.77	129.77
DISCCART	710234.49	4300882.08	128.82	128.82
DISCCART	710234.49	4301882.08	129.18	129.18
DISCCART	710234.49	4302882.08	129.73	129.73
DISCCART	710234.49	4303882.08	130.33	130.33
DISCCART	710234.49	4304882.08	128.17	128.17
DISCCART	710234.49	4305882.08	154.59	187.04
DISCCART	710234.49	4306882.08	171.05	188.99
DISCCART	710234.49	4307882.08	200.43	200.43
DISCCART	710234.49	4308882.08	158.17	186.37
DISCCART	710234.49	4309882.08	158.41	158.41
DISCCART	710234.49	4310882.08	171.45	171.45
DISCCART	710234.49	4311882.08	160.84	160.84
DISCCART	710234.49	4312882.08	138.57	157.17
DISCCART	710234.49	4313882.08	135.65	135.65
DISCCART	710234.49	4314882.08	135.43	135.43
DISCCART	710234.49	4315882.08	133.07	133.07
DISCCART	710234.49	4316882.08	127.50	127.50
DISCCART	710234.49	4317882.08	127.50	127.50
DISCCART	710234.49	4318882.08	128.03	129.12
DISCCART	710234.49	4319882.08	129.44	129.44
DISCCART	711234.49	4258882.08	145.90	278.52
DISCCART	711234.49	4257882.08	168.48	171.23
DISCCART	711234.49	4256882.08	182.52	206.44
DISCCART	711234.49	4255882.08	184.34	210.65
DISCCART	711234.49	4254882.08	139.42	219.41
DISCCART	711234.49	4253882.08	161.94	230.11
DISCCART	711234.49	4252882.08	231.87	235.60
DISCCART	711234.49	4251882.08	177.99	246.10
DISCCART	711234.49	4250882.08	183.53	250.75
DISCCART	711234.49	4249882.08	213.74	260.89
DISCCART	711234.49	4248882.08	263.81	266.29
DISCCART	711234.49	4247882.08	247.81	285.02
DISCCART	711234.49	4246882.08	200.98	268.81
DISCCART	711234.49	4245882.08	195.09	203.34
DISCCART	711234.49	4244882.08	166.33	177.17
DISCCART	711234.49	4243882.08	168.38	189.44
DISCCART	711234.49	4242882.08	165.06	189.52
DISCCART	711234.49	4241882.08	206.46	207.83
DISCCART	711234.49	4240882.08	165.52	202.51
DISCCART	711234.49	4239882.08	206.82	216.60
DISCCART	711234.49	4238882.08	176.62	206.69
DISCCART	711234.49	4237882.08	203.54	208.32
DISCCART	711234.49	4236882.08	188.98	215.05
DISCCART	711234.49	4235882.08	193.31	220.48
DISCCART	711234.49	4234882.08	234.39	237.61
DISCCART	711234.49	4233882.08	244.30	257.50
DISCCART	711234.49	4232882.08	227.18	250.90
DISCCART	711234.49	4231882.08	224.44	224.44
DISCCART	711234.49	4230882.08	221.19	221.19
DISCCART	711234.49	4229882.08	165.44	196.80
DISCCART	711234.49	4228882.08	203.95	214.23
DISCCART	711234.49	4227882.08	198.83	214.97
DISCCART	711234.49	4226882.08	216.93	220.28
DISCCART	711234.49	4225882.08	187.34	202.42

DISCCART	711234.49	4224882.08	208.58	208.58
DISCCART	711234.49	4223882.08	215.42	215.42
DISCCART	711234.49	4222882.08	212.40	219.94
DISCCART	711234.49	4221882.08	212.09	212.09
DISCCART	711234.49	4220882.08	214.44	218.41
DISCCART	711234.49	4259882.08	144.15	268.56
DISCCART	711234.49	4259882.08	144.15	268.56
DISCCART	711234.49	4260882.08	188.33	262.16
DISCCART	711234.49	4261882.08	199.64	263.31
DISCCART	711234.49	4262882.08	164.52	263.31
DISCCART	711234.49	4263882.08	181.34	205.64
DISCCART	711234.49	4264882.08	158.93	245.38
DISCCART	711234.49	4265882.08	244.53	244.53
DISCCART	711234.49	4266882.08	185.05	236.87
DISCCART	711234.49	4267882.08	121.37	229.11
DISCCART	711234.49	4268882.08	178.28	218.50
DISCCART	711234.49	4269882.08	227.47	227.47
DISCCART	711234.49	4270882.08	167.09	219.58
DISCCART	711234.49	4271882.08	163.59	217.01
DISCCART	711234.49	4272882.08	211.27	211.27
DISCCART	711234.49	4273882.08	211.05	211.05
DISCCART	711234.49	4274882.08	215.48	215.48
DISCCART	711234.49	4275882.08	208.13	208.13
DISCCART	711234.49	4276882.08	207.48	207.48
DISCCART	711234.49	4277882.08	190.52	190.52
DISCCART	711234.49	4278882.08	180.98	191.12
DISCCART	711234.49	4279882.08	176.87	184.10
DISCCART	711234.49	4280882.08	169.19	179.63
DISCCART	711234.49	4281882.08	165.05	168.05
DISCCART	711234.49	4282882.08	138.61	138.61
DISCCART	711234.49	4283882.08	137.02	137.02
DISCCART	711234.49	4284882.08	138.10	138.10
DISCCART	711234.49	4285882.08	138.41	138.41
DISCCART	711234.49	4286882.08	138.38	138.38
DISCCART	711234.49	4287882.08	139.70	190.97
DISCCART	711234.49	4288882.08	186.05	186.05
DISCCART	711234.49	4289882.08	172.63	172.63
DISCCART	711234.49	4290882.08	166.36	169.48
DISCCART	711234.49	4291882.08	186.38	186.38
DISCCART	711234.49	4292882.08	171.32	178.54
DISCCART	711234.49	4293882.08	180.80	180.80
DISCCART	711234.49	4294882.08	176.19	176.19
DISCCART	711234.49	4295882.08	160.63	168.90
DISCCART	711234.49	4296882.08	151.91	155.58
DISCCART	711234.49	4297882.08	154.53	162.04
DISCCART	711234.49	4298882.08	129.22	129.22
DISCCART	711234.49	4299882.08	129.23	129.23
DISCCART	711234.49	4300882.08	129.86	129.86
DISCCART	711234.49	4301882.08	129.35	129.35
DISCCART	711234.49	4302882.08	129.40	129.40
DISCCART	711234.49	4303882.08	129.84	129.84
DISCCART	711234.49	4304882.08	127.99	127.99
DISCCART	711234.49	4305882.08	134.76	144.34
DISCCART	711234.49	4306882.08	164.23	195.41
DISCCART	711234.49	4307882.08	149.64	192.82
DISCCART	711234.49	4308882.08	188.56	192.31
DISCCART	711234.49	4309882.08	151.81	155.37
DISCCART	711234.49	4310882.08	149.89	154.51
DISCCART	711234.49	4311882.08	154.48	156.92
DISCCART	711234.49	4312882.08	136.12	159.79
DISCCART	711234.49	4313882.08	135.06	135.06
DISCCART	711234.49	4314882.08	128.77	128.77
DISCCART	711234.49	4315882.08	127.51	127.51
DISCCART	711234.49	4316882.08	127.51	127.51
DISCCART	711234.49	4317882.08	127.49	127.49
DISCCART	711234.49	4318882.08	127.96	127.96

DISCCART	711234.49	4319882.08	127.96	127.96
DISCCART	712234.49	4258882.08	242.13	278.52
DISCCART	712234.49	4257882.08	190.63	278.52
DISCCART	712234.49	4256882.08	152.25	152.25
DISCCART	712234.49	4255882.08	180.55	217.63
DISCCART	712234.49	4254882.08	201.16	203.03
DISCCART	712234.49	4253882.08	143.35	232.69
DISCCART	712234.49	4252882.08	162.69	239.50
DISCCART	712234.49	4251882.08	182.57	250.42
DISCCART	712234.49	4250882.08	209.01	253.61
DISCCART	712234.49	4249882.08	243.30	253.89
DISCCART	712234.49	4248882.08	249.41	276.61
DISCCART	712234.49	4247882.08	246.45	285.85
DISCCART	712234.49	4246882.08	219.65	290.11
DISCCART	712234.49	4245882.08	195.01	195.01
DISCCART	712234.49	4244882.08	191.14	201.26
DISCCART	712234.49	4243882.08	182.39	195.50
DISCCART	712234.49	4242882.08	179.56	197.32
DISCCART	712234.49	4241882.08	209.16	213.29
DISCCART	712234.49	4240882.08	190.28	206.66
DISCCART	712234.49	4239882.08	182.65	215.78
DISCCART	712234.49	4238882.08	215.65	220.55
DISCCART	712234.49	4237882.08	210.26	222.62
DISCCART	712234.49	4236882.08	209.87	219.68
DISCCART	712234.49	4235882.08	228.49	238.11
DISCCART	712234.49	4234882.08	200.91	244.59
DISCCART	712234.49	4233882.08	244.04	244.04
DISCCART	712234.49	4232882.08	241.96	251.98
DISCCART	712234.49	4231882.08	217.79	245.56
DISCCART	712234.49	4230882.08	193.68	220.49
DISCCART	712234.49	4229882.08	192.68	197.92
DISCCART	712234.49	4228882.08	168.09	196.04
DISCCART	712234.49	4227882.08	200.56	208.80
DISCCART	712234.49	4226882.08	173.65	196.69
DISCCART	712234.49	4225882.08	164.30	201.73
DISCCART	712234.49	4224882.08	219.82	219.82
DISCCART	712234.49	4223882.08	188.69	202.53
DISCCART	712234.49	4222882.08	207.68	207.68
DISCCART	712234.49	4221882.08	211.75	211.75
DISCCART	712234.49	4220882.08	195.61	203.81
DISCCART	712234.49	4259882.08	199.88	268.56
DISCCART	712234.49	4259882.08	199.88	268.56
DISCCART	712234.49	4260882.08	184.36	267.49
DISCCART	712234.49	4261882.08	178.54	263.31
DISCCART	712234.49	4262882.08	176.95	254.64
DISCCART	712234.49	4263882.08	179.90	246.09
DISCCART	712234.49	4264882.08	145.65	246.09
DISCCART	712234.49	4265882.08	178.43	235.28
DISCCART	712234.49	4266882.08	207.25	210.55
DISCCART	712234.49	4267882.08	177.71	186.15
DISCCART	712234.49	4268882.08	126.33	217.15
DISCCART	712234.49	4269882.08	169.30	217.15
DISCCART	712234.49	4270882.08	165.18	207.48
DISCCART	712234.49	4271882.08	204.36	204.36
DISCCART	712234.49	4272882.08	203.73	204.36
DISCCART	712234.49	4273882.08	205.02	205.02
DISCCART	712234.49	4274882.08	183.28	183.28
DISCCART	712234.49	4275882.08	201.83	201.83
DISCCART	712234.49	4276882.08	193.91	193.91
DISCCART	712234.49	4277882.08	195.91	195.91
DISCCART	712234.49	4278882.08	179.95	185.44
DISCCART	712234.49	4279882.08	189.74	189.74
DISCCART	712234.49	4280882.08	194.68	194.68
DISCCART	712234.49	4281882.08	153.41	185.17
DISCCART	712234.49	4282882.08	139.36	175.80
DISCCART	712234.49	4283882.08	136.31	136.31

DISCCART	712234.49	4284882.08	137.86	137.86
DISCCART	712234.49	4285882.08	136.36	136.36
DISCCART	712234.49	4286882.08	137.93	137.93
DISCCART	712234.49	4287882.08	137.14	137.14
DISCCART	712234.49	4288882.08	164.40	174.00
DISCCART	712234.49	4289882.08	167.91	170.96
DISCCART	712234.49	4290882.08	161.47	171.66
DISCCART	712234.49	4291882.08	178.85	183.59
DISCCART	712234.49	4292882.08	186.97	191.30
DISCCART	712234.49	4293882.08	173.89	182.98
DISCCART	712234.49	4294882.08	167.12	167.12
DISCCART	712234.49	4295882.08	164.59	164.59
DISCCART	712234.49	4296882.08	156.35	156.35
DISCCART	712234.49	4297882.08	148.86	148.86
DISCCART	712234.49	4298882.08	130.47	130.47
DISCCART	712234.49	4299882.08	132.91	132.91
DISCCART	712234.49	4300882.08	129.52	129.52
DISCCART	712234.49	4301882.08	129.56	129.56
DISCCART	712234.49	4302882.08	130.02	130.02
DISCCART	712234.49	4303882.08	130.58	130.58
DISCCART	712234.49	4304882.08	128.91	128.91
DISCCART	712234.49	4305882.08	152.86	155.03
DISCCART	712234.49	4306882.08	166.01	190.25
DISCCART	712234.49	4307882.08	149.78	151.92
DISCCART	712234.49	4308882.08	159.11	159.11
DISCCART	712234.49	4309882.08	148.74	181.13
DISCCART	712234.49	4310882.08	142.79	142.79
DISCCART	712234.49	4311882.08	141.39	158.15
DISCCART	712234.49	4312882.08	136.39	136.39
DISCCART	712234.49	4313882.08	127.27	127.27
DISCCART	712234.49	4314882.08	127.26	127.26
DISCCART	712234.49	4315882.08	128.13	128.13
DISCCART	712234.49	4316882.08	127.87	251.53
DISCCART	712234.49	4317882.08	128.13	251.53
DISCCART	712234.49	4318882.08	129.73	238.11
DISCCART	712234.49	4319882.08	128.54	250.90
DISCCART	713234.49	4258882.08	246.13	270.13
DISCCART	713234.49	4257882.08	175.74	273.61
DISCCART	713234.49	4256882.08	198.64	198.64
DISCCART	713234.49	4255882.08	171.29	171.29
DISCCART	713234.49	4254882.08	178.69	221.74
DISCCART	713234.49	4253882.08	179.57	216.69
DISCCART	713234.49	4252882.08	146.13	239.50
DISCCART	713234.49	4251882.08	242.05	244.65
DISCCART	713234.49	4250882.08	226.05	251.96
DISCCART	713234.49	4249882.08	249.15	254.90
DISCCART	713234.49	4248882.08	193.26	279.29
DISCCART	713234.49	4247882.08	234.86	287.08
DISCCART	713234.49	4246882.08	251.86	273.72
DISCCART	713234.49	4245882.08	194.22	293.68
DISCCART	713234.49	4244882.08	191.12	200.17
DISCCART	713234.49	4243882.08	217.56	217.56
DISCCART	713234.49	4242882.08	207.53	207.53
DISCCART	713234.49	4241882.08	197.69	215.19
DISCCART	713234.49	4240882.08	206.25	250.47
DISCCART	713234.49	4239882.08	216.19	254.27
DISCCART	713234.49	4238882.08	205.98	251.25
DISCCART	713234.49	4237882.08	193.02	204.63
DISCCART	713234.49	4236882.08	224.56	225.41
DISCCART	713234.49	4235882.08	226.33	237.99
DISCCART	713234.49	4234882.08	238.23	238.23
DISCCART	713234.49	4233882.08	250.80	250.80
DISCCART	713234.49	4232882.08	223.68	232.93
DISCCART	713234.49	4231882.08	181.21	239.78
DISCCART	713234.49	4230882.08	168.29	215.47
DISCCART	713234.49	4229882.08	173.12	190.17

DISCCART	713234.49	4228882.08	166.06	177.05
DISCCART	713234.49	4227882.08	205.00	205.00
DISCCART	713234.49	4226882.08	160.72	195.96
DISCCART	713234.49	4225882.08	201.66	201.66
DISCCART	713234.49	4224882.08	170.16	170.16
DISCCART	713234.49	4223882.08	197.29	207.97
DISCCART	713234.49	4222882.08	192.87	194.33
DISCCART	713234.49	4221882.08	194.49	201.53
DISCCART	713234.49	4220882.08	189.95	195.61
DISCCART	713234.49	4259882.08	243.41	280.77
DISCCART	713234.49	4259882.08	243.41	280.77
DISCCART	713234.49	4260882.08	213.54	276.56
DISCCART	713234.49	4261882.08	234.57	261.26
DISCCART	713234.49	4262882.08	229.79	249.04
DISCCART	713234.49	4263882.08	193.68	243.06
DISCCART	713234.49	4264882.08	198.95	232.89
DISCCART	713234.49	4265882.08	223.92	233.38
DISCCART	713234.49	4266882.08	200.28	229.56
DISCCART	713234.49	4267882.08	179.29	219.93
DISCCART	713234.49	4268882.08	126.73	193.86
DISCCART	713234.49	4269882.08	150.79	200.54
DISCCART	713234.49	4270882.08	158.34	190.35
DISCCART	713234.49	4271882.08	175.15	186.72
DISCCART	713234.49	4272882.08	182.25	182.25
DISCCART	713234.49	4273882.08	179.75	184.11
DISCCART	713234.49	4274882.08	190.49	190.49
DISCCART	713234.49	4275882.08	192.00	192.00
DISCCART	713234.49	4276882.08	195.47	195.47
DISCCART	713234.49	4277882.08	165.93	202.31
DISCCART	713234.49	4278882.08	170.07	170.07
DISCCART	713234.49	4279882.08	162.59	186.56
DISCCART	713234.49	4280882.08	178.62	178.62
DISCCART	713234.49	4281882.08	195.56	195.56
DISCCART	713234.49	4282882.08	167.04	196.03
DISCCART	713234.49	4283882.08	139.33	142.93
DISCCART	713234.49	4284882.08	138.32	138.32
DISCCART	713234.49	4285882.08	137.10	137.10
DISCCART	713234.49	4286882.08	136.53	136.53
DISCCART	713234.49	4287882.08	136.06	136.06
DISCCART	713234.49	4288882.08	139.69	158.26
DISCCART	713234.49	4289882.08	148.28	165.72
DISCCART	713234.49	4290882.08	177.05	186.18
DISCCART	713234.49	4291882.08	175.78	188.53
DISCCART	713234.49	4292882.08	181.69	181.69
DISCCART	713234.49	4293882.08	175.40	175.40
DISCCART	713234.49	4294882.08	168.03	171.34
DISCCART	713234.49	4295882.08	161.97	161.97
DISCCART	713234.49	4296882.08	149.12	156.41
DISCCART	713234.49	4297882.08	154.84	154.84
DISCCART	713234.49	4298882.08	131.09	131.09
DISCCART	713234.49	4299882.08	130.45	132.85
DISCCART	713234.49	4300882.08	129.80	129.80
DISCCART	713234.49	4301882.08	130.07	130.07
DISCCART	713234.49	4302882.08	130.20	130.20
DISCCART	713234.49	4303882.08	128.13	129.89
DISCCART	713234.49	4304882.08	129.01	129.01
DISCCART	713234.49	4305882.08	127.80	127.80
DISCCART	713234.49	4306882.08	155.08	155.08
DISCCART	713234.49	4307882.08	155.39	155.39
DISCCART	713234.49	4308882.08	145.17	161.97
DISCCART	713234.49	4309882.08	150.08	150.08
DISCCART	713234.49	4310882.08	154.72	154.72
DISCCART	713234.49	4311882.08	136.99	136.99
DISCCART	713234.49	4312882.08	129.44	129.44
DISCCART	713234.49	4313882.08	127.30	127.30
DISCCART	713234.49	4314882.08	127.78	127.78

DISCCART	713234.49	4315882.08	127.76	127.76
DISCCART	713234.49	4316882.08	186.04	251.53
DISCCART	713234.49	4317882.08	216.48	248.74
DISCCART	713234.49	4318882.08	139.58	255.85
DISCCART	713234.49	4319882.08	212.29	250.90
DISCCART	714234.49	4258882.08	238.41	272.54
DISCCART	714234.49	4257882.08	235.09	273.61
DISCCART	714234.49	4256882.08	176.77	205.13
DISCCART	714234.49	4255882.08	166.46	200.12
DISCCART	714234.49	4254882.08	184.36	226.89
DISCCART	714234.49	4253882.08	191.37	202.05
DISCCART	714234.49	4252882.08	204.63	224.20
DISCCART	714234.49	4251882.08	191.84	248.03
DISCCART	714234.49	4250882.08	181.27	257.08
DISCCART	714234.49	4249882.08	229.87	254.24
DISCCART	714234.49	4248882.08	256.97	278.48
DISCCART	714234.49	4247882.08	239.76	282.72
DISCCART	714234.49	4246882.08	285.95	285.95
DISCCART	714234.49	4245882.08	220.09	294.58
DISCCART	714234.49	4244882.08	214.87	251.19
DISCCART	714234.49	4243882.08	229.78	248.32
DISCCART	714234.49	4242882.08	233.85	233.85
DISCCART	714234.49	4241882.08	188.41	219.94
DISCCART	714234.49	4240882.08	173.60	173.60
DISCCART	714234.49	4239882.08	186.54	186.54
DISCCART	714234.49	4238882.08	185.03	185.03
DISCCART	714234.49	4237882.08	184.90	204.89
DISCCART	714234.49	4236882.08	222.19	222.97
DISCCART	714234.49	4235882.08	237.14	237.48
DISCCART	714234.49	4234882.08	204.51	233.25
DISCCART	714234.49	4233882.08	238.23	238.23
DISCCART	714234.49	4232882.08	245.32	245.32
DISCCART	714234.49	4231882.08	209.34	226.34
DISCCART	714234.49	4230882.08	221.18	221.18
DISCCART	714234.49	4229882.08	181.03	203.42
DISCCART	714234.49	4228882.08	148.02	190.21
DISCCART	714234.49	4227882.08	175.48	203.03
DISCCART	714234.49	4226882.08	185.51	195.73
DISCCART	714234.49	4225882.08	177.47	178.39
DISCCART	714234.49	4224882.08	171.81	171.81
DISCCART	714234.49	4223882.08	156.60	190.26
DISCCART	714234.49	4222882.08	151.19	182.63
DISCCART	714234.49	4221882.08	183.61	183.61
DISCCART	714234.49	4220882.08	176.29	176.29
DISCCART	714234.49	4259882.08	263.87	282.67
DISCCART	714234.49	4259882.08	263.87	282.67
DISCCART	714234.49	4260882.08	224.33	278.05
DISCCART	714234.49	4261882.08	218.76	259.87
DISCCART	714234.49	4262882.08	223.73	232.92
DISCCART	714234.49	4263882.08	178.50	236.81
DISCCART	714234.49	4264882.08	241.07	242.25
DISCCART	714234.49	4265882.08	228.27	234.70
DISCCART	714234.49	4266882.08	215.20	215.20
DISCCART	714234.49	4267882.08	156.44	215.02
DISCCART	714234.49	4268882.08	125.30	125.30
DISCCART	714234.49	4269882.08	128.31	195.92
DISCCART	714234.49	4270882.08	179.07	189.36
DISCCART	714234.49	4271882.08	162.55	178.04
DISCCART	714234.49	4272882.08	181.70	181.70
DISCCART	714234.49	4273882.08	168.28	168.28
DISCCART	714234.49	4274882.08	178.01	178.01
DISCCART	714234.49	4275882.08	174.42	174.42
DISCCART	714234.49	4276882.08	203.69	203.69
DISCCART	714234.49	4277882.08	191.63	191.63
DISCCART	714234.49	4278882.08	167.28	191.89
DISCCART	714234.49	4279882.08	153.80	184.75

DISCCART	714234.49	4280882.08	183.05	183.05
DISCCART	714234.49	4281882.08	174.53	183.95
DISCCART	714234.49	4282882.08	186.68	186.68
DISCCART	714234.49	4283882.08	138.84	217.66
DISCCART	714234.49	4284882.08	132.40	141.30
DISCCART	714234.49	4285882.08	134.57	139.14
DISCCART	714234.49	4286882.08	136.41	136.41
DISCCART	714234.49	4287882.08	135.73	135.73
DISCCART	714234.49	4288882.08	131.78	131.78
DISCCART	714234.49	4289882.08	143.57	164.74
DISCCART	714234.49	4290882.08	161.68	161.68
DISCCART	714234.49	4291882.08	165.22	165.22
DISCCART	714234.49	4292882.08	176.05	176.05
DISCCART	714234.49	4293882.08	161.56	174.65
DISCCART	714234.49	4294882.08	158.03	158.03
DISCCART	714234.49	4295882.08	155.48	162.97
DISCCART	714234.49	4296882.08	163.57	163.57
DISCCART	714234.49	4297882.08	157.88	162.84
DISCCART	714234.49	4298882.08	143.40	163.61
DISCCART	714234.49	4299882.08	131.35	131.35
DISCCART	714234.49	4300882.08	131.59	131.59
DISCCART	714234.49	4301882.08	131.37	131.37
DISCCART	714234.49	4302882.08	131.54	131.54
DISCCART	714234.49	4303882.08	131.16	131.16
DISCCART	714234.49	4304882.08	129.14	129.14
DISCCART	714234.49	4305882.08	129.79	129.79
DISCCART	714234.49	4306882.08	127.92	127.92
DISCCART	714234.49	4307882.08	153.18	153.18
DISCCART	714234.49	4308882.08	139.55	154.22
DISCCART	714234.49	4309882.08	167.80	167.80
DISCCART	714234.49	4310882.08	138.67	138.67
DISCCART	714234.49	4311882.08	138.85	138.85
DISCCART	714234.49	4312882.08	127.45	127.45
DISCCART	714234.49	4313882.08	127.46	127.46
DISCCART	714234.49	4314882.08	127.45	127.45
DISCCART	714234.49	4315882.08	132.32	132.32
DISCCART	714234.49	4316882.08	183.73	248.70
DISCCART	714234.49	4317882.08	189.55	250.73
DISCCART	714234.49	4318882.08	202.70	255.85
DISCCART	714234.49	4319882.08	218.50	257.14
DISCCART	715234.49	4258882.08	269.99	282.65
DISCCART	715234.49	4257882.08	197.89	279.12
DISCCART	715234.49	4256882.08	197.33	248.41
DISCCART	715234.49	4255882.08	224.70	275.23
DISCCART	715234.49	4254882.08	196.81	275.64
DISCCART	715234.49	4253882.08	198.07	235.94
DISCCART	715234.49	4252882.08	210.08	217.69
DISCCART	715234.49	4251882.08	198.53	232.20
DISCCART	715234.49	4250882.08	212.78	229.76
DISCCART	715234.49	4249882.08	182.06	266.20
DISCCART	715234.49	4248882.08	209.08	277.77
DISCCART	715234.49	4247882.08	250.19	282.36
DISCCART	715234.49	4246882.08	256.27	279.70
DISCCART	715234.49	4245882.08	277.06	297.02
DISCCART	715234.49	4244882.08	217.21	291.84
DISCCART	715234.49	4243882.08	184.61	270.25
DISCCART	715234.49	4242882.08	181.49	181.49
DISCCART	715234.49	4241882.08	177.54	177.54
DISCCART	715234.49	4240882.08	170.32	170.32
DISCCART	715234.49	4239882.08	152.93	218.41
DISCCART	715234.49	4238882.08	197.60	201.09
DISCCART	715234.49	4237882.08	204.07	219.48
DISCCART	715234.49	4236882.08	202.58	202.58
DISCCART	715234.49	4235882.08	214.86	224.52
DISCCART	715234.49	4234882.08	194.71	220.57
DISCCART	715234.49	4233882.08	225.83	225.83

DISCCART	715234.49	4232882.08	212.23	238.29
DISCCART	715234.49	4231882.08	193.16	209.49
DISCCART	715234.49	4230882.08	159.37	212.82
DISCCART	715234.49	4229882.08	172.53	196.40
DISCCART	715234.49	4228882.08	145.84	196.40
DISCCART	715234.49	4227882.08	143.95	184.87
DISCCART	715234.49	4226882.08	162.66	179.70
DISCCART	715234.49	4225882.08	144.63	167.41
DISCCART	715234.49	4224882.08	187.43	202.36
DISCCART	715234.49	4223882.08	183.13	201.11
DISCCART	715234.49	4222882.08	162.28	195.70
DISCCART	715234.49	4221882.08	219.58	219.58
DISCCART	715234.49	4220882.08	172.58	172.58
DISCCART	715234.49	4259882.08	278.89	281.61
DISCCART	715234.49	4259882.08	278.89	281.61
DISCCART	715234.49	4260882.08	266.94	269.52
DISCCART	715234.49	4261882.08	248.55	248.55
DISCCART	715234.49	4262882.08	217.29	245.48
DISCCART	715234.49	4263882.08	235.00	235.00
DISCCART	715234.49	4264882.08	194.95	244.77
DISCCART	715234.49	4265882.08	204.14	205.52
DISCCART	715234.49	4266882.08	180.27	205.14
DISCCART	715234.49	4267882.08	161.72	189.84
DISCCART	715234.49	4268882.08	128.07	128.07
DISCCART	715234.49	4269882.08	158.27	184.41
DISCCART	715234.49	4270882.08	141.38	182.01
DISCCART	715234.49	4271882.08	173.63	174.21
DISCCART	715234.49	4272882.08	180.73	180.73
DISCCART	715234.49	4273882.08	170.21	170.21
DISCCART	715234.49	4274882.08	177.70	177.70
DISCCART	715234.49	4275882.08	176.15	179.68
DISCCART	715234.49	4276882.08	180.69	199.22
DISCCART	715234.49	4277882.08	195.09	195.09
DISCCART	715234.49	4278882.08	186.67	186.67
DISCCART	715234.49	4279882.08	176.92	179.51
DISCCART	715234.49	4280882.08	152.17	152.17
DISCCART	715234.49	4281882.08	162.48	180.93
DISCCART	715234.49	4282882.08	182.84	182.84
DISCCART	715234.49	4283882.08	201.45	201.45
DISCCART	715234.49	4284882.08	137.07	137.07
DISCCART	715234.49	4285882.08	136.27	140.50
DISCCART	715234.49	4286882.08	136.08	136.08
DISCCART	715234.49	4287882.08	136.20	136.20
DISCCART	715234.49	4288882.08	136.53	136.53
DISCCART	715234.49	4289882.08	135.40	136.72
DISCCART	715234.49	4290882.08	160.88	160.88
DISCCART	715234.49	4291882.08	163.42	163.42
DISCCART	715234.49	4292882.08	186.70	186.70
DISCCART	715234.49	4293882.08	170.15	173.62
DISCCART	715234.49	4294882.08	164.13	175.45
DISCCART	715234.49	4295882.08	167.53	167.53
DISCCART	715234.49	4296882.08	158.80	158.80
DISCCART	715234.49	4297882.08	137.27	156.19
DISCCART	715234.49	4298882.08	157.31	160.95
DISCCART	715234.49	4299882.08	134.14	134.14
DISCCART	715234.49	4300882.08	133.63	133.63
DISCCART	715234.49	4301882.08	133.87	133.87
DISCCART	715234.49	4302882.08	133.40	133.40
DISCCART	715234.49	4303882.08	132.68	132.68
DISCCART	715234.49	4304882.08	131.74	131.74
DISCCART	715234.49	4305882.08	130.76	130.76
DISCCART	715234.49	4306882.08	127.92	127.92
DISCCART	715234.49	4307882.08	128.02	135.75
DISCCART	715234.49	4308882.08	127.50	127.50
DISCCART	715234.49	4309882.08	129.41	129.41
DISCCART	715234.49	4310882.08	129.83	129.83

DISCCART	715234.49	4311882.08	128.48	128.48
DISCCART	715234.49	4312882.08	129.92	129.92
DISCCART	715234.49	4313882.08	129.62	129.62
DISCCART	715234.49	4314882.08	127.45	127.45
DISCCART	715234.49	4315882.08	131.78	131.78
DISCCART	715234.49	4316882.08	159.51	272.14
DISCCART	715234.49	4317882.08	250.48	257.95
DISCCART	715234.49	4318882.08	185.38	269.58
DISCCART	715234.49	4319882.08	248.15	263.26
DISCCART	716234.49	4258882.08	246.92	276.55
DISCCART	716234.49	4257882.08	256.23	275.62
DISCCART	716234.49	4256882.08	242.95	276.64
DISCCART	716234.49	4255882.08	264.04	272.01
DISCCART	716234.49	4254882.08	262.24	273.66
DISCCART	716234.49	4253882.08	255.52	282.53
DISCCART	716234.49	4252882.08	188.19	278.16
DISCCART	716234.49	4251882.08	242.93	247.56
DISCCART	716234.49	4250882.08	176.19	240.07
DISCCART	716234.49	4249882.08	207.43	264.15
DISCCART	716234.49	4248882.08	208.19	270.62
DISCCART	716234.49	4247882.08	203.49	279.15
DISCCART	716234.49	4246882.08	278.36	278.36
DISCCART	716234.49	4245882.08	241.08	288.61
DISCCART	716234.49	4244882.08	225.27	291.84
DISCCART	716234.49	4243882.08	183.56	276.69
DISCCART	716234.49	4242882.08	173.21	173.21
DISCCART	716234.49	4241882.08	165.41	169.21
DISCCART	716234.49	4240882.08	172.73	220.04
DISCCART	716234.49	4239882.08	186.98	227.95
DISCCART	716234.49	4238882.08	183.05	183.05
DISCCART	716234.49	4237882.08	192.03	199.36
DISCCART	716234.49	4236882.08	206.06	216.82
DISCCART	716234.49	4235882.08	192.88	226.90
DISCCART	716234.49	4234882.08	219.07	225.87
DISCCART	716234.49	4233882.08	172.53	213.83
DISCCART	716234.49	4232882.08	201.85	201.85
DISCCART	716234.49	4231882.08	201.25	216.28
DISCCART	716234.49	4230882.08	204.32	216.84
DISCCART	716234.49	4229882.08	195.58	195.58
DISCCART	716234.49	4228882.08	137.09	191.18
DISCCART	716234.49	4227882.08	139.57	173.11
DISCCART	716234.49	4226882.08	155.81	189.76
DISCCART	716234.49	4225882.08	162.11	201.32
DISCCART	716234.49	4224882.08	157.49	157.49
DISCCART	716234.49	4223882.08	188.32	195.00
DISCCART	716234.49	4222882.08	212.13	218.72
DISCCART	716234.49	4221882.08	208.18	208.18
DISCCART	716234.49	4220882.08	201.56	201.56
DISCCART	716234.49	4259882.08	238.54	276.32
DISCCART	716234.49	4259882.08	238.54	276.32
DISCCART	716234.49	4260882.08	226.71	275.50
DISCCART	716234.49	4261882.08	221.03	245.54
DISCCART	716234.49	4262882.08	217.42	224.92
DISCCART	716234.49	4263882.08	195.03	219.78
DISCCART	716234.49	4264882.08	196.64	215.49
DISCCART	716234.49	4265882.08	181.78	198.88
DISCCART	716234.49	4266882.08	181.72	184.43
DISCCART	716234.49	4267882.08	152.09	166.47
DISCCART	716234.49	4268882.08	128.30	128.30
DISCCART	716234.49	4269882.08	154.67	168.63
DISCCART	716234.49	4270882.08	170.87	170.87
DISCCART	716234.49	4271882.08	168.01	168.01
DISCCART	716234.49	4272882.08	168.54	170.84
DISCCART	716234.49	4273882.08	182.41	184.19
DISCCART	716234.49	4274882.08	166.90	166.90
DISCCART	716234.49	4275882.08	204.58	204.58

DISCCART	716234.49	4276882.08	178.19	178.19
DISCCART	716234.49	4277882.08	198.33	198.33
DISCCART	716234.49	4278882.08	184.81	186.28
DISCCART	716234.49	4279882.08	176.90	176.90
DISCCART	716234.49	4280882.08	176.20	176.20
DISCCART	716234.49	4281882.08	162.39	168.14
DISCCART	716234.49	4282882.08	174.35	181.37
DISCCART	716234.49	4283882.08	164.91	177.85
DISCCART	716234.49	4284882.08	181.13	190.68
DISCCART	716234.49	4285882.08	136.03	136.03
DISCCART	716234.49	4286882.08	137.49	137.49
DISCCART	716234.49	4287882.08	136.21	136.21
DISCCART	716234.49	4288882.08	136.43	136.43
DISCCART	716234.49	4289882.08	136.39	136.39
DISCCART	716234.49	4290882.08	130.39	130.39
DISCCART	716234.49	4291882.08	155.04	159.00
DISCCART	716234.49	4292882.08	173.84	173.84
DISCCART	716234.49	4293882.08	161.35	165.72
DISCCART	716234.49	4294882.08	180.26	187.12
DISCCART	716234.49	4295882.08	168.54	168.54
DISCCART	716234.49	4296882.08	157.69	157.69
DISCCART	716234.49	4297882.08	154.56	159.24
DISCCART	716234.49	4298882.08	160.17	160.17
DISCCART	716234.49	4299882.08	134.72	134.72
DISCCART	716234.49	4300882.08	134.98	134.98
DISCCART	716234.49	4301882.08	134.85	134.85
DISCCART	716234.49	4302882.08	134.83	134.83
DISCCART	716234.49	4303882.08	133.62	133.62
DISCCART	716234.49	4304882.08	134.05	134.05
DISCCART	716234.49	4305882.08	133.52	133.52
DISCCART	716234.49	4306882.08	131.84	131.84
DISCCART	716234.49	4307882.08	127.86	127.86
DISCCART	716234.49	4308882.08	129.38	129.38
DISCCART	716234.49	4309882.08	128.65	128.65
DISCCART	716234.49	4310882.08	127.50	127.50
DISCCART	716234.49	4311882.08	128.83	128.83
DISCCART	716234.49	4312882.08	128.76	128.76
DISCCART	716234.49	4313882.08	129.30	129.30
DISCCART	716234.49	4314882.08	129.43	129.43
DISCCART	716234.49	4315882.08	127.73	127.73
DISCCART	716234.49	4316882.08	152.65	272.14
DISCCART	716234.49	4317882.08	226.47	274.81
DISCCART	716234.49	4318882.08	260.43	260.43
DISCCART	716234.49	4319882.08	257.28	257.28
DISCCART	717234.49	4258882.08	217.55	263.94
DISCCART	717234.49	4257882.08	248.15	275.48
DISCCART	717234.49	4256882.08	260.49	267.33
DISCCART	717234.49	4255882.08	262.66	262.66
DISCCART	717234.49	4254882.08	256.97	262.88
DISCCART	717234.49	4253882.08	254.67	281.47
DISCCART	717234.49	4252882.08	260.58	281.77
DISCCART	717234.49	4251882.08	206.49	273.27
DISCCART	717234.49	4250882.08	186.49	261.47
DISCCART	717234.49	4249882.08	227.82	266.97
DISCCART	717234.49	4248882.08	209.93	270.48
DISCCART	717234.49	4247882.08	202.34	273.65
DISCCART	717234.49	4246882.08	270.70	275.40
DISCCART	717234.49	4245882.08	255.41	285.25
DISCCART	717234.49	4244882.08	251.49	288.31
DISCCART	717234.49	4243882.08	190.75	288.31
DISCCART	717234.49	4242882.08	157.30	278.34
DISCCART	717234.49	4241882.08	142.76	142.76
DISCCART	717234.49	4240882.08	174.53	174.53
DISCCART	717234.49	4239882.08	169.89	179.91
DISCCART	717234.49	4238882.08	197.88	197.88
DISCCART	717234.49	4237882.08	188.37	205.55

DISCCART	717234.49	4236882.08	190.63	198.64
DISCCART	717234.49	4235882.08	201.51	206.21
DISCCART	717234.49	4234882.08	167.11	189.30
DISCCART	717234.49	4233882.08	166.82	189.51
DISCCART	717234.49	4232882.08	169.28	196.52
DISCCART	717234.49	4231882.08	207.39	207.39
DISCCART	717234.49	4230882.08	174.49	190.35
DISCCART	717234.49	4229882.08	147.13	189.60
DISCCART	717234.49	4228882.08	134.04	134.04
DISCCART	717234.49	4227882.08	153.62	195.09
DISCCART	717234.49	4226882.08	177.75	197.98
DISCCART	717234.49	4225882.08	195.87	213.01
DISCCART	717234.49	4224882.08	198.46	205.68
DISCCART	717234.49	4223882.08	177.28	208.03
DISCCART	717234.49	4222882.08	201.84	222.79
DISCCART	717234.49	4221882.08	220.23	225.79
DISCCART	717234.49	4220882.08	216.86	220.19
DISCCART	717234.49	4259882.08	255.51	257.94
DISCCART	717234.49	4259882.08	255.51	257.94
DISCCART	717234.49	4260882.08	243.96	249.56
DISCCART	717234.49	4261882.08	201.15	232.19
DISCCART	717234.49	4262882.08	195.59	212.54
DISCCART	717234.49	4263882.08	194.29	212.42
DISCCART	717234.49	4264882.08	169.54	201.61
DISCCART	717234.49	4265882.08	163.58	187.19
DISCCART	717234.49	4266882.08	181.37	181.37
DISCCART	717234.49	4267882.08	131.61	174.76
DISCCART	717234.49	4268882.08	126.93	126.93
DISCCART	717234.49	4269882.08	127.40	127.40
DISCCART	717234.49	4270882.08	140.85	163.46
DISCCART	717234.49	4271882.08	176.31	176.31
DISCCART	717234.49	4272882.08	184.08	184.08
DISCCART	717234.49	4273882.08	172.00	172.00
DISCCART	717234.49	4274882.08	167.51	167.51
DISCCART	717234.49	4275882.08	171.28	175.14
DISCCART	717234.49	4276882.08	184.15	192.75
DISCCART	717234.49	4277882.08	172.84	186.50
DISCCART	717234.49	4278882.08	188.33	196.26
DISCCART	717234.49	4279882.08	183.36	183.36
DISCCART	717234.49	4280882.08	149.24	174.84
DISCCART	717234.49	4281882.08	154.47	171.06
DISCCART	717234.49	4282882.08	157.59	157.59
DISCCART	717234.49	4283882.08	169.79	173.87
DISCCART	717234.49	4284882.08	177.42	177.42
DISCCART	717234.49	4285882.08	136.01	136.01
DISCCART	717234.49	4286882.08	137.51	137.51
DISCCART	717234.49	4287882.08	137.26	137.26
DISCCART	717234.49	4288882.08	137.03	137.03
DISCCART	717234.49	4289882.08	134.92	134.92
DISCCART	717234.49	4290882.08	135.59	135.59
DISCCART	717234.49	4291882.08	135.69	135.69
DISCCART	717234.49	4292882.08	150.30	159.75
DISCCART	717234.49	4293882.08	153.65	154.87
DISCCART	717234.49	4294882.08	155.45	155.45
DISCCART	717234.49	4295882.08	169.84	169.84
DISCCART	717234.49	4296882.08	157.34	157.34
DISCCART	717234.49	4297882.08	161.82	162.33
DISCCART	717234.49	4298882.08	148.89	165.21
DISCCART	717234.49	4299882.08	138.58	138.58
DISCCART	717234.49	4300882.08	135.68	135.68
DISCCART	717234.49	4301882.08	134.91	134.91
DISCCART	717234.49	4302882.08	134.53	134.53
DISCCART	717234.49	4303882.08	133.53	133.53
DISCCART	717234.49	4304882.08	134.31	134.31
DISCCART	717234.49	4305882.08	134.62	134.62
DISCCART	717234.49	4306882.08	134.15	134.15

DISCCART	717234.49	4307882.08	133.16	133.16
DISCCART	717234.49	4308882.08	129.65	129.65
DISCCART	717234.49	4309882.08	129.10	129.10
DISCCART	717234.49	4310882.08	127.92	127.92
DISCCART	717234.49	4311882.08	127.50	127.50
DISCCART	717234.49	4312882.08	128.79	128.79
DISCCART	717234.49	4313882.08	128.12	128.12
DISCCART	717234.49	4314882.08	128.86	129.87
DISCCART	717234.49	4315882.08	127.72	224.46
DISCCART	717234.49	4316882.08	182.42	257.88
DISCCART	717234.49	4317882.08	186.94	265.59
DISCCART	717234.49	4318882.08	177.00	272.54
DISCCART	717234.49	4319882.08	263.63	263.63
DISCCART	718234.49	4258882.08	186.82	263.14
DISCCART	718234.49	4257882.08	252.01	254.49
DISCCART	718234.49	4256882.08	232.82	264.10
DISCCART	718234.49	4255882.08	229.10	249.66
DISCCART	718234.49	4254882.08	267.84	270.95
DISCCART	718234.49	4253882.08	260.38	263.32
DISCCART	718234.49	4252882.08	281.69	285.12
DISCCART	718234.49	4251882.08	249.09	274.61
DISCCART	718234.49	4250882.08	214.43	270.50
DISCCART	718234.49	4249882.08	260.22	266.76
DISCCART	718234.49	4248882.08	234.67	273.94
DISCCART	718234.49	4247882.08	264.43	276.47
DISCCART	718234.49	4246882.08	268.03	284.72
DISCCART	718234.49	4245882.08	223.98	285.73
DISCCART	718234.49	4244882.08	275.30	275.30
DISCCART	718234.49	4243882.08	253.79	278.82
DISCCART	718234.49	4242882.08	166.02	281.08
DISCCART	718234.49	4241882.08	135.48	135.48
DISCCART	718234.49	4240882.08	156.57	169.06
DISCCART	718234.49	4239882.08	155.11	160.56
DISCCART	718234.49	4238882.08	163.96	171.57
DISCCART	718234.49	4237882.08	171.51	171.51
DISCCART	718234.49	4236882.08	204.73	204.73
DISCCART	718234.49	4235882.08	194.11	201.09
DISCCART	718234.49	4234882.08	164.35	196.75
DISCCART	718234.49	4233882.08	154.38	184.70
DISCCART	718234.49	4232882.08	191.58	191.58
DISCCART	718234.49	4231882.08	183.76	201.90
DISCCART	718234.49	4230882.08	151.77	190.18
DISCCART	718234.49	4229882.08	153.86	176.71
DISCCART	718234.49	4228882.08	134.68	178.12
DISCCART	718234.49	4227882.08	176.09	195.34
DISCCART	718234.49	4226882.08	180.95	195.50
DISCCART	718234.49	4225882.08	185.11	210.38
DISCCART	718234.49	4224882.08	220.73	226.28
DISCCART	718234.49	4223882.08	222.23	226.57
DISCCART	718234.49	4222882.08	207.27	225.02
DISCCART	718234.49	4221882.08	238.42	238.42
DISCCART	718234.49	4220882.08	213.57	232.80
DISCCART	718234.49	4259882.08	244.53	245.09
DISCCART	718234.49	4259882.08	244.53	245.09
DISCCART	718234.49	4260882.08	218.74	239.16
DISCCART	718234.49	4261882.08	197.14	221.63
DISCCART	718234.49	4262882.08	181.67	213.69
DISCCART	718234.49	4263882.08	186.96	189.85
DISCCART	718234.49	4264882.08	171.67	190.27
DISCCART	718234.49	4265882.08	179.24	201.77
DISCCART	718234.49	4266882.08	173.63	173.63
DISCCART	718234.49	4267882.08	168.91	168.91
DISCCART	718234.49	4268882.08	127.37	127.37
DISCCART	718234.49	4269882.08	127.99	127.99
DISCCART	718234.49	4270882.08	153.11	172.56
DISCCART	718234.49	4271882.08	188.36	192.66

DISCCART	718234.49	4272882.08	156.06	156.06
DISCCART	718234.49	4273882.08	168.56	168.56
DISCCART	718234.49	4274882.08	149.00	160.56
DISCCART	718234.49	4275882.08	163.31	168.73
DISCCART	718234.49	4276882.08	187.38	187.38
DISCCART	718234.49	4277882.08	197.70	197.70
DISCCART	718234.49	4278882.08	198.98	202.93
DISCCART	718234.49	4279882.08	168.15	177.08
DISCCART	718234.49	4280882.08	173.85	173.85
DISCCART	718234.49	4281882.08	165.65	165.65
DISCCART	718234.49	4282882.08	160.36	160.36
DISCCART	718234.49	4283882.08	140.16	164.30
DISCCART	718234.49	4284882.08	148.27	149.79
DISCCART	718234.49	4285882.08	173.24	173.81
DISCCART	718234.49	4286882.08	135.50	135.50
DISCCART	718234.49	4287882.08	138.01	138.01
DISCCART	718234.49	4288882.08	134.20	134.20
DISCCART	718234.49	4289882.08	135.73	135.73
DISCCART	718234.49	4290882.08	137.80	137.80
DISCCART	718234.49	4291882.08	135.68	137.59
DISCCART	718234.49	4292882.08	129.61	129.61
DISCCART	718234.49	4293882.08	133.89	159.27
DISCCART	718234.49	4294882.08	154.06	154.06
DISCCART	718234.49	4295882.08	161.78	161.78
DISCCART	718234.49	4296882.08	150.97	150.97
DISCCART	718234.49	4297882.08	163.29	163.29
DISCCART	718234.49	4298882.08	158.49	158.49
DISCCART	718234.49	4299882.08	167.36	167.36
DISCCART	718234.49	4300882.08	136.18	136.18
DISCCART	718234.49	4301882.08	135.91	135.91
DISCCART	718234.49	4302882.08	135.20	135.20
DISCCART	718234.49	4303882.08	134.84	134.84
DISCCART	718234.49	4304882.08	135.40	135.40
DISCCART	718234.49	4305882.08	134.71	134.71
DISCCART	718234.49	4306882.08	134.83	134.83
DISCCART	718234.49	4307882.08	134.18	134.18
DISCCART	718234.49	4308882.08	132.71	132.71
DISCCART	718234.49	4309882.08	131.70	131.70
DISCCART	718234.49	4310882.08	129.32	130.92
DISCCART	718234.49	4311882.08	127.49	127.49
DISCCART	718234.49	4312882.08	127.49	127.49
DISCCART	718234.49	4313882.08	127.57	127.57
DISCCART	718234.49	4314882.08	127.68	127.68
DISCCART	718234.49	4315882.08	128.52	128.52
DISCCART	718234.49	4316882.08	139.48	257.02
DISCCART	718234.49	4317882.08	150.72	272.54
DISCCART	718234.49	4318882.08	225.29	272.54
DISCCART	718234.49	4319882.08	262.22	262.22
DISCCART	719234.49	4258882.08	228.72	236.96
DISCCART	719234.49	4257882.08	243.42	252.29
DISCCART	719234.49	4256882.08	204.05	255.30
DISCCART	719234.49	4255882.08	193.38	260.27
DISCCART	719234.49	4254882.08	198.61	267.24
DISCCART	719234.49	4253882.08	260.27	273.52
DISCCART	719234.49	4252882.08	285.19	285.19
DISCCART	719234.49	4251882.08	230.21	281.54
DISCCART	719234.49	4250882.08	260.59	265.66
DISCCART	719234.49	4249882.08	222.21	266.76
DISCCART	719234.49	4248882.08	231.32	273.33
DISCCART	719234.49	4247882.08	259.47	278.43
DISCCART	719234.49	4246882.08	240.28	284.19
DISCCART	719234.49	4245882.08	212.06	276.45
DISCCART	719234.49	4244882.08	263.18	275.20
DISCCART	719234.49	4243882.08	261.51	264.19
DISCCART	719234.49	4242882.08	231.08	265.51
DISCCART	719234.49	4241882.08	153.42	258.04

DISCCART	719234.49	4240882.08	147.66	147.66
DISCCART	719234.49	4239882.08	159.71	162.33
DISCCART	719234.49	4238882.08	179.96	191.25
DISCCART	719234.49	4237882.08	158.88	213.78
DISCCART	719234.49	4236882.08	167.38	171.07
DISCCART	719234.49	4235882.08	201.94	201.94
DISCCART	719234.49	4234882.08	173.73	177.77
DISCCART	719234.49	4233882.08	195.21	195.21
DISCCART	719234.49	4232882.08	198.94	207.60
DISCCART	719234.49	4231882.08	183.94	208.71
DISCCART	719234.49	4230882.08	158.00	177.34
DISCCART	719234.49	4229882.08	132.74	173.02
DISCCART	719234.49	4228882.08	164.33	195.37
DISCCART	719234.49	4227882.08	182.17	196.11
DISCCART	719234.49	4226882.08	157.48	184.56
DISCCART	719234.49	4225882.08	176.84	202.72
DISCCART	719234.49	4224882.08	177.86	213.52
DISCCART	719234.49	4223882.08	199.10	202.20
DISCCART	719234.49	4222882.08	201.96	215.57
DISCCART	719234.49	4221882.08	236.75	236.75
DISCCART	719234.49	4220882.08	214.02	233.33
DISCCART	719234.49	4259882.08	199.25	204.60
DISCCART	719234.49	4259882.08	199.25	204.60
DISCCART	719234.49	4260882.08	224.76	227.39
DISCCART	719234.49	4261882.08	198.42	205.83
DISCCART	719234.49	4262882.08	159.59	183.85
DISCCART	719234.49	4263882.08	152.93	168.78
DISCCART	719234.49	4264882.08	191.37	200.31
DISCCART	719234.49	4265882.08	179.26	179.26
DISCCART	719234.49	4266882.08	169.86	198.81
DISCCART	719234.49	4267882.08	164.50	164.50
DISCCART	719234.49	4268882.08	123.29	166.02
DISCCART	719234.49	4269882.08	128.35	128.35
DISCCART	719234.49	4270882.08	130.69	166.15
DISCCART	719234.49	4271882.08	152.47	159.41
DISCCART	719234.49	4272882.08	161.45	189.85
DISCCART	719234.49	4273882.08	168.59	177.89
DISCCART	719234.49	4274882.08	138.82	138.82
DISCCART	719234.49	4275882.08	171.87	173.75
DISCCART	719234.49	4276882.08	162.93	180.62
DISCCART	719234.49	4277882.08	189.67	189.67
DISCCART	719234.49	4278882.08	188.64	188.64
DISCCART	719234.49	4279882.08	189.94	189.94
DISCCART	719234.49	4280882.08	165.23	165.23
DISCCART	719234.49	4281882.08	157.48	157.48
DISCCART	719234.49	4282882.08	163.98	163.98
DISCCART	719234.49	4283882.08	159.85	159.85
DISCCART	719234.49	4284882.08	165.37	168.65
DISCCART	719234.49	4285882.08	163.84	163.84
DISCCART	719234.49	4286882.08	191.75	201.85
DISCCART	719234.49	4287882.08	167.10	183.84
DISCCART	719234.49	4288882.08	136.37	136.37
DISCCART	719234.49	4289882.08	135.42	135.42
DISCCART	719234.49	4290882.08	134.86	136.82
DISCCART	719234.49	4291882.08	133.91	133.91
DISCCART	719234.49	4292882.08	135.98	135.98
DISCCART	719234.49	4293882.08	136.40	140.43
DISCCART	719234.49	4294882.08	129.73	129.73
DISCCART	719234.49	4295882.08	129.62	129.62
DISCCART	719234.49	4296882.08	136.86	136.86
DISCCART	719234.49	4297882.08	136.21	151.82
DISCCART	719234.49	4298882.08	134.85	134.85
DISCCART	719234.49	4299882.08	135.14	135.14
DISCCART	719234.49	4300882.08	137.36	137.36
DISCCART	719234.49	4301882.08	136.27	136.27
DISCCART	719234.49	4302882.08	135.76	135.76

DISCCART	719234.49	4303882.08	136.22	136.22
DISCCART	719234.49	4304882.08	134.16	134.16
DISCCART	719234.49	4305882.08	134.27	134.27
DISCCART	719234.49	4306882.08	134.14	134.14
DISCCART	719234.49	4307882.08	134.89	134.89
DISCCART	719234.49	4308882.08	133.65	133.65
DISCCART	719234.49	4309882.08	133.12	133.12
DISCCART	719234.49	4310882.08	132.12	132.12
DISCCART	719234.49	4311882.08	131.82	131.82
DISCCART	719234.49	4312882.08	131.03	131.03
DISCCART	719234.49	4313882.08	127.41	127.41
DISCCART	719234.49	4314882.08	129.13	129.13
DISCCART	719234.49	4315882.08	127.41	127.41
DISCCART	719234.49	4316882.08	154.85	257.02
DISCCART	719234.49	4317882.08	162.20	266.32
DISCCART	719234.49	4318882.08	243.44	268.29
DISCCART	719234.49	4319882.08	255.94	255.94
DISCCART	720234.49	4258882.08	227.50	235.14
DISCCART	720234.49	4257882.08	232.45	251.32
DISCCART	720234.49	4256882.08	220.36	258.20
DISCCART	720234.49	4255882.08	181.20	251.58
DISCCART	720234.49	4254882.08	239.14	258.27
DISCCART	720234.49	4253882.08	228.50	267.16
DISCCART	720234.49	4252882.08	259.40	278.00
DISCCART	720234.49	4251882.08	214.71	270.11
DISCCART	720234.49	4250882.08	236.63	270.60
DISCCART	720234.49	4249882.08	199.81	251.94
DISCCART	720234.49	4248882.08	229.24	238.75
DISCCART	720234.49	4247882.08	189.24	279.84
DISCCART	720234.49	4246882.08	227.70	263.44
DISCCART	720234.49	4245882.08	268.47	275.61
DISCCART	720234.49	4244882.08	244.28	270.33
DISCCART	720234.49	4243882.08	229.38	270.16
DISCCART	720234.49	4242882.08	205.21	261.18
DISCCART	720234.49	4241882.08	158.17	254.65
DISCCART	720234.49	4240882.08	132.78	132.78
DISCCART	720234.49	4239882.08	145.66	158.87
DISCCART	720234.49	4238882.08	161.42	161.42
DISCCART	720234.49	4237882.08	142.70	159.69
DISCCART	720234.49	4236882.08	187.75	195.85
DISCCART	720234.49	4235882.08	169.80	207.88
DISCCART	720234.49	4234882.08	172.14	177.01
DISCCART	720234.49	4233882.08	173.16	181.46
DISCCART	720234.49	4232882.08	163.97	203.75
DISCCART	720234.49	4231882.08	143.84	143.84
DISCCART	720234.49	4230882.08	135.95	160.78
DISCCART	720234.49	4229882.08	189.38	189.38
DISCCART	720234.49	4228882.08	179.19	188.59
DISCCART	720234.49	4227882.08	172.85	198.73
DISCCART	720234.49	4226882.08	185.95	203.35
DISCCART	720234.49	4225882.08	158.01	207.61
DISCCART	720234.49	4224882.08	203.21	215.66
DISCCART	720234.49	4223882.08	165.67	201.91
DISCCART	720234.49	4222882.08	208.44	214.22
DISCCART	720234.49	4221882.08	200.95	220.16
DISCCART	720234.49	4220882.08	239.72	239.72
DISCCART	720234.49	4259882.08	215.74	239.41
DISCCART	720234.49	4259882.08	215.74	239.41
DISCCART	720234.49	4260882.08	152.74	230.92
DISCCART	720234.49	4261882.08	194.39	205.36
DISCCART	720234.49	4262882.08	158.40	197.49
DISCCART	720234.49	4263882.08	146.13	146.13
DISCCART	720234.49	4264882.08	167.49	196.33
DISCCART	720234.49	4265882.08	164.34	164.34
DISCCART	720234.49	4266882.08	158.08	187.27
DISCCART	720234.49	4267882.08	159.59	183.85

DISCCART	720234.49	4268882.08	140.47	140.47
DISCCART	720234.49	4269882.08	123.70	123.70
DISCCART	720234.49	4270882.08	123.41	131.68
DISCCART	720234.49	4271882.08	128.87	178.74
DISCCART	720234.49	4272882.08	138.48	140.28
DISCCART	720234.49	4273882.08	131.81	177.55
DISCCART	720234.49	4274882.08	154.73	172.10
DISCCART	720234.49	4275882.08	147.05	166.31
DISCCART	720234.49	4276882.08	169.39	192.70
DISCCART	720234.49	4277882.08	172.90	198.12
DISCCART	720234.49	4278882.08	196.56	196.56
DISCCART	720234.49	4279882.08	158.09	158.09
DISCCART	720234.49	4280882.08	152.64	154.79
DISCCART	720234.49	4281882.08	151.26	151.26
DISCCART	720234.49	4282882.08	162.31	162.31
DISCCART	720234.49	4283882.08	174.34	174.34
DISCCART	720234.49	4284882.08	151.70	162.52
DISCCART	720234.49	4285882.08	161.20	161.20
DISCCART	720234.49	4286882.08	163.82	192.78
DISCCART	720234.49	4287882.08	174.56	178.38
DISCCART	720234.49	4288882.08	165.48	165.48
DISCCART	720234.49	4289882.08	175.49	185.33
DISCCART	720234.49	4290882.08	136.52	146.20
DISCCART	720234.49	4291882.08	133.62	133.62
DISCCART	720234.49	4292882.08	135.25	135.25
DISCCART	720234.49	4293882.08	134.43	134.43
DISCCART	720234.49	4294882.08	133.32	133.32
DISCCART	720234.49	4295882.08	134.01	134.01
DISCCART	720234.49	4296882.08	129.98	129.98
DISCCART	720234.49	4297882.08	128.51	128.51
DISCCART	720234.49	4298882.08	134.57	134.57
DISCCART	720234.49	4299882.08	133.73	133.73
DISCCART	720234.49	4300882.08	132.96	132.96
DISCCART	720234.49	4301882.08	131.31	131.31
DISCCART	720234.49	4302882.08	136.26	136.26
DISCCART	720234.49	4303882.08	135.53	135.53
DISCCART	720234.49	4304882.08	135.39	135.39
DISCCART	720234.49	4305882.08	134.55	134.55
DISCCART	720234.49	4306882.08	133.86	133.86
DISCCART	720234.49	4307882.08	135.34	135.34
DISCCART	720234.49	4308882.08	134.74	134.74
DISCCART	720234.49	4309882.08	133.35	133.35
DISCCART	720234.49	4310882.08	131.98	131.98
DISCCART	720234.49	4311882.08	131.32	131.32
DISCCART	720234.49	4312882.08	130.06	130.06
DISCCART	720234.49	4313882.08	130.53	130.53
DISCCART	720234.49	4314882.08	127.40	127.40
DISCCART	720234.49	4315882.08	129.40	129.40
DISCCART	720234.49	4316882.08	162.42	223.23
DISCCART	720234.49	4317882.08	197.26	247.40
DISCCART	720234.49	4318882.08	242.53	256.47
DISCCART	720234.49	4319882.08	245.71	245.71
DISCCART	721234.49	4258882.08	224.79	227.62
DISCCART	721234.49	4257882.08	205.49	250.16
DISCCART	721234.49	4256882.08	214.17	251.08
DISCCART	721234.49	4255882.08	207.85	240.99
DISCCART	721234.49	4254882.08	184.49	253.97
DISCCART	721234.49	4253882.08	241.55	264.00
DISCCART	721234.49	4252882.08	244.48	276.66
DISCCART	721234.49	4251882.08	200.62	276.38
DISCCART	721234.49	4250882.08	209.59	245.40
DISCCART	721234.49	4249882.08	199.27	232.68
DISCCART	721234.49	4248882.08	160.06	257.24
DISCCART	721234.49	4247882.08	225.41	269.38
DISCCART	721234.49	4246882.08	242.75	278.95
DISCCART	721234.49	4245882.08	199.08	278.95

DISCCART	721234.49	4244882.08	208.20	263.36
DISCCART	721234.49	4243882.08	261.59	261.59
DISCCART	721234.49	4242882.08	188.18	256.41
DISCCART	721234.49	4241882.08	204.57	204.57
DISCCART	721234.49	4240882.08	140.27	140.27
DISCCART	721234.49	4239882.08	145.30	145.30
DISCCART	721234.49	4238882.08	145.49	199.35
DISCCART	721234.49	4237882.08	160.65	160.65
DISCCART	721234.49	4236882.08	184.91	186.35
DISCCART	721234.49	4235882.08	175.73	192.87
DISCCART	721234.49	4234882.08	148.64	185.43
DISCCART	721234.49	4233882.08	174.40	184.82
DISCCART	721234.49	4232882.08	152.51	172.30
DISCCART	721234.49	4231882.08	129.16	129.16
DISCCART	721234.49	4230882.08	136.93	184.74
DISCCART	721234.49	4229882.08	167.19	191.85
DISCCART	721234.49	4228882.08	149.40	198.76
DISCCART	721234.49	4227882.08	175.48	198.31
DISCCART	721234.49	4226882.08	207.59	207.59
DISCCART	721234.49	4225882.08	201.21	201.21
DISCCART	721234.49	4224882.08	203.22	217.04
DISCCART	721234.49	4223882.08	225.47	225.47
DISCCART	721234.49	4222882.08	206.41	222.01
DISCCART	721234.49	4221882.08	223.16	225.82
DISCCART	721234.49	4220882.08	209.88	219.53
DISCCART	721234.49	4259882.08	166.80	230.82
DISCCART	721234.49	4259882.08	166.80	230.82
DISCCART	721234.49	4260882.08	186.81	214.82
DISCCART	721234.49	4261882.08	188.24	188.24
DISCCART	721234.49	4262882.08	159.32	193.21
DISCCART	721234.49	4263882.08	154.45	187.09
DISCCART	721234.49	4264882.08	171.09	171.09
DISCCART	721234.49	4265882.08	162.43	190.02
DISCCART	721234.49	4266882.08	144.05	144.05
DISCCART	721234.49	4267882.08	160.48	186.92
DISCCART	721234.49	4268882.08	134.15	134.15
DISCCART	721234.49	4269882.08	131.67	131.67
DISCCART	721234.49	4270882.08	121.93	131.08
DISCCART	721234.49	4271882.08	176.39	180.95
DISCCART	721234.49	4272882.08	155.83	175.53
DISCCART	721234.49	4273882.08	156.84	180.28
DISCCART	721234.49	4274882.08	175.48	176.16
DISCCART	721234.49	4275882.08	177.22	189.96
DISCCART	721234.49	4276882.08	185.36	198.33
DISCCART	721234.49	4277882.08	204.76	204.76
DISCCART	721234.49	4278882.08	180.44	189.95
DISCCART	721234.49	4279882.08	183.93	183.93
DISCCART	721234.49	4280882.08	166.53	202.33
DISCCART	721234.49	4281882.08	183.59	192.52
DISCCART	721234.49	4282882.08	161.65	173.10
DISCCART	721234.49	4283882.08	183.24	183.24
DISCCART	721234.49	4284882.08	154.05	154.05
DISCCART	721234.49	4285882.08	182.84	182.84
DISCCART	721234.49	4286882.08	187.17	187.17
DISCCART	721234.49	4287882.08	161.16	161.16
DISCCART	721234.49	4288882.08	146.04	151.84
DISCCART	721234.49	4289882.08	149.55	149.55
DISCCART	721234.49	4290882.08	149.06	158.74
DISCCART	721234.49	4291882.08	99.50	192.85
DISCCART	721234.49	4292882.08	133.37	133.37
DISCCART	721234.49	4293882.08	131.77	134.28
DISCCART	721234.49	4294882.08	134.36	134.36
DISCCART	721234.49	4295882.08	134.18	134.18
DISCCART	721234.49	4296882.08	137.88	144.32
DISCCART	721234.49	4297882.08	133.58	133.58
DISCCART	721234.49	4298882.08	128.50	128.50

DISCCART	721234.49	4299882.08	128.51	128.51
DISCCART	721234.49	4300882.08	133.80	133.80
DISCCART	721234.49	4301882.08	131.94	131.94
DISCCART	721234.49	4302882.08	131.19	131.19
DISCCART	721234.49	4303882.08	135.72	135.72
DISCCART	721234.49	4304882.08	135.71	135.71
DISCCART	721234.49	4305882.08	135.99	135.99
DISCCART	721234.49	4306882.08	135.57	135.57
DISCCART	721234.49	4307882.08	132.92	132.92
DISCCART	721234.49	4308882.08	134.87	134.87
DISCCART	721234.49	4309882.08	133.52	133.52
DISCCART	721234.49	4310882.08	133.11	133.11
DISCCART	721234.49	4311882.08	131.85	131.85
DISCCART	721234.49	4312882.08	130.90	130.90
DISCCART	721234.49	4313882.08	130.36	130.36
DISCCART	721234.49	4314882.08	128.45	128.45
DISCCART	721234.49	4315882.08	127.40	130.31
DISCCART	721234.49	4316882.08	210.68	230.63
DISCCART	721234.49	4317882.08	160.53	250.87
DISCCART	721234.49	4318882.08	180.21	254.19
DISCCART	721234.49	4319882.08	234.42	234.42
DISCCART	722234.49	4258882.08	161.98	235.21
DISCCART	722234.49	4257882.08	213.15	235.33
DISCCART	722234.49	4256882.08	236.11	246.02
DISCCART	722234.49	4255882.08	210.40	248.21
DISCCART	722234.49	4254882.08	184.56	226.95
DISCCART	722234.49	4253882.08	201.80	208.08
DISCCART	722234.49	4252882.08	194.95	256.82
DISCCART	722234.49	4251882.08	228.12	258.43
DISCCART	722234.49	4250882.08	160.30	263.88
DISCCART	722234.49	4249882.08	170.22	204.79
DISCCART	722234.49	4248882.08	245.48	245.48
DISCCART	722234.49	4247882.08	234.16	246.85
DISCCART	722234.49	4246882.08	228.22	270.21
DISCCART	722234.49	4245882.08	247.96	247.96
DISCCART	722234.49	4244882.08	194.24	266.41
DISCCART	722234.49	4243882.08	242.97	260.97
DISCCART	722234.49	4242882.08	152.98	267.52
DISCCART	722234.49	4241882.08	164.40	226.42
DISCCART	722234.49	4240882.08	139.69	173.07
DISCCART	722234.49	4239882.08	168.64	168.64
DISCCART	722234.49	4238882.08	178.22	182.78
DISCCART	722234.49	4237882.08	156.58	188.74
DISCCART	722234.49	4236882.08	164.33	164.84
DISCCART	722234.49	4235882.08	126.40	189.76
DISCCART	722234.49	4234882.08	155.68	171.82
DISCCART	722234.49	4233882.08	152.16	177.52
DISCCART	722234.49	4232882.08	157.38	178.25
DISCCART	722234.49	4231882.08	143.27	159.06
DISCCART	722234.49	4230882.08	178.94	180.20
DISCCART	722234.49	4229882.08	179.80	188.93
DISCCART	722234.49	4228882.08	185.70	203.07
DISCCART	722234.49	4227882.08	201.77	201.77
DISCCART	722234.49	4226882.08	182.26	208.29
DISCCART	722234.49	4225882.08	207.52	220.52
DISCCART	722234.49	4224882.08	219.44	232.95
DISCCART	722234.49	4223882.08	201.76	221.92
DISCCART	722234.49	4222882.08	218.97	228.38
DISCCART	722234.49	4221882.08	184.02	184.02
DISCCART	722234.49	4220882.08	203.78	221.24
DISCCART	722234.49	4259882.08	165.04	216.04
DISCCART	722234.49	4259882.08	165.04	216.04
DISCCART	722234.49	4260882.08	152.26	176.28
DISCCART	722234.49	4261882.08	170.74	170.74
DISCCART	722234.49	4262882.08	135.79	187.25
DISCCART	722234.49	4263882.08	176.11	186.50

DISCCART	722234.49	4264882.08	146.58	181.30
DISCCART	722234.49	4265882.08	161.26	177.74
DISCCART	722234.49	4266882.08	183.52	183.52
DISCCART	722234.49	4267882.08	131.95	131.95
DISCCART	722234.49	4268882.08	132.67	132.67
DISCCART	722234.49	4269882.08	131.36	131.36
DISCCART	722234.49	4270882.08	122.37	195.62
DISCCART	722234.49	4271882.08	175.73	193.51
DISCCART	722234.49	4272882.08	170.51	170.51
DISCCART	722234.49	4273882.08	140.58	177.71
DISCCART	722234.49	4274882.08	175.96	176.77
DISCCART	722234.49	4275882.08	204.05	204.05
DISCCART	722234.49	4276882.08	196.65	196.65
DISCCART	722234.49	4277882.08	195.35	195.35
DISCCART	722234.49	4278882.08	205.45	205.45
DISCCART	722234.49	4279882.08	198.66	198.66
DISCCART	722234.49	4280882.08	183.48	183.48
DISCCART	722234.49	4281882.08	195.46	195.46
DISCCART	722234.49	4282882.08	190.88	190.88
DISCCART	722234.49	4283882.08	167.40	196.38
DISCCART	722234.49	4284882.08	187.29	187.29
DISCCART	722234.49	4285882.08	174.43	180.06
DISCCART	722234.49	4286882.08	165.38	165.38
DISCCART	722234.49	4287882.08	162.50	162.50
DISCCART	722234.49	4288882.08	153.01	153.01
DISCCART	722234.49	4289882.08	151.63	155.62
DISCCART	722234.49	4290882.08	166.45	177.41
DISCCART	722234.49	4291882.08	165.34	165.34
DISCCART	722234.49	4292882.08	181.76	184.95
DISCCART	722234.49	4293882.08	114.32	175.93
DISCCART	722234.49	4294882.08	134.84	134.84
DISCCART	722234.49	4295882.08	133.83	133.83
DISCCART	722234.49	4296882.08	133.49	133.49
DISCCART	722234.49	4297882.08	133.43	133.43
DISCCART	722234.49	4298882.08	130.76	130.76
DISCCART	722234.49	4299882.08	134.48	134.48
DISCCART	722234.49	4300882.08	128.51	128.51
DISCCART	722234.49	4301882.08	134.03	134.03
DISCCART	722234.49	4302882.08	132.06	132.06
DISCCART	722234.49	4303882.08	135.26	135.26
DISCCART	722234.49	4304882.08	134.05	134.05
DISCCART	722234.49	4305882.08	134.30	134.30
DISCCART	722234.49	4306882.08	133.84	133.84
DISCCART	722234.49	4307882.08	130.26	130.26
DISCCART	722234.49	4308882.08	130.53	130.53
DISCCART	722234.49	4309882.08	133.63	133.63
DISCCART	722234.49	4310882.08	133.38	133.38
DISCCART	722234.49	4311882.08	132.38	132.38
DISCCART	722234.49	4312882.08	130.97	130.97
DISCCART	722234.49	4313882.08	129.98	129.98
DISCCART	722234.49	4314882.08	128.65	128.65
DISCCART	722234.49	4315882.08	129.31	129.31
DISCCART	722234.49	4316882.08	135.67	245.61
DISCCART	722234.49	4317882.08	166.91	250.81
DISCCART	722234.49	4318882.08	226.68	247.50
DISCCART	722234.49	4319882.08	240.58	240.58
DISCCART	723234.49	4258882.08	163.69	214.87
DISCCART	723234.49	4257882.08	172.71	232.02
DISCCART	723234.49	4256882.08	205.10	237.01
DISCCART	723234.49	4255882.08	241.49	242.71
DISCCART	723234.49	4254882.08	247.77	251.54
DISCCART	723234.49	4253882.08	149.90	249.02
DISCCART	723234.49	4252882.08	183.30	253.75
DISCCART	723234.49	4251882.08	203.31	261.47
DISCCART	723234.49	4250882.08	176.45	260.10
DISCCART	723234.49	4249882.08	149.30	178.80

DISCCART	723234.49	4248882.08	163.37	252.27
DISCCART	723234.49	4247882.08	151.42	251.20
DISCCART	723234.49	4246882.08	211.64	235.75
DISCCART	723234.49	4245882.08	158.24	269.09
DISCCART	723234.49	4244882.08	182.45	273.61
DISCCART	723234.49	4243882.08	225.42	268.58
DISCCART	723234.49	4242882.08	219.40	262.69
DISCCART	723234.49	4241882.08	220.75	238.56
DISCCART	723234.49	4240882.08	140.10	232.42
DISCCART	723234.49	4239882.08	145.56	174.92
DISCCART	723234.49	4238882.08	176.97	176.97
DISCCART	723234.49	4237882.08	149.48	162.39
DISCCART	723234.49	4236882.08	116.59	160.21
DISCCART	723234.49	4235882.08	152.30	153.20
DISCCART	723234.49	4234882.08	150.79	171.82
DISCCART	723234.49	4233882.08	141.27	160.60
DISCCART	723234.49	4232882.08	134.99	160.90
DISCCART	723234.49	4231882.08	165.18	165.58
DISCCART	723234.49	4230882.08	160.39	183.72
DISCCART	723234.49	4229882.08	199.21	201.01
DISCCART	723234.49	4228882.08	186.72	211.39
DISCCART	723234.49	4227882.08	173.74	208.16
DISCCART	723234.49	4226882.08	212.78	212.78
DISCCART	723234.49	4225882.08	203.03	238.56
DISCCART	723234.49	4224882.08	211.16	244.19
DISCCART	723234.49	4223882.08	197.77	197.77
DISCCART	723234.49	4222882.08	222.48	224.51
DISCCART	723234.49	4221882.08	179.83	214.52
DISCCART	723234.49	4220882.08	184.72	233.19
DISCCART	723234.49	4259882.08	163.66	192.01
DISCCART	723234.49	4259882.08	163.66	192.01
DISCCART	723234.49	4260882.08	140.75	186.20
DISCCART	723234.49	4261882.08	143.03	176.94
DISCCART	723234.49	4262882.08	166.01	181.37
DISCCART	723234.49	4263882.08	175.39	181.30
DISCCART	723234.49	4264882.08	173.44	173.44
DISCCART	723234.49	4265882.08	129.39	171.44
DISCCART	723234.49	4266882.08	125.99	181.43
DISCCART	723234.49	4267882.08	125.09	125.09
DISCCART	723234.49	4268882.08	124.78	187.58
DISCCART	723234.49	4269882.08	125.75	171.90
DISCCART	723234.49	4270882.08	156.23	186.94
DISCCART	723234.49	4271882.08	180.28	192.52
DISCCART	723234.49	4272882.08	168.59	186.48
DISCCART	723234.49	4273882.08	189.86	189.86
DISCCART	723234.49	4274882.08	198.58	198.58
DISCCART	723234.49	4275882.08	193.02	195.33
DISCCART	723234.49	4276882.08	179.13	183.21
DISCCART	723234.49	4277882.08	187.76	187.76
DISCCART	723234.49	4278882.08	195.31	195.31
DISCCART	723234.49	4279882.08	183.11	183.11
DISCCART	723234.49	4280882.08	175.90	186.08
DISCCART	723234.49	4281882.08	180.11	180.11
DISCCART	723234.49	4282882.08	199.17	199.17
DISCCART	723234.49	4283882.08	195.24	195.24
DISCCART	723234.49	4284882.08	172.85	185.78
DISCCART	723234.49	4285882.08	158.78	158.78
DISCCART	723234.49	4286882.08	149.98	149.98
DISCCART	723234.49	4287882.08	155.10	155.10
DISCCART	723234.49	4288882.08	165.97	171.63
DISCCART	723234.49	4289882.08	154.75	154.75
DISCCART	723234.49	4290882.08	181.79	181.79
DISCCART	723234.49	4291882.08	166.38	166.38
DISCCART	723234.49	4292882.08	149.67	149.67
DISCCART	723234.49	4293882.08	153.02	160.45
DISCCART	723234.49	4294882.08	151.51	151.51

DISCCART	723234.49	4295882.08	133.40	133.40
DISCCART	723234.49	4296882.08	132.81	132.81
DISCCART	723234.49	4297882.08	133.85	133.85
DISCCART	723234.49	4298882.08	134.48	134.48
DISCCART	723234.49	4299882.08	134.15	134.15
DISCCART	723234.49	4300882.08	128.12	128.12
DISCCART	723234.49	4301882.08	133.16	133.16
DISCCART	723234.49	4302882.08	132.60	132.60
DISCCART	723234.49	4303882.08	131.19	131.19
DISCCART	723234.49	4304882.08	136.44	136.44
DISCCART	723234.49	4305882.08	132.00	132.00
DISCCART	723234.49	4306882.08	130.69	130.69
DISCCART	723234.49	4307882.08	128.07	130.02
DISCCART	723234.49	4308882.08	128.43	128.43
DISCCART	723234.49	4309882.08	128.56	128.56
DISCCART	723234.49	4310882.08	133.45	133.45
DISCCART	723234.49	4311882.08	132.47	132.47
DISCCART	723234.49	4312882.08	130.91	130.91
DISCCART	723234.49	4313882.08	130.17	130.17
DISCCART	723234.49	4314882.08	128.99	128.99
DISCCART	723234.49	4315882.08	127.81	242.46
DISCCART	723234.49	4316882.08	178.15	244.39
DISCCART	723234.49	4317882.08	232.25	241.62
DISCCART	723234.49	4318882.08	231.30	239.21
DISCCART	723234.49	4319882.08	221.91	224.28
DISCCART	724234.49	4258882.08	175.23	180.12
DISCCART	724234.49	4257882.08	183.45	195.44
DISCCART	724234.49	4256882.08	166.31	230.67
DISCCART	724234.49	4255882.08	199.93	233.03
DISCCART	724234.49	4254882.08	234.11	235.59
DISCCART	724234.49	4253882.08	197.96	242.32
DISCCART	724234.49	4252882.08	140.85	235.94
DISCCART	724234.49	4251882.08	200.46	200.46
DISCCART	724234.49	4250882.08	191.30	260.10
DISCCART	724234.49	4249882.08	214.58	262.75
DISCCART	724234.49	4248882.08	141.59	260.07
DISCCART	724234.49	4247882.08	136.88	257.38
DISCCART	724234.49	4246882.08	154.10	257.80
DISCCART	724234.49	4245882.08	233.80	258.09
DISCCART	724234.49	4244882.08	251.71	266.76
DISCCART	724234.49	4243882.08	240.86	272.03
DISCCART	724234.49	4242882.08	181.68	269.09
DISCCART	724234.49	4241882.08	209.03	247.55
DISCCART	724234.49	4240882.08	166.64	242.17
DISCCART	724234.49	4239882.08	131.59	131.59
DISCCART	724234.49	4238882.08	165.86	165.86
DISCCART	724234.49	4237882.08	125.28	131.64
DISCCART	724234.49	4236882.08	131.52	131.52
DISCCART	724234.49	4235882.08	146.57	146.57
DISCCART	724234.49	4234882.08	127.38	167.62
DISCCART	724234.49	4233882.08	138.62	177.65
DISCCART	724234.49	4232882.08	144.67	148.87
DISCCART	724234.49	4231882.08	136.70	171.89
DISCCART	724234.49	4230882.08	167.21	184.93
DISCCART	724234.49	4229882.08	160.21	160.21
DISCCART	724234.49	4228882.08	171.96	203.09
DISCCART	724234.49	4227882.08	168.06	219.25
DISCCART	724234.49	4226882.08	217.48	217.48
DISCCART	724234.49	4225882.08	192.57	222.84
DISCCART	724234.49	4224882.08	186.63	210.45
DISCCART	724234.49	4223882.08	183.25	214.41
DISCCART	724234.49	4222882.08	176.83	207.67
DISCCART	724234.49	4221882.08	152.70	213.83
DISCCART	724234.49	4220882.08	185.92	198.18
DISCCART	724234.49	4259882.08	145.79	178.47
DISCCART	724234.49	4259882.08	145.79	178.47

DISCCART	724234.49	4260882.08	151.96	171.63
DISCCART	724234.49	4261882.08	150.75	180.37
DISCCART	724234.49	4262882.08	128.49	181.50
DISCCART	724234.49	4263882.08	136.60	173.01
DISCCART	724234.49	4264882.08	130.07	170.75
DISCCART	724234.49	4265882.08	123.45	123.45
DISCCART	724234.49	4266882.08	124.36	124.36
DISCCART	724234.49	4267882.08	153.58	168.27
DISCCART	724234.49	4268882.08	178.56	178.56
DISCCART	724234.49	4269882.08	136.84	183.50
DISCCART	724234.49	4270882.08	184.87	192.84
DISCCART	724234.49	4271882.08	204.06	204.06
DISCCART	724234.49	4272882.08	195.27	195.27
DISCCART	724234.49	4273882.08	176.65	183.50
DISCCART	724234.49	4274882.08	195.95	195.95
DISCCART	724234.49	4275882.08	188.45	188.45
DISCCART	724234.49	4276882.08	186.76	186.76
DISCCART	724234.49	4277882.08	177.32	177.32
DISCCART	724234.49	4278882.08	198.46	198.46
DISCCART	724234.49	4279882.08	192.74	192.74
DISCCART	724234.49	4280882.08	169.61	169.61
DISCCART	724234.49	4281882.08	178.71	178.71
DISCCART	724234.49	4282882.08	193.73	194.30
DISCCART	724234.49	4283882.08	194.77	208.07
DISCCART	724234.49	4284882.08	171.72	192.75
DISCCART	724234.49	4285882.08	156.70	156.70
DISCCART	724234.49	4286882.08	158.25	158.25
DISCCART	724234.49	4287882.08	168.51	187.84
DISCCART	724234.49	4288882.08	152.10	152.53
DISCCART	724234.49	4289882.08	161.35	164.02
DISCCART	724234.49	4290882.08	175.43	185.28
DISCCART	724234.49	4291882.08	155.62	155.62
DISCCART	724234.49	4292882.08	151.71	151.71
DISCCART	724234.49	4293882.08	154.16	178.21
DISCCART	724234.49	4294882.08	168.45	170.72
DISCCART	724234.49	4295882.08	137.53	137.53
DISCCART	724234.49	4296882.08	134.69	134.69
DISCCART	724234.49	4297882.08	132.81	132.81
DISCCART	724234.49	4298882.08	133.11	133.11
DISCCART	724234.49	4299882.08	131.73	134.35
DISCCART	724234.49	4300882.08	128.15	128.15
DISCCART	724234.49	4301882.08	132.73	132.73
DISCCART	724234.49	4302882.08	132.07	132.07
DISCCART	724234.49	4303882.08	133.59	133.59
DISCCART	724234.49	4304882.08	133.68	133.68
DISCCART	724234.49	4305882.08	130.27	130.27
DISCCART	724234.49	4306882.08	129.18	129.18
DISCCART	724234.49	4307882.08	131.98	131.98
DISCCART	724234.49	4308882.08	128.91	128.91
DISCCART	724234.49	4309882.08	129.44	129.44
DISCCART	724234.49	4310882.08	133.82	133.82
DISCCART	724234.49	4311882.08	133.54	133.54
DISCCART	724234.49	4312882.08	131.91	131.91
DISCCART	724234.49	4313882.08	130.71	130.71
DISCCART	724234.49	4314882.08	127.54	127.54
DISCCART	724234.49	4315882.08	127.69	242.46
DISCCART	724234.49	4316882.08	154.15	242.61
DISCCART	724234.49	4317882.08	212.04	233.45
DISCCART	724234.49	4318882.08	222.43	222.43
DISCCART	724234.49	4319882.08	204.02	208.61
DISCCART	725234.49	4258882.08	133.50	174.20
DISCCART	725234.49	4257882.08	142.26	186.06
DISCCART	725234.49	4256882.08	192.22	192.22
DISCCART	725234.49	4255882.08	193.59	202.63
DISCCART	725234.49	4254882.08	203.00	220.72
DISCCART	725234.49	4253882.08	181.82	236.44

DISCCART	725234.49	4252882.08	161.37	236.44
DISCCART	725234.49	4251882.08	149.44	150.66
DISCCART	725234.49	4250882.08	202.49	211.46
DISCCART	725234.49	4249882.08	198.52	260.07
DISCCART	725234.49	4248882.08	148.41	260.07
DISCCART	725234.49	4247882.08	162.24	257.38
DISCCART	725234.49	4246882.08	227.83	249.10
DISCCART	725234.49	4245882.08	198.30	256.50
DISCCART	725234.49	4244882.08	182.09	260.90
DISCCART	725234.49	4243882.08	183.55	263.68
DISCCART	725234.49	4242882.08	219.78	251.60
DISCCART	725234.49	4241882.08	176.97	257.83
DISCCART	725234.49	4240882.08	137.58	246.20
DISCCART	725234.49	4239882.08	120.00	130.86
DISCCART	725234.49	4238882.08	133.81	143.82
DISCCART	725234.49	4237882.08	121.98	131.78
DISCCART	725234.49	4236882.08	127.86	127.86
DISCCART	725234.49	4235882.08	118.37	161.45
DISCCART	725234.49	4234882.08	125.77	125.77
DISCCART	725234.49	4233882.08	158.07	171.60
DISCCART	725234.49	4232882.08	124.88	177.24
DISCCART	725234.49	4231882.08	167.21	187.03
DISCCART	725234.49	4230882.08	171.63	171.63
DISCCART	725234.49	4229882.08	155.70	192.05
DISCCART	725234.49	4228882.08	190.58	200.39
DISCCART	725234.49	4227882.08	187.65	209.83
DISCCART	725234.49	4226882.08	190.44	196.88
DISCCART	725234.49	4225882.08	184.38	227.25
DISCCART	725234.49	4224882.08	152.86	196.21
DISCCART	725234.49	4223882.08	153.96	198.10
DISCCART	725234.49	4222882.08	185.96	197.68
DISCCART	725234.49	4221882.08	167.77	184.84
DISCCART	725234.49	4220882.08	169.57	169.57
DISCCART	725234.49	4259882.08	121.32	171.77
DISCCART	725234.49	4259882.08	121.32	171.77
DISCCART	725234.49	4260882.08	122.70	122.70
DISCCART	725234.49	4261882.08	122.94	122.94
DISCCART	725234.49	4262882.08	121.71	121.71
DISCCART	725234.49	4263882.08	121.71	154.34
DISCCART	725234.49	4264882.08	119.68	119.68
DISCCART	725234.49	4265882.08	125.28	125.28
DISCCART	725234.49	4266882.08	130.35	159.83
DISCCART	725234.49	4267882.08	146.84	180.90
DISCCART	725234.49	4268882.08	154.89	174.20
DISCCART	725234.49	4269882.08	186.40	186.40
DISCCART	725234.49	4270882.08	182.93	196.14
DISCCART	725234.49	4271882.08	192.28	192.28
DISCCART	725234.49	4272882.08	191.80	191.80
DISCCART	725234.49	4273882.08	197.77	197.77
DISCCART	725234.49	4274882.08	202.10	202.10
DISCCART	725234.49	4275882.08	188.85	188.85
DISCCART	725234.49	4276882.08	180.26	180.26
DISCCART	725234.49	4277882.08	189.15	189.15
DISCCART	725234.49	4278882.08	188.70	188.70
DISCCART	725234.49	4279882.08	179.60	179.60
DISCCART	725234.49	4280882.08	163.76	174.35
DISCCART	725234.49	4281882.08	178.64	183.18
DISCCART	725234.49	4282882.08	193.13	193.13
DISCCART	725234.49	4283882.08	217.17	217.17
DISCCART	725234.49	4284882.08	186.46	186.46
DISCCART	725234.49	4285882.08	166.82	166.82
DISCCART	725234.49	4286882.08	206.56	208.30
DISCCART	725234.49	4287882.08	164.06	164.06
DISCCART	725234.49	4288882.08	157.90	183.69
DISCCART	725234.49	4289882.08	186.15	186.15
DISCCART	725234.49	4290882.08	184.20	184.20

DISCCART	725234.49	4291882.08	171.45	177.14
DISCCART	725234.49	4292882.08	174.18	174.18
DISCCART	725234.49	4293882.08	175.90	179.99
DISCCART	725234.49	4294882.08	161.53	161.53
DISCCART	725234.49	4295882.08	142.82	176.45
DISCCART	725234.49	4296882.08	136.66	136.66
DISCCART	725234.49	4297882.08	135.21	135.21
DISCCART	725234.49	4298882.08	132.05	132.05
DISCCART	725234.49	4299882.08	132.51	132.51
DISCCART	725234.49	4300882.08	128.15	128.15
DISCCART	725234.49	4301882.08	132.61	132.61
DISCCART	725234.49	4302882.08	131.61	131.61
DISCCART	725234.49	4303882.08	134.10	134.10
DISCCART	725234.49	4304882.08	133.26	133.26
DISCCART	725234.49	4305882.08	131.62	131.62
DISCCART	725234.49	4306882.08	132.88	132.88
DISCCART	725234.49	4307882.08	131.54	131.54
DISCCART	725234.49	4308882.08	131.58	131.58
DISCCART	725234.49	4309882.08	128.44	128.44
DISCCART	725234.49	4310882.08	131.53	131.53
DISCCART	725234.49	4311882.08	134.11	134.11
DISCCART	725234.49	4312882.08	133.12	133.12
DISCCART	725234.49	4313882.08	129.82	129.82
DISCCART	725234.49	4314882.08	127.71	127.71
DISCCART	725234.49	4315882.08	127.50	230.29
DISCCART	725234.49	4316882.08	187.10	230.29
DISCCART	725234.49	4317882.08	187.94	224.29
DISCCART	725234.49	4318882.08	201.43	201.43
DISCCART	725234.49	4319882.08	201.84	201.84
DISCCART	726234.49	4258882.08	157.62	184.01
DISCCART	726234.49	4257882.08	184.00	188.58
DISCCART	726234.49	4256882.08	155.37	195.84
DISCCART	726234.49	4255882.08	183.66	185.25
DISCCART	726234.49	4254882.08	186.61	195.72
DISCCART	726234.49	4253882.08	206.82	219.56
DISCCART	726234.49	4252882.08	152.77	236.27
DISCCART	726234.49	4251882.08	133.03	181.39
DISCCART	726234.49	4250882.08	165.45	165.45
DISCCART	726234.49	4249882.08	167.23	211.25
DISCCART	726234.49	4248882.08	157.64	183.28
DISCCART	726234.49	4247882.08	128.37	257.38
DISCCART	726234.49	4246882.08	165.33	171.44
DISCCART	726234.49	4245882.08	179.77	214.14
DISCCART	726234.49	4244882.08	171.92	227.05
DISCCART	726234.49	4243882.08	181.71	202.65
DISCCART	726234.49	4242882.08	168.69	239.95
DISCCART	726234.49	4241882.08	173.06	245.88
DISCCART	726234.49	4240882.08	146.90	231.02
DISCCART	726234.49	4239882.08	125.49	156.62
DISCCART	726234.49	4238882.08	120.10	120.10
DISCCART	726234.49	4237882.08	115.49	135.13
DISCCART	726234.49	4236882.08	162.77	178.09
DISCCART	726234.49	4235882.08	146.90	146.90
DISCCART	726234.49	4234882.08	184.76	208.12
DISCCART	726234.49	4233882.08	147.47	147.47
DISCCART	726234.49	4232882.08	163.11	163.48
DISCCART	726234.49	4231882.08	165.73	183.40
DISCCART	726234.49	4230882.08	189.06	189.06
DISCCART	726234.49	4229882.08	183.21	191.01
DISCCART	726234.49	4228882.08	172.44	189.52
DISCCART	726234.49	4227882.08	165.12	191.73
DISCCART	726234.49	4226882.08	164.63	197.97
DISCCART	726234.49	4225882.08	180.73	208.92
DISCCART	726234.49	4224882.08	146.12	190.31
DISCCART	726234.49	4223882.08	185.56	185.56
DISCCART	726234.49	4222882.08	146.06	190.71

DISCCART	726234.49	4221882.08	176.08	184.92
DISCCART	726234.49	4220882.08	149.51	208.44
DISCCART	726234.49	4259882.08	120.31	120.31
DISCCART	726234.49	4259882.08	120.31	120.31
DISCCART	726234.49	4260882.08	120.31	160.77
DISCCART	726234.49	4261882.08	122.25	162.30
DISCCART	726234.49	4262882.08	115.91	172.64
DISCCART	726234.49	4263882.08	115.91	159.76
DISCCART	726234.49	4264882.08	121.70	172.35
DISCCART	726234.49	4265882.08	135.81	168.59
DISCCART	726234.49	4266882.08	178.18	178.18
DISCCART	726234.49	4267882.08	140.74	186.33
DISCCART	726234.49	4268882.08	170.01	193.79
DISCCART	726234.49	4269882.08	195.01	195.01
DISCCART	726234.49	4270882.08	201.96	201.96
DISCCART	726234.49	4271882.08	194.71	194.71
DISCCART	726234.49	4272882.08	195.75	195.75
DISCCART	726234.49	4273882.08	195.95	195.95
DISCCART	726234.49	4274882.08	200.37	200.37
DISCCART	726234.49	4275882.08	190.58	190.58
DISCCART	726234.49	4276882.08	165.21	190.02
DISCCART	726234.49	4277882.08	166.94	166.94
DISCCART	726234.49	4278882.08	175.45	175.45
DISCCART	726234.49	4279882.08	166.27	166.27
DISCCART	726234.49	4280882.08	168.05	168.05
DISCCART	726234.49	4281882.08	176.92	180.20
DISCCART	726234.49	4282882.08	194.78	194.78
DISCCART	726234.49	4283882.08	212.96	212.96
DISCCART	726234.49	4284882.08	207.69	207.69
DISCCART	726234.49	4285882.08	205.09	205.09
DISCCART	726234.49	4286882.08	184.29	184.29
DISCCART	726234.49	4287882.08	206.01	213.25
DISCCART	726234.49	4288882.08	188.64	200.35
DISCCART	726234.49	4289882.08	173.89	173.89
DISCCART	726234.49	4290882.08	173.24	173.24
DISCCART	726234.49	4291882.08	173.16	173.16
DISCCART	726234.49	4292882.08	191.02	191.02
DISCCART	726234.49	4293882.08	168.89	180.36
DISCCART	726234.49	4294882.08	157.76	157.76
DISCCART	726234.49	4295882.08	171.35	171.35
DISCCART	726234.49	4296882.08	137.29	137.29
DISCCART	726234.49	4297882.08	136.46	136.46
DISCCART	726234.49	4298882.08	133.66	133.66
DISCCART	726234.49	4299882.08	130.26	186.73
DISCCART	726234.49	4300882.08	132.38	135.60
DISCCART	726234.49	4301882.08	132.68	132.68
DISCCART	726234.49	4302882.08	131.64	131.64
DISCCART	726234.49	4303882.08	134.81	134.81
DISCCART	726234.49	4304882.08	132.95	132.95
DISCCART	726234.49	4305882.08	132.15	132.15
DISCCART	726234.49	4306882.08	132.43	132.43
DISCCART	726234.49	4307882.08	132.53	132.53
DISCCART	726234.49	4308882.08	130.25	130.25
DISCCART	726234.49	4309882.08	127.75	127.75
DISCCART	726234.49	4310882.08	132.26	132.26
DISCCART	726234.49	4311882.08	133.99	133.99
DISCCART	726234.49	4312882.08	133.40	133.40
DISCCART	726234.49	4313882.08	130.75	130.75
DISCCART	726234.49	4314882.08	129.58	129.58
DISCCART	726234.49	4315882.08	128.22	223.71
DISCCART	726234.49	4316882.08	167.87	224.04
DISCCART	726234.49	4317882.08	200.80	226.00
DISCCART	726234.49	4318882.08	216.04	216.04
DISCCART	726234.49	4319882.08	189.22	192.67
DISCCART	727234.49	4258882.08	149.31	193.31
DISCCART	727234.49	4257882.08	170.41	174.20

DISCCART	727234.49	4256882.08	152.29	180.99
DISCCART	727234.49	4255882.08	177.25	193.78
DISCCART	727234.49	4254882.08	162.13	162.13
DISCCART	727234.49	4253882.08	183.91	183.91
DISCCART	727234.49	4252882.08	175.73	214.80
DISCCART	727234.49	4251882.08	165.64	217.31
DISCCART	727234.49	4250882.08	134.46	216.81
DISCCART	727234.49	4249882.08	139.96	224.06
DISCCART	727234.49	4248882.08	183.81	220.52
DISCCART	727234.49	4247882.08	134.02	162.19
DISCCART	727234.49	4246882.08	131.64	157.24
DISCCART	727234.49	4245882.08	145.86	187.58
DISCCART	727234.49	4244882.08	150.74	162.93
DISCCART	727234.49	4243882.08	152.99	174.04
DISCCART	727234.49	4242882.08	172.53	177.57
DISCCART	727234.49	4241882.08	143.16	231.02
DISCCART	727234.49	4240882.08	135.81	135.81
DISCCART	727234.49	4239882.08	151.85	184.55
DISCCART	727234.49	4238882.08	119.43	177.23
DISCCART	727234.49	4237882.08	140.20	140.20
DISCCART	727234.49	4236882.08	130.64	130.64
DISCCART	727234.49	4235882.08	161.28	179.97
DISCCART	727234.49	4234882.08	164.52	176.48
DISCCART	727234.49	4233882.08	136.31	136.31
DISCCART	727234.49	4232882.08	139.38	147.53
DISCCART	727234.49	4231882.08	137.46	162.12
DISCCART	727234.49	4230882.08	141.20	171.94
DISCCART	727234.49	4229882.08	141.36	177.31
DISCCART	727234.49	4228882.08	157.57	177.90
DISCCART	727234.49	4227882.08	134.23	165.27
DISCCART	727234.49	4226882.08	131.40	191.19
DISCCART	727234.49	4225882.08	157.01	185.00
DISCCART	727234.49	4224882.08	144.04	168.26
DISCCART	727234.49	4223882.08	130.49	204.30
DISCCART	727234.49	4222882.08	166.52	196.71
DISCCART	727234.49	4221882.08	173.61	217.12
DISCCART	727234.49	4220882.08	176.41	177.10
DISCCART	727234.49	4259882.08	116.05	118.73
DISCCART	727234.49	4259882.08	116.05	118.73
DISCCART	727234.49	4260882.08	139.78	153.06
DISCCART	727234.49	4261882.08	141.23	175.00
DISCCART	727234.49	4262882.08	168.71	168.71
DISCCART	727234.49	4263882.08	147.60	162.95
DISCCART	727234.49	4264882.08	174.49	174.49
DISCCART	727234.49	4265882.08	177.20	186.59
DISCCART	727234.49	4266882.08	196.47	196.47
DISCCART	727234.49	4267882.08	174.47	201.84
DISCCART	727234.49	4268882.08	198.04	198.04
DISCCART	727234.49	4269882.08	176.38	176.38
DISCCART	727234.49	4270882.08	195.47	195.47
DISCCART	727234.49	4271882.08	169.84	183.64
DISCCART	727234.49	4272882.08	191.98	191.98
DISCCART	727234.49	4273882.08	186.19	186.19
DISCCART	727234.49	4274882.08	185.82	185.82
DISCCART	727234.49	4275882.08	170.61	173.72
DISCCART	727234.49	4276882.08	161.81	161.81
DISCCART	727234.49	4277882.08	149.13	183.53
DISCCART	727234.49	4278882.08	160.75	160.75
DISCCART	727234.49	4279882.08	158.65	158.65
DISCCART	727234.49	4280882.08	175.59	175.59
DISCCART	727234.49	4281882.08	191.84	191.84
DISCCART	727234.49	4282882.08	202.95	203.85
DISCCART	727234.49	4283882.08	212.62	212.62
DISCCART	727234.49	4284882.08	193.11	193.11
DISCCART	727234.49	4285882.08	204.72	212.12
DISCCART	727234.49	4286882.08	213.92	213.92

DISCCART	727234.49	4287882.08	207.53	207.53
DISCCART	727234.49	4288882.08	184.99	189.35
DISCCART	727234.49	4289882.08	179.97	179.97
DISCCART	727234.49	4290882.08	165.34	165.34
DISCCART	727234.49	4291882.08	168.06	168.06
DISCCART	727234.49	4292882.08	167.58	167.58
DISCCART	727234.49	4293882.08	186.32	186.32
DISCCART	727234.49	4294882.08	176.57	176.57
DISCCART	727234.49	4295882.08	171.21	175.96
DISCCART	727234.49	4296882.08	158.09	177.25
DISCCART	727234.49	4297882.08	157.64	168.54
DISCCART	727234.49	4298882.08	157.55	183.90
DISCCART	727234.49	4299882.08	151.53	192.74
DISCCART	727234.49	4300882.08	132.61	135.60
DISCCART	727234.49	4301882.08	132.13	132.13
DISCCART	727234.49	4302882.08	133.21	133.21
DISCCART	727234.49	4303882.08	133.61	133.61
DISCCART	727234.49	4304882.08	133.07	133.07
DISCCART	727234.49	4305882.08	133.43	133.43
DISCCART	727234.49	4306882.08	133.03	133.03
DISCCART	727234.49	4307882.08	131.17	131.17
DISCCART	727234.49	4308882.08	130.12	130.12
DISCCART	727234.49	4309882.08	128.40	128.40
DISCCART	727234.49	4310882.08	130.30	130.30
DISCCART	727234.49	4311882.08	134.19	134.19
DISCCART	727234.49	4312882.08	133.15	133.15
DISCCART	727234.49	4313882.08	127.48	127.48
DISCCART	727234.49	4314882.08	127.39	216.61
DISCCART	727234.49	4315882.08	183.33	205.61
DISCCART	727234.49	4316882.08	158.44	202.78
DISCCART	727234.49	4317882.08	208.10	208.10
DISCCART	727234.49	4318882.08	203.58	203.58
DISCCART	727234.49	4319882.08	197.87	197.87
DISCCART	728234.49	4258882.08	148.91	153.62
DISCCART	728234.49	4257882.08	148.64	156.31
DISCCART	728234.49	4256882.08	151.18	174.07
DISCCART	728234.49	4255882.08	136.48	171.18
DISCCART	728234.49	4254882.08	166.73	166.73
DISCCART	728234.49	4253882.08	140.40	177.25
DISCCART	728234.49	4252882.08	142.84	165.82
DISCCART	728234.49	4251882.08	158.61	181.65
DISCCART	728234.49	4250882.08	132.02	215.74
DISCCART	728234.49	4249882.08	144.12	200.07
DISCCART	728234.49	4248882.08	158.92	168.92
DISCCART	728234.49	4247882.08	174.01	189.88
DISCCART	728234.49	4246882.08	129.58	189.81
DISCCART	728234.49	4245882.08	154.25	190.45
DISCCART	728234.49	4244882.08	148.24	190.85
DISCCART	728234.49	4243882.08	133.37	179.82
DISCCART	728234.49	4242882.08	158.77	169.17
DISCCART	728234.49	4241882.08	148.48	178.06
DISCCART	728234.49	4240882.08	147.94	152.05
DISCCART	728234.49	4239882.08	149.73	174.10
DISCCART	728234.49	4238882.08	121.35	181.19
DISCCART	728234.49	4237882.08	128.94	151.33
DISCCART	728234.49	4236882.08	162.70	162.70
DISCCART	728234.49	4235882.08	165.53	165.78
DISCCART	728234.49	4234882.08	147.11	192.37
DISCCART	728234.49	4233882.08	144.26	144.26
DISCCART	728234.49	4232882.08	140.43	140.43
DISCCART	728234.49	4231882.08	124.83	141.22
DISCCART	728234.49	4230882.08	128.84	128.84
DISCCART	728234.49	4229882.08	127.01	143.01
DISCCART	728234.49	4228882.08	139.44	159.79
DISCCART	728234.49	4227882.08	123.55	148.29
DISCCART	728234.49	4226882.08	147.23	152.52

DISCCART	728234.49	4225882.08	128.32	178.22
DISCCART	728234.49	4224882.08	152.69	167.55
DISCCART	728234.49	4223882.08	168.45	203.84
DISCCART	728234.49	4222882.08	175.31	220.38
DISCCART	728234.49	4221882.08	217.79	232.83
DISCCART	728234.49	4220882.08	197.82	197.82
DISCCART	728234.49	4259882.08	122.13	122.13
DISCCART	728234.49	4259882.08	122.13	122.13
DISCCART	728234.49	4260882.08	131.72	147.34
DISCCART	728234.49	4261882.08	159.82	159.82
DISCCART	728234.49	4262882.08	176.43	185.62
DISCCART	728234.49	4263882.08	186.71	186.71
DISCCART	728234.49	4264882.08	194.98	194.98
DISCCART	728234.49	4265882.08	194.04	194.04
DISCCART	728234.49	4266882.08	183.28	183.28
DISCCART	728234.49	4267882.08	196.89	196.89
DISCCART	728234.49	4268882.08	188.65	188.65
DISCCART	728234.49	4269882.08	183.07	186.18
DISCCART	728234.49	4270882.08	188.80	188.80
DISCCART	728234.49	4271882.08	186.60	186.60
DISCCART	728234.49	4272882.08	174.38	177.85
DISCCART	728234.49	4273882.08	192.27	192.27
DISCCART	728234.49	4274882.08	173.93	179.26
DISCCART	728234.49	4275882.08	170.34	170.34
DISCCART	728234.49	4276882.08	148.33	168.57
DISCCART	728234.49	4277882.08	141.64	161.68
DISCCART	728234.49	4278882.08	156.67	156.67
DISCCART	728234.49	4279882.08	158.10	158.10
DISCCART	728234.49	4280882.08	185.11	185.11
DISCCART	728234.49	4281882.08	175.11	188.35
DISCCART	728234.49	4282882.08	205.54	205.54
DISCCART	728234.49	4283882.08	201.46	201.46
DISCCART	728234.49	4284882.08	180.33	180.33
DISCCART	728234.49	4285882.08	195.56	195.56
DISCCART	728234.49	4286882.08	204.20	204.20
DISCCART	728234.49	4287882.08	201.25	201.25
DISCCART	728234.49	4288882.08	192.42	192.42
DISCCART	728234.49	4289882.08	168.28	168.28
DISCCART	728234.49	4290882.08	180.38	180.38
DISCCART	728234.49	4291882.08	171.18	171.18
DISCCART	728234.49	4292882.08	164.83	164.83
DISCCART	728234.49	4293882.08	176.82	176.82
DISCCART	728234.49	4294882.08	180.32	180.32
DISCCART	728234.49	4295882.08	169.32	169.32
DISCCART	728234.49	4296882.08	171.05	171.05
DISCCART	728234.49	4297882.08	176.23	176.23
DISCCART	728234.49	4298882.08	160.24	169.66
DISCCART	728234.49	4299882.08	144.01	196.12
DISCCART	728234.49	4300882.08	133.02	133.02
DISCCART	728234.49	4301882.08	132.52	132.52
DISCCART	728234.49	4302882.08	131.08	131.08
DISCCART	728234.49	4303882.08	133.59	133.59
DISCCART	728234.49	4304882.08	132.30	132.30
DISCCART	728234.49	4305882.08	132.85	132.85
DISCCART	728234.49	4306882.08	132.22	132.22
DISCCART	728234.49	4307882.08	131.86	131.86
DISCCART	728234.49	4308882.08	130.78	130.78
DISCCART	728234.49	4309882.08	129.58	129.58
DISCCART	728234.49	4310882.08	131.01	131.01
DISCCART	728234.49	4311882.08	132.06	132.06
DISCCART	728234.49	4312882.08	132.23	132.23
DISCCART	728234.49	4313882.08	127.39	127.39
DISCCART	728234.49	4314882.08	156.34	216.61
DISCCART	728234.49	4315882.08	176.01	186.44
DISCCART	728234.49	4316882.08	186.79	190.58
DISCCART	728234.49	4317882.08	189.47	189.47

DISCCART	728234.49	4318882.08	187.15	189.65
DISCCART	728234.49	4319882.08	200.26	200.26
DISCCART	729234.49	4258882.08	134.03	141.65
DISCCART	729234.49	4257882.08	171.05	171.05
DISCCART	729234.49	4256882.08	176.97	176.97
DISCCART	729234.49	4255882.08	130.77	156.48
DISCCART	729234.49	4254882.08	148.88	169.73
DISCCART	729234.49	4253882.08	164.91	164.91
DISCCART	729234.49	4252882.08	165.19	175.48
DISCCART	729234.49	4251882.08	147.35	159.99
DISCCART	729234.49	4250882.08	164.70	177.35
DISCCART	729234.49	4249882.08	134.07	134.07
DISCCART	729234.49	4248882.08	134.78	184.17
DISCCART	729234.49	4247882.08	170.02	170.42
DISCCART	729234.49	4246882.08	126.24	174.98
DISCCART	729234.49	4245882.08	139.17	173.95
DISCCART	729234.49	4244882.08	140.05	171.65
DISCCART	729234.49	4243882.08	164.08	174.74
DISCCART	729234.49	4242882.08	144.43	161.25
DISCCART	729234.49	4241882.08	151.22	151.22
DISCCART	729234.49	4240882.08	122.03	152.25
DISCCART	729234.49	4239882.08	129.08	170.62
DISCCART	729234.49	4238882.08	140.41	140.41
DISCCART	729234.49	4237882.08	133.77	156.15
DISCCART	729234.49	4236882.08	118.45	174.49
DISCCART	729234.49	4235882.08	178.00	182.92
DISCCART	729234.49	4234882.08	147.05	147.05
DISCCART	729234.49	4233882.08	134.84	134.84
DISCCART	729234.49	4232882.08	124.37	126.90
DISCCART	729234.49	4231882.08	130.39	130.39
DISCCART	729234.49	4230882.08	121.46	251.63
DISCCART	729234.49	4229882.08	122.39	257.81
DISCCART	729234.49	4228882.08	138.34	217.43
DISCCART	729234.49	4227882.08	152.77	165.68
DISCCART	729234.49	4226882.08	131.76	184.60
DISCCART	729234.49	4225882.08	170.27	183.89
DISCCART	729234.49	4224882.08	136.37	196.98
DISCCART	729234.49	4223882.08	147.88	196.24
DISCCART	729234.49	4222882.08	200.77	200.77
DISCCART	729234.49	4221882.08	210.67	213.02
DISCCART	729234.49	4220882.08	212.57	239.66
DISCCART	729234.49	4259882.08	124.96	124.96
DISCCART	729234.49	4259882.08	124.96	124.96
DISCCART	729234.49	4260882.08	133.81	133.81
DISCCART	729234.49	4261882.08	147.68	170.23
DISCCART	729234.49	4262882.08	174.38	177.39
DISCCART	729234.49	4263882.08	188.83	188.83
DISCCART	729234.49	4264882.08	175.22	175.22
DISCCART	729234.49	4265882.08	187.42	187.42
DISCCART	729234.49	4266882.08	180.69	180.69
DISCCART	729234.49	4267882.08	195.72	195.72
DISCCART	729234.49	4268882.08	174.11	174.11
DISCCART	729234.49	4269882.08	188.68	188.68
DISCCART	729234.49	4270882.08	155.28	180.79
DISCCART	729234.49	4271882.08	176.26	183.16
DISCCART	729234.49	4272882.08	185.95	185.95
DISCCART	729234.49	4273882.08	182.52	182.52
DISCCART	729234.49	4274882.08	171.61	173.91
DISCCART	729234.49	4275882.08	166.63	170.45
DISCCART	729234.49	4276882.08	161.04	161.04
DISCCART	729234.49	4277882.08	152.62	152.62
DISCCART	729234.49	4278882.08	161.44	165.78
DISCCART	729234.49	4279882.08	174.83	174.83
DISCCART	729234.49	4280882.08	178.24	178.24
DISCCART	729234.49	4281882.08	177.57	177.57
DISCCART	729234.49	4282882.08	182.65	190.10

DISCCART	729234.49	4283882.08	177.35	177.35
DISCCART	729234.49	4284882.08	172.91	172.91
DISCCART	729234.49	4285882.08	182.19	182.19
DISCCART	729234.49	4286882.08	192.02	192.02
DISCCART	729234.49	4287882.08	178.61	178.61
DISCCART	729234.49	4288882.08	173.39	173.39
DISCCART	729234.49	4289882.08	185.39	185.39
DISCCART	729234.49	4290882.08	176.17	176.17
DISCCART	729234.49	4291882.08	164.59	164.59
DISCCART	729234.49	4292882.08	161.02	161.02
DISCCART	729234.49	4293882.08	161.30	161.30
DISCCART	729234.49	4294882.08	162.51	162.51
DISCCART	729234.49	4295882.08	161.83	161.83
DISCCART	729234.49	4296882.08	166.96	166.96
DISCCART	729234.49	4297882.08	170.13	170.13
DISCCART	729234.49	4298882.08	173.44	173.44
DISCCART	729234.49	4299882.08	183.38	183.38
DISCCART	729234.49	4300882.08	128.47	196.59
DISCCART	729234.49	4301882.08	132.42	132.42
DISCCART	729234.49	4302882.08	132.22	132.22
DISCCART	729234.49	4303882.08	132.88	132.88
DISCCART	729234.49	4304882.08	132.86	132.86
DISCCART	729234.49	4305882.08	132.27	132.27
DISCCART	729234.49	4306882.08	132.40	132.40
DISCCART	729234.49	4307882.08	131.77	131.77
DISCCART	729234.49	4308882.08	131.42	131.42
DISCCART	729234.49	4309882.08	130.86	130.86
DISCCART	729234.49	4310882.08	131.51	131.51
DISCCART	729234.49	4311882.08	131.22	131.22
DISCCART	729234.49	4312882.08	127.39	127.39
DISCCART	729234.49	4313882.08	127.39	204.99
DISCCART	729234.49	4314882.08	147.87	197.30
DISCCART	729234.49	4315882.08	170.21	190.80
DISCCART	729234.49	4316882.08	178.27	178.27
DISCCART	729234.49	4317882.08	186.49	186.49
DISCCART	729234.49	4318882.08	196.49	196.49
DISCCART	729234.49	4319882.08	191.89	191.89
DISCCART	730234.49	4258882.08	129.15	130.76
DISCCART	730234.49	4257882.08	132.05	132.05
DISCCART	730234.49	4256882.08	152.99	172.98
DISCCART	730234.49	4255882.08	126.78	156.46
DISCCART	730234.49	4254882.08	176.57	179.82
DISCCART	730234.49	4253882.08	164.81	174.14
DISCCART	730234.49	4252882.08	139.09	169.25
DISCCART	730234.49	4251882.08	137.31	147.87
DISCCART	730234.49	4250882.08	152.67	165.84
DISCCART	730234.49	4249882.08	127.87	127.87
DISCCART	730234.49	4248882.08	142.20	166.20
DISCCART	730234.49	4247882.08	117.12	159.37
DISCCART	730234.49	4246882.08	117.02	117.02
DISCCART	730234.49	4245882.08	119.14	119.14
DISCCART	730234.49	4244882.08	121.77	122.58
DISCCART	730234.49	4243882.08	121.01	122.00
DISCCART	730234.49	4242882.08	117.78	124.14
DISCCART	730234.49	4241882.08	121.17	121.17
DISCCART	730234.49	4240882.08	119.22	119.22
DISCCART	730234.49	4239882.08	116.59	116.59
DISCCART	730234.49	4238882.08	116.43	116.43
DISCCART	730234.49	4237882.08	116.30	116.30
DISCCART	730234.49	4236882.08	115.77	173.19
DISCCART	730234.49	4235882.08	120.60	179.92
DISCCART	730234.49	4234882.08	119.89	159.52
DISCCART	730234.49	4233882.08	119.60	119.60
DISCCART	730234.49	4232882.08	147.66	257.66
DISCCART	730234.49	4231882.08	137.93	257.67
DISCCART	730234.49	4230882.08	199.88	251.63

DISCCART	730234.49	4229882.08	214.29	257.73
DISCCART	730234.49	4228882.08	201.27	201.57
DISCCART	730234.49	4227882.08	158.87	166.12
DISCCART	730234.49	4226882.08	171.26	171.26
DISCCART	730234.49	4225882.08	166.62	177.75
DISCCART	730234.49	4224882.08	155.13	219.73
DISCCART	730234.49	4223882.08	197.77	199.51
DISCCART	730234.49	4222882.08	163.69	208.53
DISCCART	730234.49	4221882.08	193.92	225.32
DISCCART	730234.49	4220882.08	234.74	234.74
DISCCART	730234.49	4259882.08	121.45	129.07
DISCCART	730234.49	4259882.08	121.45	129.07
DISCCART	730234.49	4260882.08	130.20	163.67
DISCCART	730234.49	4261882.08	148.49	169.87
DISCCART	730234.49	4262882.08	173.22	173.22
DISCCART	730234.49	4263882.08	160.48	162.01
DISCCART	730234.49	4264882.08	180.02	180.02
DISCCART	730234.49	4265882.08	181.74	181.74
DISCCART	730234.49	4266882.08	178.27	178.27
DISCCART	730234.49	4267882.08	180.91	180.91
DISCCART	730234.49	4268882.08	161.60	161.60
DISCCART	730234.49	4269882.08	168.45	168.45
DISCCART	730234.49	4270882.08	171.14	171.14
DISCCART	730234.49	4271882.08	185.56	185.56
DISCCART	730234.49	4272882.08	177.04	184.59
DISCCART	730234.49	4273882.08	175.42	175.42
DISCCART	730234.49	4274882.08	167.93	167.93
DISCCART	730234.49	4275882.08	153.95	158.91
DISCCART	730234.49	4276882.08	143.67	143.67
DISCCART	730234.49	4277882.08	149.49	149.49
DISCCART	730234.49	4278882.08	151.91	151.91
DISCCART	730234.49	4279882.08	161.61	161.61
DISCCART	730234.49	4280882.08	165.39	165.39
DISCCART	730234.49	4281882.08	165.47	165.47
DISCCART	730234.49	4282882.08	172.54	172.54
DISCCART	730234.49	4283882.08	167.61	167.61
DISCCART	730234.49	4284882.08	170.62	173.23
DISCCART	730234.49	4285882.08	182.57	182.57
DISCCART	730234.49	4286882.08	199.23	199.23
DISCCART	730234.49	4287882.08	192.59	192.59
DISCCART	730234.49	4288882.08	199.08	199.08
DISCCART	730234.49	4289882.08	181.97	181.97
DISCCART	730234.49	4290882.08	168.71	168.71
DISCCART	730234.49	4291882.08	172.99	172.99
DISCCART	730234.49	4292882.08	170.82	170.82
DISCCART	730234.49	4293882.08	157.92	157.92
DISCCART	730234.49	4294882.08	156.92	156.92
DISCCART	730234.49	4295882.08	155.82	155.82
DISCCART	730234.49	4296882.08	156.94	156.94
DISCCART	730234.49	4297882.08	162.59	162.59
DISCCART	730234.49	4298882.08	164.43	164.43
DISCCART	730234.49	4299882.08	174.26	174.26
DISCCART	730234.49	4300882.08	175.17	175.17
DISCCART	730234.49	4301882.08	171.05	209.87
DISCCART	730234.49	4302882.08	127.40	209.52
DISCCART	730234.49	4303882.08	131.95	131.95
DISCCART	730234.49	4304882.08	131.72	131.72
DISCCART	730234.49	4305882.08	131.03	131.03
DISCCART	730234.49	4306882.08	132.53	132.53
DISCCART	730234.49	4307882.08	132.38	132.38
DISCCART	730234.49	4308882.08	131.95	131.95
DISCCART	730234.49	4309882.08	131.64	131.64
DISCCART	730234.49	4310882.08	132.87	132.87
DISCCART	730234.49	4311882.08	133.02	133.02
DISCCART	730234.49	4312882.08	127.39	127.39
DISCCART	730234.49	4313882.08	173.94	194.40

DISCCART	730234.49	4314882.08	178.13	191.08
DISCCART	730234.49	4315882.08	198.00	198.00
DISCCART	730234.49	4316882.08	145.01	166.44
DISCCART	730234.49	4317882.08	148.53	196.47
DISCCART	730234.49	4318882.08	160.25	192.96
DISCCART	730234.49	4319882.08	171.77	194.27
DISCCART	731234.49	4258882.08	124.99	124.99
DISCCART	731234.49	4257882.08	128.11	128.11
DISCCART	731234.49	4256882.08	128.93	128.93
DISCCART	731234.49	4255882.08	121.93	121.93
DISCCART	731234.49	4254882.08	120.45	120.45
DISCCART	731234.49	4253882.08	121.32	174.19
DISCCART	731234.49	4252882.08	120.39	168.63
DISCCART	731234.49	4251882.08	121.53	121.53
DISCCART	731234.49	4250882.08	117.20	117.20
DISCCART	731234.49	4249882.08	117.08	117.08
DISCCART	731234.49	4248882.08	118.86	118.86
DISCCART	731234.49	4247882.08	118.68	118.68
DISCCART	731234.49	4246882.08	120.84	120.84
DISCCART	731234.49	4245882.08	121.43	121.43
DISCCART	731234.49	4244882.08	120.48	126.24
DISCCART	731234.49	4243882.08	119.13	119.13
DISCCART	731234.49	4242882.08	119.27	119.27
DISCCART	731234.49	4241882.08	119.04	119.04
DISCCART	731234.49	4240882.08	121.34	121.34
DISCCART	731234.49	4239882.08	120.69	120.69
DISCCART	731234.49	4238882.08	118.97	118.97
DISCCART	731234.49	4237882.08	119.47	119.47
DISCCART	731234.49	4236882.08	119.63	119.63
DISCCART	731234.49	4235882.08	119.76	119.76
DISCCART	731234.49	4234882.08	115.49	115.49
DISCCART	731234.49	4233882.08	115.22	115.22
DISCCART	731234.49	4232882.08	147.76	257.67
DISCCART	731234.49	4231882.08	225.76	251.10
DISCCART	731234.49	4230882.08	209.39	224.77
DISCCART	731234.49	4229882.08	140.71	257.81
DISCCART	731234.49	4228882.08	140.13	209.32
DISCCART	731234.49	4227882.08	175.32	190.27
DISCCART	731234.49	4226882.08	152.36	177.16
DISCCART	731234.49	4225882.08	167.12	221.28
DISCCART	731234.49	4224882.08	202.97	202.97
DISCCART	731234.49	4223882.08	205.89	221.63
DISCCART	731234.49	4222882.08	212.87	212.87
DISCCART	731234.49	4221882.08	169.46	225.82
DISCCART	731234.49	4220882.08	201.06	232.23
DISCCART	731234.49	4259882.08	121.12	121.47
DISCCART	731234.49	4259882.08	121.12	121.47
DISCCART	731234.49	4260882.08	146.15	176.07
DISCCART	731234.49	4261882.08	178.13	178.13
DISCCART	731234.49	4262882.08	178.40	178.40
DISCCART	731234.49	4263882.08	152.22	165.12
DISCCART	731234.49	4264882.08	143.37	174.68
DISCCART	731234.49	4265882.08	183.51	183.51
DISCCART	731234.49	4266882.08	182.57	182.57
DISCCART	731234.49	4267882.08	160.40	163.35
DISCCART	731234.49	4268882.08	162.12	162.12
DISCCART	731234.49	4269882.08	150.51	150.51
DISCCART	731234.49	4270882.08	176.27	176.27
DISCCART	731234.49	4271882.08	170.75	170.75
DISCCART	731234.49	4272882.08	170.71	170.71
DISCCART	731234.49	4273882.08	167.17	167.17
DISCCART	731234.49	4274882.08	173.79	173.79
DISCCART	731234.49	4275882.08	153.65	153.65
DISCCART	731234.49	4276882.08	131.57	149.97
DISCCART	731234.49	4277882.08	152.49	155.50
DISCCART	731234.49	4278882.08	141.99	141.99

DISCCART	731234.49	4279882.08	159.01	159.01
DISCCART	731234.49	4280882.08	166.91	166.91
DISCCART	731234.49	4281882.08	186.90	186.90
DISCCART	731234.49	4282882.08	167.73	167.73
DISCCART	731234.49	4283882.08	159.03	159.03
DISCCART	731234.49	4284882.08	167.02	170.61
DISCCART	731234.49	4285882.08	190.13	190.13
DISCCART	731234.49	4286882.08	199.28	199.28
DISCCART	731234.49	4287882.08	195.24	195.24
DISCCART	731234.49	4288882.08	183.96	192.76
DISCCART	731234.49	4289882.08	194.28	194.28
DISCCART	731234.49	4290882.08	182.29	185.21
DISCCART	731234.49	4291882.08	179.51	179.51
DISCCART	731234.49	4292882.08	167.98	167.98
DISCCART	731234.49	4293882.08	167.30	167.30
DISCCART	731234.49	4294882.08	174.14	174.14
DISCCART	731234.49	4295882.08	162.21	162.21
DISCCART	731234.49	4296882.08	154.62	154.62
DISCCART	731234.49	4297882.08	155.50	155.50
DISCCART	731234.49	4298882.08	158.20	158.20
DISCCART	731234.49	4299882.08	160.54	160.54
DISCCART	731234.49	4300882.08	165.12	165.12
DISCCART	731234.49	4301882.08	176.80	176.80
DISCCART	731234.49	4302882.08	188.76	203.47
DISCCART	731234.49	4303882.08	137.87	183.55
DISCCART	731234.49	4304882.08	164.34	184.78
DISCCART	731234.49	4305882.08	130.90	189.70
DISCCART	731234.49	4306882.08	131.50	131.50
DISCCART	731234.49	4307882.08	125.62	132.13
DISCCART	731234.49	4308882.08	129.84	129.84
DISCCART	731234.49	4309882.08	131.01	131.01
DISCCART	731234.49	4310882.08	130.55	130.55
DISCCART	731234.49	4311882.08	128.69	131.84
DISCCART	731234.49	4312882.08	127.39	229.53
DISCCART	731234.49	4313882.08	219.90	219.90
DISCCART	731234.49	4314882.08	179.41	208.09
DISCCART	731234.49	4315882.08	169.57	169.57
DISCCART	731234.49	4316882.08	167.22	169.12
DISCCART	731234.49	4317882.08	160.37	180.49
DISCCART	731234.49	4318882.08	164.49	182.09
DISCCART	731234.49	4319882.08	187.77	195.74
DISCCART	732234.49	4258882.08	122.55	171.16
DISCCART	732234.49	4257882.08	142.36	178.36
DISCCART	732234.49	4256882.08	151.95	160.13
DISCCART	732234.49	4255882.08	127.04	162.49
DISCCART	732234.49	4254882.08	125.56	125.56
DISCCART	732234.49	4253882.08	127.56	127.56
DISCCART	732234.49	4252882.08	121.75	121.75
DISCCART	732234.49	4251882.08	117.19	117.19
DISCCART	732234.49	4250882.08	120.38	120.38
DISCCART	732234.49	4249882.08	119.78	119.78
DISCCART	732234.49	4248882.08	119.91	119.91
DISCCART	732234.49	4247882.08	120.53	120.53
DISCCART	732234.49	4246882.08	120.31	120.31
DISCCART	732234.49	4245882.08	118.50	118.50
DISCCART	732234.49	4244882.08	120.10	120.10
DISCCART	732234.49	4243882.08	119.96	119.96
DISCCART	732234.49	4242882.08	121.28	121.28
DISCCART	732234.49	4241882.08	119.27	119.27
DISCCART	732234.49	4240882.08	121.05	121.05
DISCCART	732234.49	4239882.08	120.85	120.85
DISCCART	732234.49	4238882.08	120.61	120.61
DISCCART	732234.49	4237882.08	120.63	120.63
DISCCART	732234.49	4236882.08	118.56	118.56
DISCCART	732234.49	4235882.08	120.94	120.94
DISCCART	732234.49	4234882.08	119.67	119.67

DISCCART	732234.49	4233882.08	118.93	118.93
DISCCART	732234.49	4232882.08	120.70	257.67
DISCCART	732234.49	4231882.08	114.92	257.67
DISCCART	732234.49	4230882.08	129.00	221.10
DISCCART	732234.49	4229882.08	134.46	209.56
DISCCART	732234.49	4228882.08	166.07	197.52
DISCCART	732234.49	4227882.08	156.56	213.81
DISCCART	732234.49	4226882.08	180.22	207.89
DISCCART	732234.49	4225882.08	157.89	222.28
DISCCART	732234.49	4224882.08	166.08	172.35
DISCCART	732234.49	4223882.08	190.69	190.69
DISCCART	732234.49	4222882.08	218.00	218.00
DISCCART	732234.49	4221882.08	223.53	231.94
DISCCART	732234.49	4220882.08	203.44	232.19
DISCCART	732234.49	4259882.08	121.94	134.70
DISCCART	732234.49	4259882.08	121.94	134.70
DISCCART	732234.49	4260882.08	148.70	166.40
DISCCART	732234.49	4261882.08	132.80	178.43
DISCCART	732234.49	4262882.08	133.96	133.96
DISCCART	732234.49	4263882.08	146.19	164.73
DISCCART	732234.49	4264882.08	173.04	173.55
DISCCART	732234.49	4265882.08	177.60	177.60
DISCCART	732234.49	4266882.08	165.03	177.10
DISCCART	732234.49	4267882.08	151.03	164.37
DISCCART	732234.49	4268882.08	175.07	175.07
DISCCART	732234.49	4269882.08	179.66	179.66
DISCCART	732234.49	4270882.08	175.45	175.45
DISCCART	732234.49	4271882.08	157.94	157.94
DISCCART	732234.49	4272882.08	146.17	146.17
DISCCART	732234.49	4273882.08	153.89	154.60
DISCCART	732234.49	4274882.08	159.05	165.49
DISCCART	732234.49	4275882.08	145.94	145.94
DISCCART	732234.49	4276882.08	150.22	150.22
DISCCART	732234.49	4277882.08	148.80	148.80
DISCCART	732234.49	4278882.08	146.00	146.00
DISCCART	732234.49	4279882.08	155.30	155.30
DISCCART	732234.49	4280882.08	179.68	179.68
DISCCART	732234.49	4281882.08	174.64	174.64
DISCCART	732234.49	4282882.08	165.27	165.27
DISCCART	732234.49	4283882.08	167.78	167.78
DISCCART	732234.49	4284882.08	171.56	171.56
DISCCART	732234.49	4285882.08	192.17	192.17
DISCCART	732234.49	4286882.08	194.17	194.17
DISCCART	732234.49	4287882.08	178.91	190.61
DISCCART	732234.49	4288882.08	178.74	178.74
DISCCART	732234.49	4289882.08	174.79	174.79
DISCCART	732234.49	4290882.08	174.58	174.58
DISCCART	732234.49	4291882.08	181.28	181.28
DISCCART	732234.49	4292882.08	164.62	164.62
DISCCART	732234.49	4293882.08	171.72	171.72
DISCCART	732234.49	4294882.08	183.10	183.10
DISCCART	732234.49	4295882.08	163.51	163.51
DISCCART	732234.49	4296882.08	166.73	166.73
DISCCART	732234.49	4297882.08	165.53	165.53
DISCCART	732234.49	4298882.08	154.84	155.22
DISCCART	732234.49	4299882.08	155.50	155.50
DISCCART	732234.49	4300882.08	161.63	161.63
DISCCART	732234.49	4301882.08	168.63	168.63
DISCCART	732234.49	4302882.08	172.47	172.47
DISCCART	732234.49	4303882.08	181.26	195.94
DISCCART	732234.49	4304882.08	194.46	194.46
DISCCART	732234.49	4305882.08	124.99	211.01
DISCCART	732234.49	4306882.08	130.85	130.85
DISCCART	732234.49	4307882.08	125.62	125.62
DISCCART	732234.49	4308882.08	129.09	129.09
DISCCART	732234.49	4309882.08	130.72	130.72

DISCCART	732234.49	4310882.08	130.42	130.42
DISCCART	732234.49	4311882.08	127.39	127.39
DISCCART	732234.49	4312882.08	127.39	214.98
DISCCART	732234.49	4313882.08	176.81	208.92
DISCCART	732234.49	4314882.08	186.68	204.74
DISCCART	732234.49	4315882.08	136.69	192.37
DISCCART	732234.49	4316882.08	189.20	192.02
DISCCART	732234.49	4317882.08	194.16	201.79
DISCCART	732234.49	4318882.08	199.09	199.09
DISCCART	732234.49	4319882.08	193.25	193.25
DISCCART	733234.49	4258882.08	164.94	166.18
DISCCART	733234.49	4257882.08	175.86	175.86
DISCCART	733234.49	4256882.08	176.26	176.26
DISCCART	733234.49	4255882.08	177.36	177.36
DISCCART	733234.49	4254882.08	146.57	174.79
DISCCART	733234.49	4253882.08	121.75	168.85
DISCCART	733234.49	4252882.08	117.65	117.65
DISCCART	733234.49	4251882.08	118.73	127.29
DISCCART	733234.49	4250882.08	120.55	120.55
DISCCART	733234.49	4249882.08	120.39	120.39
DISCCART	733234.49	4248882.08	120.80	120.80
DISCCART	733234.49	4247882.08	121.69	121.69
DISCCART	733234.49	4246882.08	121.45	121.45
DISCCART	733234.49	4245882.08	121.82	121.82
DISCCART	733234.49	4244882.08	121.98	121.98
DISCCART	733234.49	4243882.08	121.68	121.68
DISCCART	733234.49	4242882.08	120.49	120.49
DISCCART	733234.49	4241882.08	120.52	120.52
DISCCART	733234.49	4240882.08	119.24	119.24
DISCCART	733234.49	4239882.08	117.89	117.89
DISCCART	733234.49	4238882.08	119.38	119.38
DISCCART	733234.49	4237882.08	117.53	117.53
DISCCART	733234.49	4236882.08	118.73	118.73
DISCCART	733234.49	4235882.08	118.08	118.08
DISCCART	733234.49	4234882.08	120.70	120.70
DISCCART	733234.49	4233882.08	119.08	119.08
DISCCART	733234.49	4232882.08	114.31	116.87
DISCCART	733234.49	4231882.08	118.93	118.93
DISCCART	733234.49	4230882.08	114.30	219.05
DISCCART	733234.49	4229882.08	215.33	215.33
DISCCART	733234.49	4228882.08	153.84	244.70
DISCCART	733234.49	4227882.08	157.20	213.72
DISCCART	733234.49	4226882.08	153.99	170.61
DISCCART	733234.49	4225882.08	146.96	146.96
DISCCART	733234.49	4224882.08	159.60	178.70
DISCCART	733234.49	4223882.08	187.86	190.27
DISCCART	733234.49	4222882.08	167.39	194.51
DISCCART	733234.49	4221882.08	183.82	202.86
DISCCART	733234.49	4220882.08	191.43	203.56
DISCCART	733234.49	4259882.08	149.45	172.67
DISCCART	733234.49	4259882.08	149.45	172.67
DISCCART	733234.49	4260882.08	128.41	162.20
DISCCART	733234.49	4261882.08	133.21	171.67
DISCCART	733234.49	4262882.08	167.56	167.56
DISCCART	733234.49	4263882.08	176.22	180.30
DISCCART	733234.49	4264882.08	181.54	181.54
DISCCART	733234.49	4265882.08	183.37	183.37
DISCCART	733234.49	4266882.08	149.18	156.80
DISCCART	733234.49	4267882.08	140.93	156.29
DISCCART	733234.49	4268882.08	167.73	167.73
DISCCART	733234.49	4269882.08	161.08	161.08
DISCCART	733234.49	4270882.08	163.20	163.20
DISCCART	733234.49	4271882.08	161.88	161.88
DISCCART	733234.49	4272882.08	147.52	153.43
DISCCART	733234.49	4273882.08	150.16	150.16
DISCCART	733234.49	4274882.08	143.87	143.87

DISCCART	733234.49	4275882.08	140.67	143.38
DISCCART	733234.49	4276882.08	152.72	152.72
DISCCART	733234.49	4277882.08	161.41	161.41
DISCCART	733234.49	4278882.08	155.51	155.51
DISCCART	733234.49	4279882.08	162.93	162.93
DISCCART	733234.49	4280882.08	178.78	178.78
DISCCART	733234.49	4281882.08	174.50	174.50
DISCCART	733234.49	4282882.08	152.42	152.42
DISCCART	733234.49	4283882.08	169.84	169.84
DISCCART	733234.49	4284882.08	161.86	161.86
DISCCART	733234.49	4285882.08	177.54	177.54
DISCCART	733234.49	4286882.08	189.56	189.56
DISCCART	733234.49	4287882.08	198.42	198.42
DISCCART	733234.49	4288882.08	188.90	192.82
DISCCART	733234.49	4289882.08	170.83	183.89
DISCCART	733234.49	4290882.08	157.63	157.63
DISCCART	733234.49	4291882.08	171.92	176.06
DISCCART	733234.49	4292882.08	176.82	176.82
DISCCART	733234.49	4293882.08	186.06	186.06
DISCCART	733234.49	4294882.08	169.92	169.92
DISCCART	733234.49	4295882.08	173.56	173.56
DISCCART	733234.49	4296882.08	177.19	177.19
DISCCART	733234.49	4297882.08	156.84	156.84
DISCCART	733234.49	4298882.08	155.67	155.67
DISCCART	733234.49	4299882.08	151.64	151.64
DISCCART	733234.49	4300882.08	152.91	152.91
DISCCART	733234.49	4301882.08	155.16	155.16
DISCCART	733234.49	4302882.08	168.74	168.74
DISCCART	733234.49	4303882.08	173.51	173.51
DISCCART	733234.49	4304882.08	187.23	187.23
DISCCART	733234.49	4305882.08	131.09	205.10
DISCCART	733234.49	4306882.08	129.39	129.39
DISCCART	733234.49	4307882.08	131.94	131.94
DISCCART	733234.49	4308882.08	128.69	128.69
DISCCART	733234.49	4309882.08	129.35	129.35
DISCCART	733234.49	4310882.08	131.06	131.06
DISCCART	733234.49	4311882.08	127.39	127.39
DISCCART	733234.49	4312882.08	131.88	212.25
DISCCART	733234.49	4313882.08	161.07	202.58
DISCCART	733234.49	4314882.08	157.87	158.91
DISCCART	733234.49	4315882.08	156.98	157.79
DISCCART	733234.49	4316882.08	171.39	171.39
DISCCART	733234.49	4317882.08	165.95	190.19
DISCCART	733234.49	4318882.08	188.62	192.04
DISCCART	733234.49	4319882.08	185.44	185.44
DISCCART	734234.49	4258882.08	173.34	173.34
DISCCART	734234.49	4257882.08	180.86	180.86
DISCCART	734234.49	4256882.08	165.52	170.03
DISCCART	734234.49	4255882.08	129.10	174.76
DISCCART	734234.49	4254882.08	117.43	178.73
DISCCART	734234.49	4253882.08	120.40	120.40
DISCCART	734234.49	4252882.08	120.22	120.22
DISCCART	734234.49	4251882.08	121.67	121.67
DISCCART	734234.49	4250882.08	121.74	121.74
DISCCART	734234.49	4249882.08	121.41	121.41
DISCCART	734234.49	4248882.08	120.67	120.67
DISCCART	734234.49	4247882.08	120.63	120.63
DISCCART	734234.49	4246882.08	117.79	120.97
DISCCART	734234.49	4245882.08	123.11	123.11
DISCCART	734234.49	4244882.08	122.12	122.12
DISCCART	734234.49	4243882.08	120.19	120.19
DISCCART	734234.49	4242882.08	120.61	120.61
DISCCART	734234.49	4241882.08	119.79	119.79
DISCCART	734234.49	4240882.08	119.09	119.09
DISCCART	734234.49	4239882.08	118.81	118.81
DISCCART	734234.49	4238882.08	118.61	118.61

DISCCART	734234.49	4237882.08	118.35	118.35
DISCCART	734234.49	4236882.08	117.30	117.30
DISCCART	734234.49	4235882.08	118.04	118.04
DISCCART	734234.49	4234882.08	120.30	120.30
DISCCART	734234.49	4233882.08	118.81	118.81
DISCCART	734234.49	4232882.08	117.96	117.96
DISCCART	734234.49	4231882.08	118.72	118.72
DISCCART	734234.49	4230882.08	118.45	118.45
DISCCART	734234.49	4229882.08	114.45	250.63
DISCCART	734234.49	4228882.08	239.21	250.63
DISCCART	734234.49	4227882.08	141.67	250.63
DISCCART	734234.49	4226882.08	158.94	171.61
DISCCART	734234.49	4225882.08	134.31	134.31
DISCCART	734234.49	4224882.08	148.65	148.65
DISCCART	734234.49	4223882.08	140.59	172.44
DISCCART	734234.49	4222882.08	166.72	181.92
DISCCART	734234.49	4221882.08	187.05	187.05
DISCCART	734234.49	4220882.08	183.78	183.78
DISCCART	734234.49	4259882.08	168.09	168.09
DISCCART	734234.49	4259882.08	168.09	168.09
DISCCART	734234.49	4260882.08	174.87	176.83
DISCCART	734234.49	4261882.08	170.40	170.40
DISCCART	734234.49	4262882.08	163.53	163.53
DISCCART	734234.49	4263882.08	154.67	154.67
DISCCART	734234.49	4264882.08	179.30	179.30
DISCCART	734234.49	4265882.08	160.36	160.36
DISCCART	734234.49	4266882.08	134.51	157.09
DISCCART	734234.49	4267882.08	161.19	161.19
DISCCART	734234.49	4268882.08	160.72	160.72
DISCCART	734234.49	4269882.08	155.60	159.15
DISCCART	734234.49	4270882.08	167.67	167.67
DISCCART	734234.49	4271882.08	134.70	134.70
DISCCART	734234.49	4272882.08	149.26	149.26
DISCCART	734234.49	4273882.08	123.33	134.64
DISCCART	734234.49	4274882.08	145.40	145.40
DISCCART	734234.49	4275882.08	149.61	149.61
DISCCART	734234.49	4276882.08	133.03	148.28
DISCCART	734234.49	4277882.08	147.13	147.13
DISCCART	734234.49	4278882.08	173.84	173.84
DISCCART	734234.49	4279882.08	171.33	171.33
DISCCART	734234.49	4280882.08	162.96	162.96
DISCCART	734234.49	4281882.08	162.23	162.23
DISCCART	734234.49	4282882.08	151.88	151.88
DISCCART	734234.49	4283882.08	161.49	161.49
DISCCART	734234.49	4284882.08	168.65	168.65
DISCCART	734234.49	4285882.08	183.72	183.72
DISCCART	734234.49	4286882.08	179.92	195.64
DISCCART	734234.49	4287882.08	194.39	194.39
DISCCART	734234.49	4288882.08	175.79	179.69
DISCCART	734234.49	4289882.08	157.80	157.80
DISCCART	734234.49	4290882.08	143.59	169.46
DISCCART	734234.49	4291882.08	151.23	151.23
DISCCART	734234.49	4292882.08	159.66	173.54
DISCCART	734234.49	4293882.08	186.71	186.71
DISCCART	734234.49	4294882.08	179.95	183.31
DISCCART	734234.49	4295882.08	178.83	178.83
DISCCART	734234.49	4296882.08	171.72	171.72
DISCCART	734234.49	4297882.08	155.70	155.70
DISCCART	734234.49	4298882.08	158.86	158.86
DISCCART	734234.49	4299882.08	156.12	156.12
DISCCART	734234.49	4300882.08	156.03	156.03
DISCCART	734234.49	4301882.08	159.93	159.93
DISCCART	734234.49	4302882.08	151.99	162.51
DISCCART	734234.49	4303882.08	157.46	169.08
DISCCART	734234.49	4304882.08	138.19	183.65
DISCCART	734234.49	4305882.08	131.37	131.37

DISCCART	734234.49	4306882.08	129.61	129.61
DISCCART	734234.49	4307882.08	125.21	125.21
DISCCART	734234.49	4308882.08	130.62	130.62
DISCCART	734234.49	4309882.08	129.06	133.84
DISCCART	734234.49	4310882.08	129.47	129.47
DISCCART	734234.49	4311882.08	127.39	127.39
DISCCART	734234.49	4312882.08	127.70	192.03
DISCCART	734234.49	4313882.08	143.11	143.11
DISCCART	734234.49	4314882.08	132.16	132.16
DISCCART	734234.49	4315882.08	172.39	172.39
DISCCART	734234.49	4316882.08	156.05	172.12
DISCCART	734234.49	4317882.08	183.41	185.75
DISCCART	734234.49	4318882.08	189.89	189.89
DISCCART	734234.49	4319882.08	181.65	181.65
DISCCART	735234.49	4258882.08	179.73	179.73
DISCCART	735234.49	4257882.08	177.32	183.16
DISCCART	735234.49	4256882.08	124.01	183.71
DISCCART	735234.49	4255882.08	117.43	178.59
DISCCART	735234.49	4254882.08	120.43	120.43
DISCCART	735234.49	4253882.08	120.37	120.37
DISCCART	735234.49	4252882.08	121.27	121.27
DISCCART	735234.49	4251882.08	120.12	120.12
DISCCART	735234.49	4250882.08	120.46	120.46
DISCCART	735234.49	4249882.08	121.43	121.43
DISCCART	735234.49	4248882.08	120.69	120.69
DISCCART	735234.49	4247882.08	121.55	121.55
DISCCART	735234.49	4246882.08	121.41	121.41
DISCCART	735234.49	4245882.08	119.24	119.24
DISCCART	735234.49	4244882.08	122.49	122.49
DISCCART	735234.49	4243882.08	120.57	252.18
DISCCART	735234.49	4242882.08	122.65	252.18
DISCCART	735234.49	4241882.08	122.22	242.04
DISCCART	735234.49	4240882.08	119.75	226.44
DISCCART	735234.49	4239882.08	119.51	213.66
DISCCART	735234.49	4238882.08	119.21	119.21
DISCCART	735234.49	4237882.08	118.31	118.31
DISCCART	735234.49	4236882.08	118.44	118.44
DISCCART	735234.49	4235882.08	117.24	117.24
DISCCART	735234.49	4234882.08	116.97	116.97
DISCCART	735234.49	4233882.08	117.73	117.73
DISCCART	735234.49	4232882.08	117.57	117.57
DISCCART	735234.49	4231882.08	117.39	117.39
DISCCART	735234.49	4230882.08	118.69	118.69
DISCCART	735234.49	4229882.08	114.23	120.15
DISCCART	735234.49	4228882.08	114.20	250.63
DISCCART	735234.49	4227882.08	218.54	224.53
DISCCART	735234.49	4226882.08	204.21	226.22
DISCCART	735234.49	4225882.08	139.97	251.25
DISCCART	735234.49	4224882.08	122.82	122.82
DISCCART	735234.49	4223882.08	158.20	158.20
DISCCART	735234.49	4222882.08	133.62	172.03
DISCCART	735234.49	4221882.08	161.05	165.70
DISCCART	735234.49	4220882.08	171.47	171.47
DISCCART	735234.49	4259882.08	179.28	179.28
DISCCART	735234.49	4259882.08	179.28	179.28
DISCCART	735234.49	4260882.08	184.64	184.64
DISCCART	735234.49	4261882.08	177.04	177.04
DISCCART	735234.49	4262882.08	146.18	146.18
DISCCART	735234.49	4263882.08	156.74	156.74
DISCCART	735234.49	4264882.08	167.54	167.54
DISCCART	735234.49	4265882.08	162.59	162.59
DISCCART	735234.49	4266882.08	136.59	149.18
DISCCART	735234.49	4267882.08	134.34	134.34
DISCCART	735234.49	4268882.08	129.72	130.06
DISCCART	735234.49	4269882.08	141.15	141.15
DISCCART	735234.49	4270882.08	142.96	142.96

DISCCART	735234.49	4271882.08	139.20	139.20
DISCCART	735234.49	4272882.08	131.16	131.16
DISCCART	735234.49	4273882.08	137.44	137.44
DISCCART	735234.49	4274882.08	140.87	140.87
DISCCART	735234.49	4275882.08	147.09	147.09
DISCCART	735234.49	4276882.08	157.85	157.85
DISCCART	735234.49	4277882.08	140.34	140.34
DISCCART	735234.49	4278882.08	156.13	156.13
DISCCART	735234.49	4279882.08	163.28	163.28
DISCCART	735234.49	4280882.08	146.24	146.24
DISCCART	735234.49	4281882.08	152.39	152.39
DISCCART	735234.49	4282882.08	150.77	150.77
DISCCART	735234.49	4283882.08	156.07	156.07
DISCCART	735234.49	4284882.08	172.78	172.78
DISCCART	735234.49	4285882.08	192.01	192.01
DISCCART	735234.49	4286882.08	196.35	196.35
DISCCART	735234.49	4287882.08	190.78	190.78
DISCCART	735234.49	4288882.08	183.59	183.59
DISCCART	735234.49	4289882.08	180.31	180.31
DISCCART	735234.49	4290882.08	147.50	162.48
DISCCART	735234.49	4291882.08	156.80	165.24
DISCCART	735234.49	4292882.08	157.41	174.35
DISCCART	735234.49	4293882.08	183.00	183.00
DISCCART	735234.49	4294882.08	183.63	183.63
DISCCART	735234.49	4295882.08	185.70	189.45
DISCCART	735234.49	4296882.08	176.09	176.09
DISCCART	735234.49	4297882.08	166.86	166.86
DISCCART	735234.49	4298882.08	171.73	174.23
DISCCART	735234.49	4299882.08	150.29	152.58
DISCCART	735234.49	4300882.08	159.09	159.50
DISCCART	735234.49	4301882.08	169.24	169.24
DISCCART	735234.49	4302882.08	166.66	166.66
DISCCART	735234.49	4303882.08	150.90	162.59
DISCCART	735234.49	4304882.08	158.68	171.56
DISCCART	735234.49	4305882.08	129.66	129.66
DISCCART	735234.49	4306882.08	130.17	130.17
DISCCART	735234.49	4307882.08	130.78	130.78
DISCCART	735234.49	4308882.08	129.78	129.78
DISCCART	735234.49	4309882.08	129.36	129.36
DISCCART	735234.49	4310882.08	140.00	155.72
DISCCART	735234.49	4311882.08	127.45	127.45
DISCCART	735234.49	4312882.08	127.51	127.51
DISCCART	735234.49	4313882.08	156.03	186.29
DISCCART	735234.49	4314882.08	144.42	169.33
DISCCART	735234.49	4315882.08	126.87	181.63
DISCCART	735234.49	4316882.08	177.10	177.10
DISCCART	735234.49	4317882.08	139.81	174.58
DISCCART	735234.49	4318882.08	180.55	180.55
DISCCART	735234.49	4319882.08	166.85	166.85
DISCCART	736234.49	4258882.08	121.58	179.06
DISCCART	736234.49	4257882.08	122.13	122.13
DISCCART	736234.49	4256882.08	117.58	117.58
DISCCART	736234.49	4255882.08	124.58	124.58
DISCCART	736234.49	4254882.08	119.90	119.90
DISCCART	736234.49	4253882.08	122.25	122.25
DISCCART	736234.49	4252882.08	120.58	120.58
DISCCART	736234.49	4251882.08	119.22	119.22
DISCCART	736234.49	4250882.08	121.20	121.53
DISCCART	736234.49	4249882.08	119.69	119.69
DISCCART	736234.49	4248882.08	121.72	121.72
DISCCART	736234.49	4247882.08	122.58	122.58
DISCCART	736234.49	4246882.08	123.14	123.14
DISCCART	736234.49	4245882.08	121.78	121.78
DISCCART	736234.49	4244882.08	122.19	252.18
DISCCART	736234.49	4243882.08	212.66	252.18
DISCCART	736234.49	4242882.08	169.95	251.36

DISCCART	736234.49	4241882.08	180.41	239.71
DISCCART	736234.49	4240882.08	184.83	219.84
DISCCART	736234.49	4239882.08	134.28	230.90
DISCCART	736234.49	4238882.08	163.98	232.93
DISCCART	736234.49	4237882.08	118.43	232.93
DISCCART	736234.49	4236882.08	119.65	119.65
DISCCART	736234.49	4235882.08	117.05	117.05
DISCCART	736234.49	4234882.08	116.67	116.67
DISCCART	736234.49	4233882.08	117.42	117.42
DISCCART	736234.49	4232882.08	117.01	117.01
DISCCART	736234.49	4231882.08	116.53	116.53
DISCCART	736234.49	4230882.08	116.25	116.25
DISCCART	736234.49	4229882.08	118.44	118.44
DISCCART	736234.49	4228882.08	114.42	114.42
DISCCART	736234.49	4227882.08	118.51	250.17
DISCCART	736234.49	4226882.08	175.28	251.25
DISCCART	736234.49	4225882.08	159.29	251.25
DISCCART	736234.49	4224882.08	149.51	177.30
DISCCART	736234.49	4223882.08	130.87	146.37
DISCCART	736234.49	4222882.08	128.04	128.04
DISCCART	736234.49	4221882.08	138.35	153.64
DISCCART	736234.49	4220882.08	165.21	165.21
DISCCART	736234.49	4259882.08	170.75	170.75
DISCCART	736234.49	4259882.08	170.75	170.75
DISCCART	736234.49	4260882.08	166.82	166.82
DISCCART	736234.49	4261882.08	143.53	164.03
DISCCART	736234.49	4262882.08	146.33	164.48
DISCCART	736234.49	4263882.08	134.68	140.00
DISCCART	736234.49	4264882.08	144.96	153.01
DISCCART	736234.49	4265882.08	170.58	170.58
DISCCART	736234.49	4266882.08	158.75	158.75
DISCCART	736234.49	4267882.08	151.91	151.91
DISCCART	736234.49	4268882.08	149.52	154.28
DISCCART	736234.49	4269882.08	128.15	128.15
DISCCART	736234.49	4270882.08	135.80	135.80
DISCCART	736234.49	4271882.08	133.34	133.34
DISCCART	736234.49	4272882.08	142.62	142.62
DISCCART	736234.49	4273882.08	145.62	145.62
DISCCART	736234.49	4274882.08	154.46	154.46
DISCCART	736234.49	4275882.08	150.63	158.85
DISCCART	736234.49	4276882.08	174.92	174.92
DISCCART	736234.49	4277882.08	149.92	149.92
DISCCART	736234.49	4278882.08	160.98	160.98
DISCCART	736234.49	4279882.08	161.49	161.49
DISCCART	736234.49	4280882.08	146.29	146.29
DISCCART	736234.49	4281882.08	149.29	149.29
DISCCART	736234.49	4282882.08	160.34	160.34
DISCCART	736234.49	4283882.08	172.59	172.59
DISCCART	736234.49	4284882.08	180.78	180.78
DISCCART	736234.49	4285882.08	170.59	170.59
DISCCART	736234.49	4286882.08	181.38	181.38
DISCCART	736234.49	4287882.08	181.69	181.69
DISCCART	736234.49	4288882.08	166.51	184.67
DISCCART	736234.49	4289882.08	174.91	179.78
DISCCART	736234.49	4290882.08	151.09	162.39
DISCCART	736234.49	4291882.08	150.49	150.49
DISCCART	736234.49	4292882.08	167.66	167.66
DISCCART	736234.49	4293882.08	160.29	169.21
DISCCART	736234.49	4294882.08	178.86	178.86
DISCCART	736234.49	4295882.08	168.62	182.89
DISCCART	736234.49	4296882.08	174.79	174.79
DISCCART	736234.49	4297882.08	168.28	180.98
DISCCART	736234.49	4298882.08	153.40	178.48
DISCCART	736234.49	4299882.08	169.67	169.67
DISCCART	736234.49	4300882.08	176.35	176.35
DISCCART	736234.49	4301882.08	155.36	159.40

DISCCART	736234.49	4302882.08	158.56	163.63
DISCCART	736234.49	4303882.08	152.09	155.76
DISCCART	736234.49	4304882.08	125.01	165.80
DISCCART	736234.49	4305882.08	125.11	131.26
DISCCART	736234.49	4306882.08	130.49	130.49
DISCCART	736234.49	4307882.08	130.00	130.00
DISCCART	736234.49	4308882.08	128.96	128.96
DISCCART	736234.49	4309882.08	130.94	130.94
DISCCART	736234.49	4310882.08	127.76	127.76
DISCCART	736234.49	4311882.08	127.50	127.50
DISCCART	736234.49	4312882.08	127.51	179.51
DISCCART	736234.49	4313882.08	171.76	171.76
DISCCART	736234.49	4314882.08	134.07	184.42
DISCCART	736234.49	4315882.08	134.02	173.90
DISCCART	736234.49	4316882.08	133.61	150.45
DISCCART	736234.49	4317882.08	144.26	159.62
DISCCART	736234.49	4318882.08	161.95	168.56
DISCCART	736234.49	4319882.08	145.30	163.88
DISCCART	737234.49	4258882.08	118.41	118.41
DISCCART	737234.49	4257882.08	121.64	121.64
DISCCART	737234.49	4256882.08	121.87	121.87
DISCCART	737234.49	4255882.08	122.22	122.22
DISCCART	737234.49	4254882.08	122.31	122.31
DISCCART	737234.49	4253882.08	122.09	122.09
DISCCART	737234.49	4252882.08	121.37	121.37
DISCCART	737234.49	4251882.08	120.11	120.11
DISCCART	737234.49	4250882.08	122.01	122.01
DISCCART	737234.49	4249882.08	120.41	120.41
DISCCART	737234.49	4248882.08	123.03	123.03
DISCCART	737234.49	4247882.08	123.06	123.06
DISCCART	737234.49	4246882.08	121.43	121.43
DISCCART	737234.49	4245882.08	119.14	231.06
DISCCART	737234.49	4244882.08	122.64	244.68
DISCCART	737234.49	4243882.08	227.25	244.68
DISCCART	737234.49	4242882.08	216.92	216.92
DISCCART	737234.49	4241882.08	231.41	239.77
DISCCART	737234.49	4240882.08	171.58	225.40
DISCCART	737234.49	4239882.08	145.93	219.48
DISCCART	737234.49	4238882.08	184.91	229.91
DISCCART	737234.49	4237882.08	186.81	186.81
DISCCART	737234.49	4236882.08	159.77	214.07
DISCCART	737234.49	4235882.08	121.06	225.79
DISCCART	737234.49	4234882.08	118.48	121.05
DISCCART	737234.49	4233882.08	120.55	120.55
DISCCART	737234.49	4232882.08	119.06	119.06
DISCCART	737234.49	4231882.08	117.99	117.99
DISCCART	737234.49	4230882.08	116.66	116.66
DISCCART	737234.49	4229882.08	118.23	118.23
DISCCART	737234.49	4228882.08	118.66	118.66
DISCCART	737234.49	4227882.08	114.23	114.23
DISCCART	737234.49	4226882.08	117.02	251.25
DISCCART	737234.49	4225882.08	130.06	237.87
DISCCART	737234.49	4224882.08	116.05	221.61
DISCCART	737234.49	4223882.08	140.41	232.46
DISCCART	737234.49	4222882.08	146.61	232.46
DISCCART	737234.49	4221882.08	157.35	220.57
DISCCART	737234.49	4220882.08	140.09	220.53
DISCCART	737234.49	4259882.08	118.79	118.79
DISCCART	737234.49	4259882.08	118.79	118.79
DISCCART	737234.49	4260882.08	118.73	118.73
DISCCART	737234.49	4261882.08	118.50	118.50
DISCCART	737234.49	4262882.08	118.60	126.42
DISCCART	737234.49	4263882.08	157.19	157.19
DISCCART	737234.49	4264882.08	143.08	146.74
DISCCART	737234.49	4265882.08	146.59	146.59
DISCCART	737234.49	4266882.08	151.05	151.05

DISCCART	737234.49	4267882.08	146.28	146.28
DISCCART	737234.49	4268882.08	139.63	139.63
DISCCART	737234.49	4269882.08	131.54	137.45
DISCCART	737234.49	4270882.08	124.85	124.85
DISCCART	737234.49	4271882.08	143.66	146.43
DISCCART	737234.49	4272882.08	135.06	135.06
DISCCART	737234.49	4273882.08	136.97	139.68
DISCCART	737234.49	4274882.08	154.68	154.68
DISCCART	737234.49	4275882.08	157.53	157.53
DISCCART	737234.49	4276882.08	165.59	165.59
DISCCART	737234.49	4277882.08	154.54	154.54
DISCCART	737234.49	4278882.08	149.67	153.08
DISCCART	737234.49	4279882.08	148.86	148.86
DISCCART	737234.49	4280882.08	143.27	143.27
DISCCART	737234.49	4281882.08	158.30	158.30
DISCCART	737234.49	4282882.08	159.87	159.87
DISCCART	737234.49	4283882.08	171.83	171.83
DISCCART	737234.49	4284882.08	163.97	167.73
DISCCART	737234.49	4285882.08	170.90	170.90
DISCCART	737234.49	4286882.08	167.00	167.00
DISCCART	737234.49	4287882.08	174.33	174.33
DISCCART	737234.49	4288882.08	174.04	178.31
DISCCART	737234.49	4289882.08	177.44	177.44
DISCCART	737234.49	4290882.08	164.06	164.06
DISCCART	737234.49	4291882.08	147.36	147.36
DISCCART	737234.49	4292882.08	144.85	144.85
DISCCART	737234.49	4293882.08	169.01	174.26
DISCCART	737234.49	4294882.08	151.01	151.01
DISCCART	737234.49	4295882.08	163.47	174.02
DISCCART	737234.49	4296882.08	171.80	192.54
DISCCART	737234.49	4297882.08	182.12	182.12
DISCCART	737234.49	4298882.08	159.68	173.89
DISCCART	737234.49	4299882.08	165.14	165.14
DISCCART	737234.49	4300882.08	167.16	167.16
DISCCART	737234.49	4301882.08	161.78	162.86
DISCCART	737234.49	4302882.08	164.70	164.70
DISCCART	737234.49	4303882.08	158.46	158.46
DISCCART	737234.49	4304882.08	129.19	131.42
DISCCART	737234.49	4305882.08	127.44	131.68
DISCCART	737234.49	4306882.08	130.64	130.64
DISCCART	737234.49	4307882.08	130.01	130.01
DISCCART	737234.49	4308882.08	128.96	128.96
DISCCART	737234.49	4309882.08	127.50	127.50
DISCCART	737234.49	4310882.08	127.95	127.95
DISCCART	737234.49	4311882.08	127.41	127.41
DISCCART	737234.49	4312882.08	182.67	182.96
DISCCART	737234.49	4313882.08	164.35	180.67
DISCCART	737234.49	4314882.08	157.01	180.20
DISCCART	737234.49	4315882.08	142.35	158.69
DISCCART	737234.49	4316882.08	161.63	174.69
DISCCART	737234.49	4317882.08	170.47	177.35
DISCCART	737234.49	4318882.08	133.98	133.98
DISCCART	737234.49	4319882.08	145.80	156.95
DISCCART	738234.49	4258882.08	121.53	121.53
DISCCART	738234.49	4257882.08	120.33	120.33
DISCCART	738234.49	4256882.08	120.73	120.73
DISCCART	738234.49	4255882.08	120.32	120.32
DISCCART	738234.49	4254882.08	120.95	120.95
DISCCART	738234.49	4253882.08	120.14	120.14
DISCCART	738234.49	4252882.08	119.98	119.98
DISCCART	738234.49	4251882.08	120.95	120.95
DISCCART	738234.49	4250882.08	121.32	121.32
DISCCART	738234.49	4249882.08	121.23	121.23
DISCCART	738234.49	4248882.08	123.37	123.37
DISCCART	738234.49	4247882.08	122.93	122.93
DISCCART	738234.49	4246882.08	119.92	210.56

DISCCART	738234.49	4245882.08	123.11	231.06
DISCCART	738234.49	4244882.08	165.43	231.06
DISCCART	738234.49	4243882.08	211.18	224.00
DISCCART	738234.49	4242882.08	223.67	223.67
DISCCART	738234.49	4241882.08	218.84	223.16
DISCCART	738234.49	4240882.08	200.33	235.73
DISCCART	738234.49	4239882.08	189.16	242.94
DISCCART	738234.49	4238882.08	165.72	217.04
DISCCART	738234.49	4237882.08	145.84	201.38
DISCCART	738234.49	4236882.08	206.61	215.57
DISCCART	738234.49	4235882.08	219.33	219.33
DISCCART	738234.49	4234882.08	165.25	233.12
DISCCART	738234.49	4233882.08	123.14	123.14
DISCCART	738234.49	4232882.08	120.90	120.90
DISCCART	738234.49	4231882.08	120.29	120.29
DISCCART	738234.49	4230882.08	119.98	119.98
DISCCART	738234.49	4229882.08	118.69	119.40
DISCCART	738234.49	4228882.08	117.56	117.56
DISCCART	738234.49	4227882.08	118.15	118.15
DISCCART	738234.49	4226882.08	114.40	114.40
DISCCART	738234.49	4225882.08	118.20	118.20
DISCCART	738234.49	4224882.08	118.44	221.61
DISCCART	738234.49	4223882.08	187.35	196.76
DISCCART	738234.49	4222882.08	149.00	237.99
DISCCART	738234.49	4221882.08	195.92	226.32
DISCCART	738234.49	4220882.08	123.26	226.32
DISCCART	738234.49	4259882.08	121.52	121.52
DISCCART	738234.49	4259882.08	121.52	121.52
DISCCART	738234.49	4260882.08	122.86	122.86
DISCCART	738234.49	4261882.08	122.94	122.94
DISCCART	738234.49	4262882.08	122.14	122.14
DISCCART	738234.49	4263882.08	120.04	120.04
DISCCART	738234.49	4264882.08	120.82	120.82
DISCCART	738234.49	4265882.08	121.31	121.31
DISCCART	738234.49	4266882.08	120.46	120.46
DISCCART	738234.49	4267882.08	124.98	124.98
DISCCART	738234.49	4268882.08	123.31	126.76
DISCCART	738234.49	4269882.08	132.27	132.27
DISCCART	738234.49	4270882.08	130.73	130.73
DISCCART	738234.49	4271882.08	149.16	149.16
DISCCART	738234.49	4272882.08	141.68	141.68
DISCCART	738234.49	4273882.08	153.84	153.84
DISCCART	738234.49	4274882.08	168.89	168.89
DISCCART	738234.49	4275882.08	160.56	160.56
DISCCART	738234.49	4276882.08	158.60	158.60
DISCCART	738234.49	4277882.08	151.87	151.87
DISCCART	738234.49	4278882.08	150.43	150.43
DISCCART	738234.49	4279882.08	156.48	156.48
DISCCART	738234.49	4280882.08	152.07	152.07
DISCCART	738234.49	4281882.08	155.73	155.73
DISCCART	738234.49	4282882.08	163.65	163.65
DISCCART	738234.49	4283882.08	159.16	159.16
DISCCART	738234.49	4284882.08	160.36	160.36
DISCCART	738234.49	4285882.08	161.25	161.25
DISCCART	738234.49	4286882.08	156.26	156.26
DISCCART	738234.49	4287882.08	175.92	175.92
DISCCART	738234.49	4288882.08	149.82	149.82
DISCCART	738234.49	4289882.08	170.77	170.77
DISCCART	738234.49	4290882.08	162.70	162.70
DISCCART	738234.49	4291882.08	145.96	145.96
DISCCART	738234.49	4292882.08	136.77	156.77
DISCCART	738234.49	4293882.08	142.81	142.81
DISCCART	738234.49	4294882.08	147.13	147.13
DISCCART	738234.49	4295882.08	158.69	167.33
DISCCART	738234.49	4296882.08	182.33	182.33
DISCCART	738234.49	4297882.08	159.15	180.49

DISCCART	738234.49	4298882.08	160.13	162.50
DISCCART	738234.49	4299882.08	143.30	163.03
DISCCART	738234.49	4300882.08	167.72	167.72
DISCCART	738234.49	4301882.08	161.45	163.58
DISCCART	738234.49	4302882.08	154.16	165.40
DISCCART	738234.49	4303882.08	123.90	160.68
DISCCART	738234.49	4304882.08	131.57	131.57
DISCCART	738234.49	4305882.08	129.87	129.87
DISCCART	738234.49	4306882.08	130.45	130.45
DISCCART	738234.49	4307882.08	130.56	130.56
DISCCART	738234.49	4308882.08	130.69	130.69
DISCCART	738234.49	4309882.08	127.24	127.24
DISCCART	738234.49	4310882.08	127.04	127.04
DISCCART	738234.49	4311882.08	127.04	127.04
DISCCART	738234.49	4312882.08	178.65	181.04
DISCCART	738234.49	4313882.08	184.07	186.68
DISCCART	738234.49	4314882.08	167.83	178.57
DISCCART	738234.49	4315882.08	129.80	172.72
DISCCART	738234.49	4316882.08	176.36	176.36
DISCCART	738234.49	4317882.08	188.21	188.21
DISCCART	738234.49	4318882.08	160.62	168.53
DISCCART	738234.49	4319882.08	165.79	165.79
DISCCART	739234.49	4258882.08	123.57	123.57
DISCCART	739234.49	4257882.08	123.08	123.08
DISCCART	739234.49	4256882.08	121.38	121.38
DISCCART	739234.49	4255882.08	121.30	121.93
DISCCART	739234.49	4254882.08	122.60	122.60
DISCCART	739234.49	4253882.08	121.29	121.29
DISCCART	739234.49	4252882.08	121.46	121.46
DISCCART	739234.49	4251882.08	121.57	169.76
DISCCART	739234.49	4250882.08	124.20	189.55
DISCCART	739234.49	4249882.08	154.82	190.63
DISCCART	739234.49	4248882.08	179.37	198.81
DISCCART	739234.49	4247882.08	191.75	195.71
DISCCART	739234.49	4246882.08	190.35	200.38
DISCCART	739234.49	4245882.08	201.69	208.49
DISCCART	739234.49	4244882.08	207.77	207.77
DISCCART	739234.49	4243882.08	207.79	207.79
DISCCART	739234.49	4242882.08	213.98	213.98
DISCCART	739234.49	4241882.08	221.75	221.75
DISCCART	739234.49	4240882.08	228.60	228.60
DISCCART	739234.49	4239882.08	197.35	199.64
DISCCART	739234.49	4238882.08	165.29	202.96
DISCCART	739234.49	4237882.08	136.35	195.53
DISCCART	739234.49	4236882.08	195.95	195.95
DISCCART	739234.49	4235882.08	220.92	220.92
DISCCART	739234.49	4234882.08	205.06	215.37
DISCCART	739234.49	4233882.08	191.58	195.93
DISCCART	739234.49	4232882.08	125.47	221.03
DISCCART	739234.49	4231882.08	121.10	121.10
DISCCART	739234.49	4230882.08	119.66	119.66
DISCCART	739234.49	4229882.08	120.09	120.09
DISCCART	739234.49	4228882.08	120.14	120.14
DISCCART	739234.49	4227882.08	117.52	117.52
DISCCART	739234.49	4226882.08	119.16	119.16
DISCCART	739234.49	4225882.08	114.26	114.26
DISCCART	739234.49	4224882.08	117.92	213.80
DISCCART	739234.49	4223882.08	120.80	239.25
DISCCART	739234.49	4222882.08	237.78	238.08
DISCCART	739234.49	4221882.08	216.11	225.92
DISCCART	739234.49	4220882.08	117.13	275.56
DISCCART	739234.49	4259882.08	124.10	124.10
DISCCART	739234.49	4259882.08	124.10	124.10
DISCCART	739234.49	4260882.08	121.21	121.21
DISCCART	739234.49	4261882.08	122.06	122.06
DISCCART	739234.49	4262882.08	122.15	130.20

DISCCART	739234.49	4263882.08	123.82	123.82
DISCCART	739234.49	4264882.08	124.71	124.71
DISCCART	739234.49	4265882.08	122.69	122.69
DISCCART	739234.49	4266882.08	122.34	122.34
DISCCART	739234.49	4267882.08	121.15	121.15
DISCCART	739234.49	4268882.08	120.07	120.07
DISCCART	739234.49	4269882.08	134.26	134.26
DISCCART	739234.49	4270882.08	140.35	140.35
DISCCART	739234.49	4271882.08	143.12	143.12
DISCCART	739234.49	4272882.08	143.43	143.43
DISCCART	739234.49	4273882.08	140.81	140.81
DISCCART	739234.49	4274882.08	152.99	152.99
DISCCART	739234.49	4275882.08	151.06	151.06
DISCCART	739234.49	4276882.08	152.21	152.21
DISCCART	739234.49	4277882.08	146.64	146.64
DISCCART	739234.49	4278882.08	148.84	148.84
DISCCART	739234.49	4279882.08	149.89	149.89
DISCCART	739234.49	4280882.08	149.33	149.33
DISCCART	739234.49	4281882.08	156.66	156.66
DISCCART	739234.49	4282882.08	155.58	155.58
DISCCART	739234.49	4283882.08	153.57	153.57
DISCCART	739234.49	4284882.08	152.54	152.54
DISCCART	739234.49	4285882.08	155.65	155.65
DISCCART	739234.49	4286882.08	147.90	147.90
DISCCART	739234.49	4287882.08	148.75	152.42
DISCCART	739234.49	4288882.08	155.69	155.69
DISCCART	739234.49	4289882.08	152.67	152.67
DISCCART	739234.49	4290882.08	145.87	145.87
DISCCART	739234.49	4291882.08	138.17	138.17
DISCCART	739234.49	4292882.08	145.22	145.22
DISCCART	739234.49	4293882.08	158.26	158.26
DISCCART	739234.49	4294882.08	167.02	173.90
DISCCART	739234.49	4295882.08	177.33	177.33
DISCCART	739234.49	4296882.08	165.55	170.83
DISCCART	739234.49	4297882.08	178.16	178.16
DISCCART	739234.49	4298882.08	161.78	161.78
DISCCART	739234.49	4299882.08	141.96	152.97
DISCCART	739234.49	4300882.08	158.36	158.36
DISCCART	739234.49	4301882.08	156.71	156.71
DISCCART	739234.49	4302882.08	151.02	159.46
DISCCART	739234.49	4303882.08	128.98	128.98
DISCCART	739234.49	4304882.08	128.55	128.55
DISCCART	739234.49	4305882.08	129.60	129.60
DISCCART	739234.49	4306882.08	130.59	130.59
DISCCART	739234.49	4307882.08	129.99	129.99
DISCCART	739234.49	4308882.08	127.67	127.67
DISCCART	739234.49	4309882.08	127.38	127.38
DISCCART	739234.49	4310882.08	127.13	127.13
DISCCART	739234.49	4311882.08	191.52	191.52
DISCCART	739234.49	4312882.08	168.66	181.61
DISCCART	739234.49	4313882.08	182.22	182.22
DISCCART	739234.49	4314882.08	142.92	171.30
DISCCART	739234.49	4315882.08	163.99	174.60
DISCCART	739234.49	4316882.08	169.56	190.72
DISCCART	739234.49	4317882.08	186.79	186.79
DISCCART	739234.49	4318882.08	166.46	166.46
DISCCART	739234.49	4319882.08	148.04	165.36
DISCCART	740234.49	4258882.08	123.27	123.27
DISCCART	740234.49	4257882.08	122.91	122.91
DISCCART	740234.49	4256882.08	123.21	123.21
DISCCART	740234.49	4255882.08	122.66	173.14
DISCCART	740234.49	4254882.08	122.86	179.59
DISCCART	740234.49	4253882.08	167.02	180.08
DISCCART	740234.49	4252882.08	167.62	174.83
DISCCART	740234.49	4251882.08	126.53	180.11
DISCCART	740234.49	4250882.08	138.77	147.37

DISCCART	740234.49	4249882.08	153.01	186.87
DISCCART	740234.49	4248882.08	165.28	165.28
DISCCART	740234.49	4247882.08	191.20	195.36
DISCCART	740234.49	4246882.08	167.03	198.96
DISCCART	740234.49	4245882.08	182.90	195.66
DISCCART	740234.49	4244882.08	190.37	196.43
DISCCART	740234.49	4243882.08	201.14	201.14
DISCCART	740234.49	4242882.08	213.42	213.42
DISCCART	740234.49	4241882.08	216.88	220.08
DISCCART	740234.49	4240882.08	227.43	228.53
DISCCART	740234.49	4239882.08	209.30	230.72
DISCCART	740234.49	4238882.08	170.33	223.89
DISCCART	740234.49	4237882.08	179.51	196.50
DISCCART	740234.49	4236882.08	179.53	184.73
DISCCART	740234.49	4235882.08	204.52	204.52
DISCCART	740234.49	4234882.08	207.48	207.48
DISCCART	740234.49	4233882.08	173.30	202.26
DISCCART	740234.49	4232882.08	217.17	217.17
DISCCART	740234.49	4231882.08	122.13	231.72
DISCCART	740234.49	4230882.08	119.16	231.72
DISCCART	740234.49	4229882.08	120.01	120.01
DISCCART	740234.49	4228882.08	119.18	119.18
DISCCART	740234.49	4227882.08	118.03	118.03
DISCCART	740234.49	4226882.08	116.78	116.78
DISCCART	740234.49	4225882.08	119.47	119.47
DISCCART	740234.49	4224882.08	114.20	114.20
DISCCART	740234.49	4223882.08	114.11	214.25
DISCCART	740234.49	4222882.08	120.24	239.25
DISCCART	740234.49	4221882.08	113.41	237.21
DISCCART	740234.49	4220882.08	129.69	258.19
DISCCART	740234.49	4259882.08	122.80	122.80
DISCCART	740234.49	4259882.08	122.80	122.80
DISCCART	740234.49	4260882.08	123.24	123.24
DISCCART	740234.49	4261882.08	123.49	123.49
DISCCART	740234.49	4262882.08	122.71	122.71
DISCCART	740234.49	4263882.08	123.35	123.35
DISCCART	740234.49	4264882.08	121.53	121.53
DISCCART	740234.49	4265882.08	122.12	122.12
DISCCART	740234.49	4266882.08	122.05	122.05
DISCCART	740234.49	4267882.08	124.88	124.88
DISCCART	740234.49	4268882.08	121.04	121.04
DISCCART	740234.49	4269882.08	124.43	124.43
DISCCART	740234.49	4270882.08	119.87	119.87
DISCCART	740234.49	4271882.08	146.73	146.73
DISCCART	740234.49	4272882.08	151.39	151.39
DISCCART	740234.49	4273882.08	165.87	165.87
DISCCART	740234.49	4274882.08	164.83	164.83
DISCCART	740234.49	4275882.08	165.46	165.46
DISCCART	740234.49	4276882.08	167.20	167.20
DISCCART	740234.49	4277882.08	167.41	167.41
DISCCART	740234.49	4278882.08	154.19	154.19
DISCCART	740234.49	4279882.08	148.14	148.14
DISCCART	740234.49	4280882.08	150.74	150.74
DISCCART	740234.49	4281882.08	154.18	154.18
DISCCART	740234.49	4282882.08	156.47	156.47
DISCCART	740234.49	4283882.08	158.47	158.47
DISCCART	740234.49	4284882.08	149.91	149.91
DISCCART	740234.49	4285882.08	151.92	151.92
DISCCART	740234.49	4286882.08	153.56	153.56
DISCCART	740234.49	4287882.08	140.04	140.04
DISCCART	740234.49	4288882.08	154.85	154.85
DISCCART	740234.49	4289882.08	148.95	148.95
DISCCART	740234.49	4290882.08	155.67	155.67
DISCCART	740234.49	4291882.08	136.52	136.52
DISCCART	740234.49	4292882.08	154.44	154.44
DISCCART	740234.49	4293882.08	158.82	158.82

DISCCART	740234.49	4294882.08	167.72	167.72
DISCCART	740234.49	4295882.08	154.99	154.99
DISCCART	740234.49	4296882.08	165.99	165.99
DISCCART	740234.49	4297882.08	180.78	180.78
DISCCART	740234.49	4298882.08	165.20	166.71
DISCCART	740234.49	4299882.08	138.82	156.63
DISCCART	740234.49	4300882.08	156.59	159.84
DISCCART	740234.49	4301882.08	105.52	167.65
DISCCART	740234.49	4302882.08	123.65	123.65
DISCCART	740234.49	4303882.08	140.59	142.33
DISCCART	740234.49	4304882.08	129.46	129.46
DISCCART	740234.49	4305882.08	129.18	129.18
DISCCART	740234.49	4306882.08	129.37	129.37
DISCCART	740234.49	4307882.08	128.95	128.95
DISCCART	740234.49	4308882.08	127.58	127.58
DISCCART	740234.49	4309882.08	127.78	127.78
DISCCART	740234.49	4310882.08	127.37	195.76
DISCCART	740234.49	4311882.08	191.34	191.34
DISCCART	740234.49	4312882.08	178.07	178.07
DISCCART	740234.49	4313882.08	179.64	179.64
DISCCART	740234.49	4314882.08	171.16	171.16
DISCCART	740234.49	4315882.08	167.61	167.61
DISCCART	740234.49	4316882.08	185.14	185.14
DISCCART	740234.49	4317882.08	182.25	182.25
DISCCART	740234.49	4318882.08	171.39	171.39
DISCCART	740234.49	4319882.08	162.41	177.96
DISCCART	741234.49	4258882.08	126.91	131.39
DISCCART	741234.49	4257882.08	123.82	172.87
DISCCART	741234.49	4256882.08	154.86	168.32
DISCCART	741234.49	4255882.08	158.12	166.13
DISCCART	741234.49	4254882.08	173.68	173.68
DISCCART	741234.49	4253882.08	151.00	164.19
DISCCART	741234.49	4252882.08	163.60	170.74
DISCCART	741234.49	4251882.08	171.18	176.60
DISCCART	741234.49	4250882.08	155.48	156.45
DISCCART	741234.49	4249882.08	151.79	156.56
DISCCART	741234.49	4248882.08	168.87	168.87
DISCCART	741234.49	4247882.08	187.30	187.30
DISCCART	741234.49	4246882.08	192.91	192.91
DISCCART	741234.49	4245882.08	200.76	200.76
DISCCART	741234.49	4244882.08	197.72	197.72
DISCCART	741234.49	4243882.08	201.40	211.17
DISCCART	741234.49	4242882.08	206.06	216.70
DISCCART	741234.49	4241882.08	219.19	219.19
DISCCART	741234.49	4240882.08	228.50	228.50
DISCCART	741234.49	4239882.08	227.73	227.73
DISCCART	741234.49	4238882.08	227.83	227.83
DISCCART	741234.49	4237882.08	184.32	208.77
DISCCART	741234.49	4236882.08	209.31	209.31
DISCCART	741234.49	4235882.08	195.31	197.51
DISCCART	741234.49	4234882.08	193.33	194.96
DISCCART	741234.49	4233882.08	157.87	196.52
DISCCART	741234.49	4232882.08	171.66	196.96
DISCCART	741234.49	4231882.08	180.93	231.72
DISCCART	741234.49	4230882.08	124.60	231.72
DISCCART	741234.49	4229882.08	117.07	227.67
DISCCART	741234.49	4228882.08	117.82	117.82
DISCCART	741234.49	4227882.08	117.07	117.07
DISCCART	741234.49	4226882.08	118.14	118.14
DISCCART	741234.49	4225882.08	119.29	119.29
DISCCART	741234.49	4224882.08	117.41	117.41
DISCCART	741234.49	4223882.08	118.93	118.93
DISCCART	741234.49	4222882.08	113.55	113.55
DISCCART	741234.49	4221882.08	125.92	221.11
DISCCART	741234.49	4220882.08	153.16	226.53
DISCCART	741234.49	4259882.08	123.49	123.49

DISCCART	741234.49	4259882.08	123.49	123.49
DISCCART	741234.49	4260882.08	124.39	124.39
DISCCART	741234.49	4261882.08	122.69	122.69
DISCCART	741234.49	4262882.08	124.36	124.36
DISCCART	741234.49	4263882.08	122.44	122.44
DISCCART	741234.49	4264882.08	121.20	121.20
DISCCART	741234.49	4265882.08	121.61	121.61
DISCCART	741234.49	4266882.08	122.38	122.38
DISCCART	741234.49	4267882.08	123.15	123.15
DISCCART	741234.49	4268882.08	124.12	124.12
DISCCART	741234.49	4269882.08	123.34	123.34
DISCCART	741234.49	4270882.08	123.57	123.57
DISCCART	741234.49	4271882.08	119.95	119.95
DISCCART	741234.49	4272882.08	120.02	162.11
DISCCART	741234.49	4273882.08	152.56	152.56
DISCCART	741234.49	4274882.08	161.91	161.91
DISCCART	741234.49	4275882.08	170.34	170.34
DISCCART	741234.49	4276882.08	161.33	161.33
DISCCART	741234.49	4277882.08	160.36	160.36
DISCCART	741234.49	4278882.08	140.66	140.66
DISCCART	741234.49	4279882.08	151.32	151.32
DISCCART	741234.49	4280882.08	166.03	166.03
DISCCART	741234.49	4281882.08	153.19	153.19
DISCCART	741234.49	4282882.08	149.28	149.28
DISCCART	741234.49	4283882.08	152.31	152.31
DISCCART	741234.49	4284882.08	155.38	155.38
DISCCART	741234.49	4285882.08	150.32	150.32
DISCCART	741234.49	4286882.08	131.00	131.00
DISCCART	741234.49	4287882.08	130.77	130.77
DISCCART	741234.49	4288882.08	129.40	129.40
DISCCART	741234.49	4289882.08	129.38	129.38
DISCCART	741234.49	4290882.08	134.31	134.31
DISCCART	741234.49	4291882.08	148.34	148.34
DISCCART	741234.49	4292882.08	158.70	158.70
DISCCART	741234.49	4293882.08	165.63	167.78
DISCCART	741234.49	4294882.08	151.79	151.79
DISCCART	741234.49	4295882.08	159.83	159.83
DISCCART	741234.49	4296882.08	168.55	168.55
DISCCART	741234.49	4297882.08	168.00	168.00
DISCCART	741234.49	4298882.08	160.50	160.50
DISCCART	741234.49	4299882.08	149.21	149.21
DISCCART	741234.49	4300882.08	156.36	156.36
DISCCART	741234.49	4301882.08	130.01	157.34
DISCCART	741234.49	4302882.08	130.64	130.96
DISCCART	741234.49	4303882.08	129.59	129.59
DISCCART	741234.49	4304882.08	129.21	131.28
DISCCART	741234.49	4305882.08	129.07	129.07
DISCCART	741234.49	4306882.08	128.08	128.08
DISCCART	741234.49	4307882.08	127.78	127.78
DISCCART	741234.49	4308882.08	127.66	127.66
DISCCART	741234.49	4309882.08	127.06	196.02
DISCCART	741234.49	4310882.08	136.78	195.76
DISCCART	741234.49	4311882.08	178.76	192.96
DISCCART	741234.49	4312882.08	187.31	187.31
DISCCART	741234.49	4313882.08	164.82	171.40
DISCCART	741234.49	4314882.08	174.91	174.91
DISCCART	741234.49	4315882.08	178.40	178.40
DISCCART	741234.49	4316882.08	179.39	179.39
DISCCART	741234.49	4317882.08	176.95	176.95
DISCCART	741234.49	4318882.08	165.74	170.73
DISCCART	741234.49	4319882.08	159.27	171.43
DISCCART	742234.49	4258882.08	134.98	134.98
DISCCART	742234.49	4257882.08	159.18	159.64
DISCCART	742234.49	4256882.08	155.80	166.11
DISCCART	742234.49	4255882.08	150.11	156.90
DISCCART	742234.49	4254882.08	170.01	170.01

DISCCART	742234.49	4253882.08	171.32	171.32
DISCCART	742234.49	4252882.08	169.23	169.23
DISCCART	742234.49	4251882.08	171.64	171.64
DISCCART	742234.49	4250882.08	149.92	159.87
DISCCART	742234.49	4249882.08	159.05	159.05
DISCCART	742234.49	4248882.08	154.21	162.79
DISCCART	742234.49	4247882.08	165.19	167.58
DISCCART	742234.49	4246882.08	182.74	182.74
DISCCART	742234.49	4245882.08	189.93	189.93
DISCCART	742234.49	4244882.08	193.78	193.78
DISCCART	742234.49	4243882.08	198.03	198.03
DISCCART	742234.49	4242882.08	208.27	208.27
DISCCART	742234.49	4241882.08	214.34	214.34
DISCCART	742234.49	4240882.08	215.49	215.49
DISCCART	742234.49	4239882.08	218.83	218.83
DISCCART	742234.49	4238882.08	225.03	225.03
DISCCART	742234.49	4237882.08	223.21	223.21
DISCCART	742234.49	4236882.08	210.91	221.10
DISCCART	742234.49	4235882.08	192.52	196.19
DISCCART	742234.49	4234882.08	169.78	169.78
DISCCART	742234.49	4233882.08	161.43	187.09
DISCCART	742234.49	4232882.08	177.87	197.28
DISCCART	742234.49	4231882.08	202.12	210.28
DISCCART	742234.49	4230882.08	207.42	217.71
DISCCART	742234.49	4229882.08	121.70	219.79
DISCCART	742234.49	4228882.08	119.05	206.54
DISCCART	742234.49	4227882.08	119.02	119.02
DISCCART	742234.49	4226882.08	117.53	117.53
DISCCART	742234.49	4225882.08	117.29	117.29
DISCCART	742234.49	4224882.08	117.48	117.48
DISCCART	742234.49	4223882.08	119.42	124.59
DISCCART	742234.49	4222882.08	119.40	119.40
DISCCART	742234.49	4221882.08	119.06	119.06
DISCCART	742234.49	4220882.08	117.31	214.28
DISCCART	742234.49	4259882.08	136.42	153.92
DISCCART	742234.49	4259882.08	136.42	153.92
DISCCART	742234.49	4260882.08	134.87	137.29
DISCCART	742234.49	4261882.08	126.21	156.12
DISCCART	742234.49	4262882.08	127.07	127.07
DISCCART	742234.49	4263882.08	123.70	123.70
DISCCART	742234.49	4264882.08	122.82	122.82
DISCCART	742234.49	4265882.08	121.87	121.87
DISCCART	742234.49	4266882.08	121.40	121.40
DISCCART	742234.49	4267882.08	122.30	122.30
DISCCART	742234.49	4268882.08	123.40	123.40
DISCCART	742234.49	4269882.08	123.40	123.40
DISCCART	742234.49	4270882.08	124.31	124.31
DISCCART	742234.49	4271882.08	123.92	123.92
DISCCART	742234.49	4272882.08	124.69	124.69
DISCCART	742234.49	4273882.08	120.51	120.51
DISCCART	742234.49	4274882.08	158.42	158.42
DISCCART	742234.49	4275882.08	161.85	161.85
DISCCART	742234.49	4276882.08	164.63	164.63
DISCCART	742234.49	4277882.08	159.86	159.86
DISCCART	742234.49	4278882.08	143.84	146.12
DISCCART	742234.49	4279882.08	163.62	163.62
DISCCART	742234.49	4280882.08	161.64	161.64
DISCCART	742234.49	4281882.08	150.13	150.13
DISCCART	742234.49	4282882.08	152.72	152.72
DISCCART	742234.49	4283882.08	156.50	156.50
DISCCART	742234.49	4284882.08	158.88	158.88
DISCCART	742234.49	4285882.08	128.20	128.20
DISCCART	742234.49	4286882.08	129.02	129.02
DISCCART	742234.49	4287882.08	115.23	115.23
DISCCART	742234.49	4288882.08	120.30	120.30
DISCCART	742234.49	4289882.08	122.73	122.73

DISCCART	742234.49	4290882.08	130.57	150.73
DISCCART	742234.49	4291882.08	154.32	155.20
DISCCART	742234.49	4292882.08	160.68	160.68
DISCCART	742234.49	4293882.08	161.09	161.09
DISCCART	742234.49	4294882.08	158.36	158.36
DISCCART	742234.49	4295882.08	158.12	158.12
DISCCART	742234.49	4296882.08	160.06	160.06
DISCCART	742234.49	4297882.08	166.12	166.12
DISCCART	742234.49	4298882.08	156.53	159.85
DISCCART	742234.49	4299882.08	147.86	147.86
DISCCART	742234.49	4300882.08	152.12	152.12
DISCCART	742234.49	4301882.08	129.45	129.45
DISCCART	742234.49	4302882.08	129.01	129.01
DISCCART	742234.49	4303882.08	130.96	130.96
DISCCART	742234.49	4304882.08	129.82	129.82
DISCCART	742234.49	4305882.08	128.49	129.83
DISCCART	742234.49	4306882.08	128.28	128.28
DISCCART	742234.49	4307882.08	127.48	127.48
DISCCART	742234.49	4308882.08	126.99	126.99
DISCCART	742234.49	4309882.08	191.64	191.64
DISCCART	742234.49	4310882.08	175.63	185.35
DISCCART	742234.49	4311882.08	183.32	183.32
DISCCART	742234.49	4312882.08	183.60	183.60
DISCCART	742234.49	4313882.08	180.91	180.91
DISCCART	742234.49	4314882.08	180.07	180.07
DISCCART	742234.49	4315882.08	175.60	175.60
DISCCART	742234.49	4316882.08	182.60	182.60
DISCCART	742234.49	4317882.08	181.01	181.01
DISCCART	742234.49	4318882.08	174.54	179.44
DISCCART	742234.49	4319882.08	177.63	177.63
DISCCART	743234.49	4258882.08	130.43	148.58
DISCCART	743234.49	4257882.08	130.71	130.71
DISCCART	743234.49	4256882.08	138.76	157.90
DISCCART	743234.49	4255882.08	156.04	156.04
DISCCART	743234.49	4254882.08	154.75	163.53
DISCCART	743234.49	4253882.08	176.42	176.42
DISCCART	743234.49	4252882.08	175.48	175.48
DISCCART	743234.49	4251882.08	170.92	170.92
DISCCART	743234.49	4250882.08	161.40	161.40
DISCCART	743234.49	4249882.08	168.95	172.83
DISCCART	743234.49	4248882.08	137.20	165.53
DISCCART	743234.49	4247882.08	160.78	160.78
DISCCART	743234.49	4246882.08	164.55	164.55
DISCCART	743234.49	4245882.08	173.20	177.15
DISCCART	743234.49	4244882.08	182.70	182.70
DISCCART	743234.49	4243882.08	188.96	188.96
DISCCART	743234.49	4242882.08	194.79	194.79
DISCCART	743234.49	4241882.08	204.90	204.90
DISCCART	743234.49	4240882.08	209.62	209.62
DISCCART	743234.49	4239882.08	213.30	213.30
DISCCART	743234.49	4238882.08	221.06	221.06
DISCCART	743234.49	4237882.08	228.20	228.20
DISCCART	743234.49	4236882.08	214.85	214.85
DISCCART	743234.49	4235882.08	203.48	226.21
DISCCART	743234.49	4234882.08	195.86	196.64
DISCCART	743234.49	4233882.08	176.66	183.27
DISCCART	743234.49	4232882.08	195.11	195.11
DISCCART	743234.49	4231882.08	193.16	203.21
DISCCART	743234.49	4230882.08	196.05	196.05
DISCCART	743234.49	4229882.08	123.56	215.29
DISCCART	743234.49	4228882.08	120.58	229.14
DISCCART	743234.49	4227882.08	118.28	229.14
DISCCART	743234.49	4226882.08	119.28	119.28
DISCCART	743234.49	4225882.08	118.55	118.55
DISCCART	743234.49	4224882.08	117.71	119.22
DISCCART	743234.49	4223882.08	115.73	115.73

DISCCART	743234.49	4222882.08	115.00	118.61
DISCCART	743234.49	4221882.08	117.00	118.49
DISCCART	743234.49	4220882.08	114.33	114.33
DISCCART	743234.49	4259882.08	139.80	146.86
DISCCART	743234.49	4259882.08	139.80	146.86
DISCCART	743234.49	4260882.08	130.92	133.81
DISCCART	743234.49	4261882.08	150.03	153.73
DISCCART	743234.49	4262882.08	139.65	139.65
DISCCART	743234.49	4263882.08	141.85	154.38
DISCCART	743234.49	4264882.08	123.86	205.29
DISCCART	743234.49	4265882.08	126.85	126.85
DISCCART	743234.49	4266882.08	127.69	127.69
DISCCART	743234.49	4267882.08	126.80	126.80
DISCCART	743234.49	4268882.08	123.23	123.23
DISCCART	743234.49	4269882.08	124.80	124.80
DISCCART	743234.49	4270882.08	123.86	123.86
DISCCART	743234.49	4271882.08	121.69	121.69
DISCCART	743234.49	4272882.08	123.08	123.08
DISCCART	743234.49	4273882.08	125.22	125.22
DISCCART	743234.49	4274882.08	126.17	126.32
DISCCART	743234.49	4275882.08	133.09	133.09
DISCCART	743234.49	4276882.08	140.45	140.45
DISCCART	743234.49	4277882.08	151.45	151.45
DISCCART	743234.49	4278882.08	136.46	136.46
DISCCART	743234.49	4279882.08	152.13	152.13
DISCCART	743234.49	4280882.08	154.43	154.43
DISCCART	743234.49	4281882.08	151.99	151.99
DISCCART	743234.49	4282882.08	143.25	143.25
DISCCART	743234.49	4283882.08	156.03	156.03
DISCCART	743234.49	4284882.08	130.25	130.25
DISCCART	743234.49	4285882.08	126.15	126.15
DISCCART	743234.49	4286882.08	117.69	117.69
DISCCART	743234.49	4287882.08	117.36	117.36
DISCCART	743234.49	4288882.08	120.12	120.12
DISCCART	743234.49	4289882.08	126.21	126.21
DISCCART	743234.49	4290882.08	123.31	123.31
DISCCART	743234.49	4291882.08	128.59	156.50
DISCCART	743234.49	4292882.08	150.26	150.26
DISCCART	743234.49	4293882.08	139.11	139.11
DISCCART	743234.49	4294882.08	155.25	155.25
DISCCART	743234.49	4295882.08	158.51	158.51
DISCCART	743234.49	4296882.08	162.81	162.81
DISCCART	743234.49	4297882.08	164.96	164.96
DISCCART	743234.49	4298882.08	162.55	162.55
DISCCART	743234.49	4299882.08	149.21	149.21
DISCCART	743234.49	4300882.08	123.45	123.45
DISCCART	743234.49	4301882.08	128.91	128.91
DISCCART	743234.49	4302882.08	127.72	127.72
DISCCART	743234.49	4303882.08	127.24	130.60
DISCCART	743234.49	4304882.08	129.94	129.94
DISCCART	743234.49	4305882.08	128.66	128.66
DISCCART	743234.49	4306882.08	127.93	131.73
DISCCART	743234.49	4307882.08	126.91	126.91
DISCCART	743234.49	4308882.08	176.30	182.92
DISCCART	743234.49	4309882.08	189.38	189.38
DISCCART	743234.49	4310882.08	186.46	193.22
DISCCART	743234.49	4311882.08	194.52	194.52
DISCCART	743234.49	4312882.08	175.99	179.51
DISCCART	743234.49	4313882.08	186.22	186.22
DISCCART	743234.49	4314882.08	184.07	184.07
DISCCART	743234.49	4315882.08	175.79	175.79
DISCCART	743234.49	4316882.08	183.79	183.79
DISCCART	743234.49	4317882.08	189.29	189.29
DISCCART	743234.49	4318882.08	182.51	186.72
DISCCART	743234.49	4319882.08	185.71	185.71

```
RE FINISHED

ME STARTING
ME SURFFILE KJEFILX-MIN-USTAR-1214.SFC FREE
ME PROFFILE KJEFILX-MIN-USTAR-1214.PFL
ME SURFDATA  03963 2012 JEFF CITY
ME UAIRDATA  04833 2012 Lincoln, Ill
ME PROFBASE 166 Meters
ME FINISHED

OU STARTING
OU MAXTABLE ALLAVE 50
OU RECTABLE 1 4
OU SUMMFILE Labadie_SO2_1HR_SummarY_34comb_12-14_betalw3JEF.SUM
OU MAXDCONT ALL 4 4 Labadie_SO2_1HR_maxdaily_34comb_12-14_betalw3JEF.txt
OU PLOTFILE 1 ALL 4 Labadie_SO2_1HR_34comb_12-14_betalw3JEF.PLT
OU FINISHED
```

AECOM/Ameren's Excerpted Output file (Jeff City Met and Beta/Low Wind Options)

```
*** AERMOD - VERSION  15181 ***   *** Labadie Actual emissions, temps and flows 3-4 combined 2012-14      ***       08/07/15
 *** AERMET - VERSION  15181 ***   *** NAD83 Z15 SO2                                                    ***       10:16:34
                                                                                                   PAGE  1040
 **MODELOPTs:   NonDFAULT CONC     ELEV     BETA     RURAL    LW3      ADJ_U*
                *** THE SUMMARY OF MAXIMUM   4TH-HIGHEST MAX DAILY  1-HR RESULTS AVERAGED OVER   3 YEARS ***
                          ** CONC OF SO2     IN MICROGRAMS/M**3                    **
                                                                                NETWORK
GROUP ID                  AVERAGE CONC            RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

LABADIE1  1ST HIGHEST VALUE IS     57.36301 AT (  685484.49,  4272132.08,   164.56,   164.56,    0.00)  DC
        2ND HIGHEST VALUE IS     57.14536 AT (  686234.49,  4271632.08,   159.65,   170.54,    0.00)  DC
        3RD HIGHEST VALUE IS     57.11410 AT (  685234.49,  4272382.08,   182.40,   237.81,    0.00)  DC
        4TH HIGHEST VALUE IS     56.34533 AT (  685984.49,  4271632.08,   147.96,   170.46,    0.00)  DC
        5TH HIGHEST VALUE IS     56.04874 AT (  686234.49,  4271882.08,   162.57,   166.16,    0.00)  DC
        6TH HIGHEST VALUE IS     55.98817 AT (  686584.49,  4271932.08,   168.07,   171.70,    0.00)  DC
        7TH HIGHEST VALUE IS     55.77366 AT (  686484.49,  4272032.08,   170.67,   170.67,    0.00)  DC
        8TH HIGHEST VALUE IS     55.66444 AT (  685234.49,  4272132.08,   164.54,   237.81,    0.00)  DC
        9TH HIGHEST VALUE IS     55.56516 AT (  686684.49,  4271832.08,   153.10,   177.40,    0.00)  DC
       10TH HIGHEST VALUE IS     55.52452 AT (  686484.49,  4271732.08,   171.72,   171.72,    0.00)  DC

LABADIE2  1ST HIGHEST VALUE IS     53.08733 AT (  686234.49,  4271632.08,   159.65,   170.54,    0.00)  DC
        2ND HIGHEST VALUE IS     52.83552 AT (  685234.49,  4272382.08,   182.40,   237.81,    0.00)  DC
        3RD HIGHEST VALUE IS     52.61371 AT (  685734.49,  4271632.08,   158.83,   162.88,    0.00)  DC
        4TH HIGHEST VALUE IS     52.56468 AT (  685484.49,  4272132.08,   164.56,   164.56,    0.00)  DC
        5TH HIGHEST VALUE IS     52.35117 AT (  686684.49,  4271832.08,   153.10,   177.40,    0.00)  DC
        6TH HIGHEST VALUE IS     52.32281 AT (  686684.49,  4271732.08,   160.29,   173.86,    0.00)  DC
        7TH HIGHEST VALUE IS     52.28544 AT (  686584.49,  4271832.08,   166.94,   176.65,    0.00)  DC
        8TH HIGHEST VALUE IS     52.28150 AT (  685984.49,  4271632.08,   147.96,   170.46,    0.00)  DC
        9TH HIGHEST VALUE IS     52.09690 AT (  686584.49,  4271932.08,   168.07,   171.70,    0.00)  DC
       10TH HIGHEST VALUE IS     52.01693 AT (  686784.49,  4271832.08,   152.67,   167.00,    0.00)  DC

LAB34     1ST HIGHEST VALUE IS     83.05449 AT (  684984.49,  4272382.08,   185.81,   244.10,    0.00)  DC
        2ND HIGHEST VALUE IS     82.66254 AT (  685484.49,  4272132.08,   164.56,   164.56,    0.00)  DC
        3RD HIGHEST VALUE IS     82.63307 AT (  685234.49,  4272132.08,   164.54,   237.81,    0.00)  DC
        4TH HIGHEST VALUE IS     82.10209 AT (  685234.49,  4272382.08,   182.40,   237.81,    0.00)  DC
        5TH HIGHEST VALUE IS     80.88174 AT (  684984.49,  4272132.08,   184.01,   237.81,    0.00)  DC
        6TH HIGHEST VALUE IS     80.40529 AT (  684734.49,  4272632.08,   232.25,   232.25,    0.00)  DC
        7TH HIGHEST VALUE IS     80.21809 AT (  685234.49,  4271882.08,   167.51,   197.44,    0.00)  DC
        8TH HIGHEST VALUE IS     80.09727 AT (  684984.49,  4272632.08,   177.15,   244.10,    0.00)  DC
        9TH HIGHEST VALUE IS     79.71843 AT (  685484.49,  4271632.08,   160.04,   174.12,    0.00)  DC
       10TH HIGHEST VALUE IS     79.38325 AT (  686234.49,  4273132.08,   174.60,   266.77,    0.00)  DC
```

```
ALL      1ST HIGHEST VALUE IS    193.03843 AT (  685484.49,  4272132.08,   164.56,   164.56,    0.00)  DC
       2ND HIGHEST VALUE IS    192.37825 AT (  686234.49,  4271632.08,   159.65,   170.54,    0.00)  DC
       3RD HIGHEST VALUE IS    191.97754 AT (  685734.49,  4272132.08,   150.57,   165.79,    0.00)  DC
       4TH HIGHEST VALUE IS    191.74812 AT (  686234.49,  4271882.08,   162.57,   166.16,    0.00)  DC
       5TH HIGHEST VALUE IS    191.59994 AT (  685984.49,  4271882.08,   160.22,   165.35,    0.00)  DC
       6TH HIGHEST VALUE IS    190.73610 AT (  685484.49,  4272382.08,   166.78,   237.81,    0.00)  DC
       7TH HIGHEST VALUE IS    190.71600 AT (  685984.49,  4272132.08,   161.95,   166.50,    0.00)  DC
       8TH HIGHEST VALUE IS    190.64257 AT (  686484.49,  4271732.08,   171.72,   171.72,    0.00)  DC
       9TH HIGHEST VALUE IS    190.41818 AT (  686484.49,  4271632.08,   147.45,   177.40,    0.00)  DC
      10TH HIGHEST VALUE IS    190.09230 AT (  686584.49,  4271832.08,   166.94,   176.65,    0.00)  DC
```

AECOM/Ameren's Excerpted Hourly Emissions File (Unit 3 and 4 Merged Release)

```
SO HOUREMIS 12  1  1  1 LABADIE1 248.371 414.167 18.563
SO HOUREMIS 12  1  1  1 LABADIE2 215.939 410.111 15.955
SO HOUREMIS 12  1  1  1 LAB34 502.412 419.393 17.922
SO HOUREMIS 12  1  1  2 LABADIE1 249.077 406.667 18.302
SO HOUREMIS 12  1  1  2 LABADIE2 222.214 405.889 16.131
SO HOUREMIS 12  1  1  2 LAB34 522.106 412.174 18.059
SO HOUREMIS 12  1  1  3 LABADIE1 242.323 403.000 17.661
SO HOUREMIS 12  1  1  3 LABADIE2 225.389 404.167 16.059
SO HOUREMIS 12  1  1  3 LAB34 529.024 409.111 18.121
SO HOUREMIS 12  1  1  4 LABADIE1 256.763 401.667 18.355
SO HOUREMIS 12  1  1  4 LABADIE2 240.521 404.833 16.860
SO HOUREMIS 12  1  1  4 LAB34 544.937 406.305 18.420
SO HOUREMIS 12  1  1  5 LABADIE1 271.165 401.778 18.942
SO HOUREMIS 12  1  1  5 LABADIE2 246.154 403.333 17.255
SO HOUREMIS 12  1  1  5 LAB34 557.487 405.424 18.560
SO HOUREMIS 12  1  1  6 LABADIE1 271.177 401.167 18.780
SO HOUREMIS 12  1  1  6 LABADIE2 243.697 404.056 17.050
SO HOUREMIS 12  1  1  6 LAB34 555.307 405.635 18.588
SO HOUREMIS 12  1  1  7 LABADIE1 275.045 402.167 19.158
SO HOUREMIS 12  1  1  7 LABADIE2 240.975 402.833 16.711
SO HOUREMIS 12  1  1  7 LAB34 561.758 404.758 18.773
SO HOUREMIS 12  1  1  8 LABADIE1 272.248 402.278 18.726
SO HOUREMIS 12  1  1  8 LABADIE2 236.464 403.333 16.140
SO HOUREMIS 12  1  1  8 LAB34 555.736 405.267 18.603
SO HOUREMIS 12  1  1  9 LABADIE1 284.798 402.167 19.376
SO HOUREMIS 12  1  1  9 LABADIE2 250.085 402.667 16.725
SO HOUREMIS 12  1  1  9 LAB34 573.426 403.797 18.780
SO HOUREMIS 12  1  1 10 LABADIE1 263.579 401.778 18.107
SO HOUREMIS 12  1  1 10 LABADIE2 224.897 402.500 15.350
SO HOUREMIS 12  1  1 10 LAB34 599.382 406.219 19.410
SO HOUREMIS 12  1  1 11 LABADIE1 261.526 402.000 17.969
SO HOUREMIS 12  1  1 11 LABADIE2 225.981 401.389 15.450
SO HOUREMIS 12  1  1 11 LAB34 556.038 407.300 18.438
SO HOUREMIS 12  1  1 12 LABADIE1 299.754 404.444 20.551
SO HOUREMIS 12  1  1 12 LABADIE2 256.649 403.111 17.250
SO HOUREMIS 12  1  1 12 LAB34 593.485 404.900 19.160
SO HOUREMIS 12  1  1 13 LABADIE1 293.101 404.000 20.323
SO HOUREMIS 12  1  1 13 LABADIE2 253.550 405.222 17.043
SO HOUREMIS 12  1  1 13 LAB34 651.042 409.596 20.988
SO HOUREMIS 12  1  1 14 LABADIE1 279.203 404.500 19.545
SO HOUREMIS 12  1  1 14 LABADIE2 250.211 405.556 16.940
SO HOUREMIS 12  1  1 14 LAB34 654.230 413.546 21.529
SO HOUREMIS 12  1  1 15 LABADIE1 270.018 404.722 18.905
SO HOUREMIS 12  1  1 15 LABADIE2 239.148 404.611 16.342
SO HOUREMIS 12  1  1 15 LAB34 601.625 412.246 19.868
SO HOUREMIS 12  1  1 16 LABADIE1 344.509 404.944 23.278
SO HOUREMIS 12  1  1 16 LABADIE2 287.973 406.222 19.184
SO HOUREMIS 12  1  1 16 LAB34 668.720 409.657 21.555
SO HOUREMIS 12  1  1 17 LABADIE1 392.830 413.444 27.374
```

```
SO HOUREMIS 12  1  1 17 LABADIE2 278.674 408.944 18.942
SO HOUREMIS 12  1  1 17 LAB34 754.274 416.152 24.764
SO HOUREMIS 12  1  1 18 LABADIE1 464.134 419.389 32.295
SO HOUREMIS 12  1  1 18 LABADIE2 391.129 422.722 26.491
SO HOUREMIS 12  1  1 18 LAB34 911.270 428.971 30.279
SO HOUREMIS 12  1  1 19 LABADIE1 465.709 422.167 32.737
SO HOUREMIS 12  1  1 19 LABADIE2 394.569 431.944 27.539
SO HOUREMIS 12  1  1 19 LAB34 911.358 433.692 30.746
SO HOUREMIS 12  1  1 20 LABADIE1 462.685 421.611 32.391
SO HOUREMIS 12  1  1 20 LABADIE2 393.145 432.889 27.735
SO HOUREMIS 12  1  1 20 LAB34 896.188 433.672 30.432
SO HOUREMIS 12  1  1 21 LABADIE1 429.962 418.278 30.201
SO HOUREMIS 12  1  1 21 LABADIE2 362.401 429.611 25.703
SO HOUREMIS 12  1  1 21 LAB34 857.959 432.090 29.276
SO HOUREMIS 12  1  1 22 LABADIE1 454.217 420.722 31.936
SO HOUREMIS 12  1  1 22 LABADIE2 357.790 424.278 24.875
SO HOUREMIS 12  1  1 22 LAB34 829.798 429.802 28.119
SO HOUREMIS 12  1  1 23 LABADIE1 375.518 419.778 26.689
SO HOUREMIS 12  1  1 23 LABADIE2 301.644 426.000 21.341
SO HOUREMIS 12  1  1 23 LAB34 778.441 428.073 26.327
SO HOUREMIS 12  1  1 24 LABADIE1 419.958 417.611 29.368
SO HOUREMIS 12  1  1 24 LABADIE2 298.897 419.111 20.336
SO HOUREMIS 12  1  1 24 LAB34 677.414 422.018 22.897
```

G.3 – Sierra Club Modeling for Ameren Labadie Energy Center

Washington University in St. Louis
SCHOOL OF LAW

Interdisciplinary Environmental Clinic

September 3, 2015

Ms. Wendy Vit
Chief, Air Quality Planning Section
Air Pollution Control Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176
Via email to apcpsip@dnr.mo.gov

Re: 2010 1-Hour Sulfur Dioxide Standard, Proposed Options for Area Boundary Recommendations, July 2016 Designations

Dear Ms. Vit:

On behalf of the Sierra Club, we submit the following comments on the 2010 1-Hour Sulfur Dioxide Standard, Proposed Options for Area Boundary Recommendations, July 2016 Designations.[1] We strongly urge the Department of Natural Resources ("DNR") to propose and the Air Conservation Commission to adopt and submit to the Environmental Protection Agency ("EPA") a recommended designation of nonattainment based on modeling for the Ameren Labadie Energy Center in Franklin County, Missouri.

The Labadie plant is far-and-away the largest source of SO_2 pollution in the state. It is calculated to be responsible for more premature deaths than any other coal plant in the nation without scrubbers.[2] While Ameren has installed scrubbers – which are long-proven, highly-effective SO_2 controls – on its Sioux plant, it appears to be spending considerable money on consultants and poorly-sited monitors to try to avoid installing scrubbers at Labadie.

Because three years of source-oriented monitoring data are not available for the Labadie plant, the designation must be based on modeling in order to meet the July 2016 deadline in the March 2, 2015 federal Consent Decree for the next round of sulfur dioxide ("SO_2") designations.[3] DNR's modeling demonstrates that the area surrounding the Labadie plant is not attaining the 2010 1-hour SO_2 national ambient air quality standard ("NAAQS") based on the most recent three years of the Labadie plant's actual emissions.

---

[1] DNR, 2010 1-Hour Sulfur Dioxide Standard, Proposed Options for Area Boundary Recommendations, July 2016 Designations, July 24, 2015("Proposed 2016 Designation Options"), available at http://dnr.mo.gov/env/apcp/docs/2010-so2-options-for-july-2016-desig-aug-27-2015-pub-hrg.pdf.
[2] Environmental Integrity Project, *Net Loss: Comparing the Cost of Pollution vs. the Value of Electricity from 51 Coal-Fired Plants* (June 2012) at i-ii.
[3] *Sierra Club v. McCarthy*, No. 3:13-cv-3953-SI, Consent Decree filed March 2, 2015, available at http://www.epa.gov/so2designations/pdfs/201503FinalCourtOrder.pdf.

Campus Box 1120, One Brookings Drive, St. Louis, MO 63130-4899
(314) 935-7238, FAX: (314) 935-5171; www.law.wustl.edu

DNR's alternative option of an unclassifiable designation is not appropriate because unclassifiable only applies when there is insufficient data to support a nonattainment or attainment decision, and in this case DNR's modeling provides ample data to support a nonattainment designation. Ameren's suggestion that the area be designated attainment is directly refuted by DNR's modeling. Ameren's consultant made numerous questionable changes to DNR's modeling approach, without providing adequate justification or obtaining the necessary approval from EPA, for the apparent purpose of obtaining an attainment result. Ameren's modeling should be disregarded.

I. The Area Around The Labadie Energy Center Must Be Designated Nonattainment.

When the U.S. Environmental Protection Agency ("EPA") established the 1-hour SO_2 NAAQS in 2010, it emphasized the value of modeling in making area designations.

> [I]n areas without currently operating monitors but with sources that might have the potential to cause or contribute to violations of the NAAQS, we anticipate that the identification of NAAQS violations and compliance with the 1-hour SO2 NAAQS would primarily be done through refined, source-oriented air quality dispersion modeling analyses …
>
> Compared to other NAAQS pollutants, we would not consider ambient air quality monitoring alone to be the most appropriate means of determining whether all areas are attaining a short-term SO_2 NAAQS. Due to the generally localized impacts of SO_2, we have not historically considered monitoring alone to be an adequate, nor the most appropriate, tool to identify all maximum concentrations of SO_2.[4]

While EPA allows the use of modeling or monitoring to support a designation, a monitoring approach is only valid when it is based on three years of quality-assured data from appropriately-sited monitors.[5] Because the monitors at the Labadie plant[6] did not begin operating until April 2015, and the Consent Decree requires EPA to make an SO_2 designation for the Labadie plant by July 2, 2016, the Labadie designation must be based on modeling, not monitoring. EPA recognized this in Guidance issued shortly after the Consent Decree became final:

---

[4] EPA, Primary National Ambient Air Quality Standard for Sulfur Dioxide, Final Rule, 75 Fed. Reg. 35520, 35551 (June 22, 2010).

[5] EPA, Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard (NAAQS), Final Rule, 80 Fed. Reg. 51052 (Aug. 21, 2015); EPA, Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard (Mar. 20, 2015) ("Updated SO_2 Designations Guidance"), available at http://www.epa.gov/airquality/sulfurdioxide/pdfs/20150320SO2designations.pdf.

[6] The SO_2 monitors that Ameren recently constructed near the Labadie plant are not sited in areas of expected peak SO_2 concentrations and their locations were not approved by EPA. Therefore, the data they are generating should not in any event be relied upon for regulatory decisions. See comments previously submitted to DNR on behalf of the Sierra Club regarding the Ameren's "Labadie Sulfur Reduction Quality Assurance Project Plan," (Apr. 1, 2015), DNR's 2015 Monitoring Network Plan (July 20, 2015), and supplemental comments regarding the 2015 Monitoring Network Plan (Aug. 11, 2015). Copies of those letters are attached hereto as Exhibits 1, 2, and 3.

> We recognize that the timeline for designations by July 2, 2016, does not provide for establishment and use of data from new ambient monitors. Therefore, **we anticipate that in many areas the most reliable information for informing these designations will be source modeling**. The EPA has issued guidance on the use of source modeling for this purpose in the SO_2 NAAQS Designations Modeling Technical Assistance Document (Modeling TAD).[7]

Pursuant to EPA Guidance,[8] DNR performed dispersion modeling that compels a nonattainment designation. According to DNR:

> The area containing the Ameren Labadie Energy Center models violations of the 2010 1-hour SO_2 standard using actual emissions.[9]

Using 9 ppb as the regional background concentration, DNR's "maximum modeled concentration for the area was 234.5 µg/m^3 or 89 ppb, which is not in compliance with the 1-hour SO_2 standard of 75 ppb."[10] DNR also considered using the Mott Street monitor in Herculaneum for "a more conservative background concentration" of 18 ppb, which "would yield a maximum modeled concentration of 98 ppb."[11]

Sierra Club retained a modeling consultant to conduct independent modeling regarding the Labadie plant. Modeling performed by Wingra Engineering confirms that the area around the Labadie plant violates the 1-hour SO_2 NAAQS.[12]

Pursuant to section 107(d)(1) of the Clean Air Act and EPA guidance applicable specifically to the 1-hour SO_2 NAAQS, the area around the Labadie plant must be designated nonattainment.

II. The Unclassifiable Option in DNR's Proposal is Inappropriate.

The unclassifiable designation applies only "[i]n the absence of information clearly demonstrating a designation of 'attainment' or 'nonattainment.'"[13] Because DNR's modeling

---

[7] Updated SO_2 Designations Guidance at 3 (emphasis supplied).
[8] Updated SO_2 Designations Guidance and EPA, SO_2 NAAQS Designations Modeling Technical Assistance Document ("Modeling TAD"), available at http://www.epa.gov/airquality/sulfurdioxide/pdfs/SO2ModelingTAD.pdf.
[9] Proposed 2016 Designation Options at 26.
[10] *Id*. at 27.
[11] *Id*.
[12] The Wingra Engineering modeling report is submitted herewith as Exhibit 4. Wingra Engineering determined that meteorological data from the Spirit of St. Louis airport was more representative of site conditions than the Jefferson City airport data used by DNR in its modeling. Although the NAAQS exceedances modeled by Wingra Engineering are almost identical to those modeled by DNR, the area boundaries based on Wingra's modeling would differ in part from those proposed by DNR. The geographic scope of the appropriate nonattainment area boundary is discussed below.
[13] Updated SO_2 Designations Guidance at 5.

demonstrated NAAQS violations near the Labadie plant compelling a nonattainment designation, the unclassifiable option in DNR's proposal is inapplicable and inappropriate.

DNR's unclassifiable option relies on (1) three months of not quality-assured data from monitors recently constructed by Ameren near the Labadie plant and (2) monitoring data from long-inactive monitors that documented high concentrations of SO_2. DNR's suggestion that the monitoring data casts doubt on the conclusions of its modeling falls far short of the mark.

First, the Labadie monitoring data cannot and do not undermine the nonattainment designation compelled by DNR's modeling. *Three months* of preliminary data from the new Labadie monitors are meaningless; *three years* of quality-assured monitoring data are required in order to determine whether an area complies with the 1-hour SO_2 NAAQS.[14] Accordingly, EPA Guidance recognizes that modeling, not monitoring, will be the principal basis for making designations for areas subject to the July 2016 deadline.[15]

In addition, the fact that Ameren's Labadie monitors have not recorded any SO_2 concentrations above the NAAQS during their first three months of operation should come as no surprise to DNR. Using the MAXDAILY output option, DNR's modeling – which documents nonattainment for a three-year period – predicts no NAAQS exceedances during the three-month time period of the Labadie monitoring data in any of the modeled years at Ameren's Northwest monitoring site, and no NAAQS exceedances in two of the three modeled years (2013 and 2014) at Ameren's Valley monitoring site.

Moreover, the data from Ameren's Labadie monitors should not be relied upon for NAAQS compliance purposes because the monitors are not sited in areas of expected peak concentrations. The modeling conducted by DNR for the Proposed 2016 Designation Options (after Ameren sited its Labadie monitors) makes clear that the Valley monitor is not sited in an area of expected peak concentrations. Furthermore, preliminary meteorological data collected by Ameren at the Valley monitoring site suggests that the meteorological data used in DNR's modeling[16] is not as representative of site conditions as meteorological data collected at the Spirit of St. Louis Airport. Modeling conducted with meteorological data from the Spirit of St. Louis Airport demonstrates that neither of Ameren's monitors is located in an area of expected peak concentrations.[17]

Second, monitoring data from the long-inactive Augusta and Augusta Quarry SO_2 monitors similarly fail to undermine the nonattainment designation required by DNR's modeling. There is no indication that either of those monitors was sited in areas of expected peak concentrations caused by the Labadie plant's emissions. To the contrary, DNR's modeling indicates that they were not sited in areas of expected peak concentrations associated with Labadie's emissions. This is shown in Figure 1, below.

---

[14] The form of the 1-hour SO_2 NAAQS is the three-year average of the 99th percentile of 1-hour daily maximum concentrations.
[15] Updated SO2 Designations Guidance at 3.
[16] DNR used meteorological data collected at Jefferson City Memorial Airport in its modeling.
[17] See Exhibits 1, 2, and 3 submitted herewith.

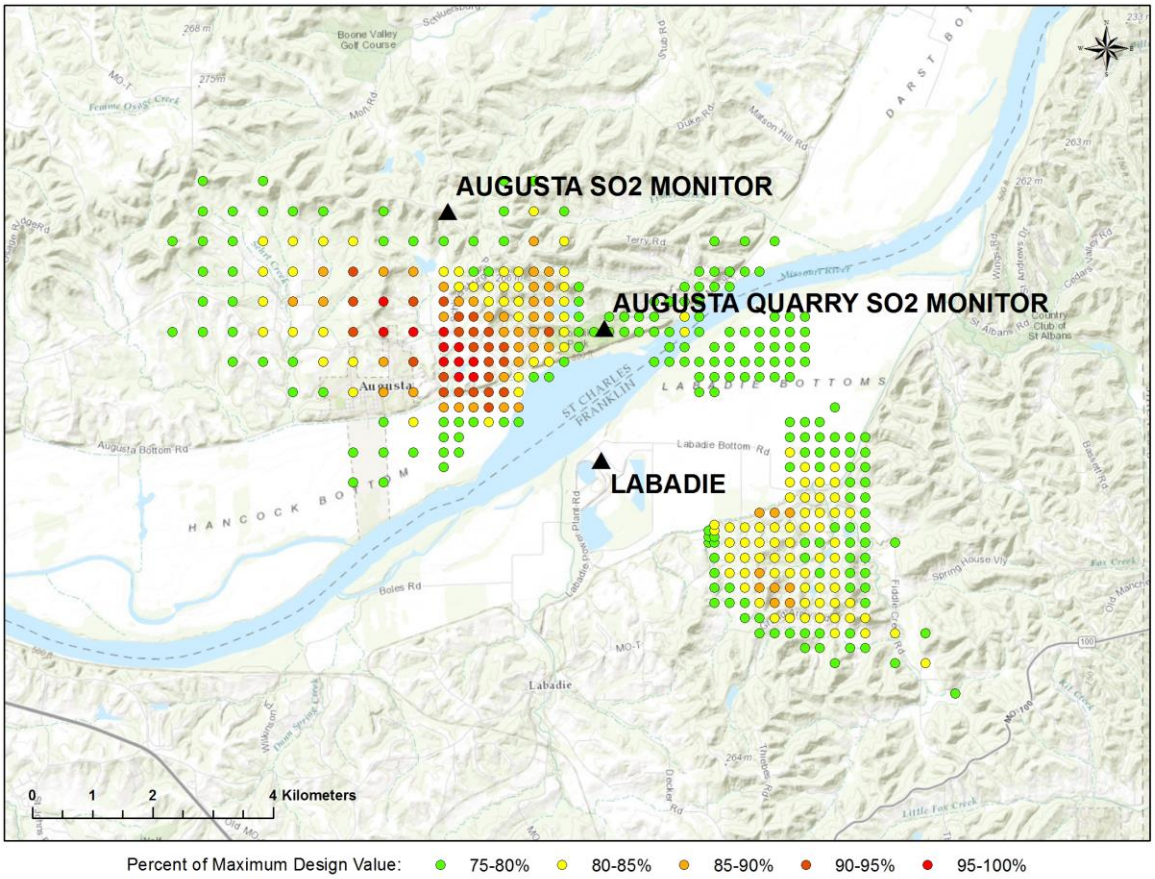


Figure 1. Augusta SO_2 monitors in relation to DNR's modeled peak concentration areas.

Furthermore, the data from the Augusta monitors reveal high 1-hour SO_2 concentrations, with consistent violations of the NAAQS. The Augusta monitor operated from July 1, 1987 until December 19, 1994. The design values for every three-year period during the monitor's operation were well above the 1-hour SO2 NAAQS – ranging from 259 ppb for 1987-1989 to 114 ppb for 1992-1994.[18] The Augusta Quarry site operated for three full years (1995-1997) and portions of two additional years (1994 and 1998). The design value for the only complete three-year period was 78 ppb, exceeding the 1-hour SO_2 NAAQS. The fourth-highest one-hour readings during two of the three complete data years were well above the 1-hour SO_2 NAAQS (86 ppb in 1995 and 80 ppb in 1997).[19]

In sum, there is no legitimate reason for an unclassifiable designation for the area around the Labadie plant.

[18] Proposed 2016 Designation Options, Appendix F, at F-3.
[19] *Id*. at F-2.

III. Ameren's Modeling Purporting To Support An Attainment Designation Actually Shows NAAQS Violations Near The Labadie Plant When Appropriate Inputs Are Used.

Ameren provided DNR with its own modeling using the latest release of AERMOD (v15181) that purports to support an attainment designation for the Labadie plant. We obtained a copy of Ameren's modeling data just before DNR's September 3 comment deadline, so our ability to comment on it in this letter is limited. Based on a cursory review and Ameren's consultant's description of it in his public hearing testimony at the August 27 Missouri Air Conservation Commission meeting, we believe that Ameren's modeling would actually show NAAQS violations near the Labadie plant if appropriate inputs were used. Therefore, it actually supports a nonattainment designation as DNR's option #1 proposes.

There are three key differences between Ameren's new modeling and DNR's. First, Ameren merged the emissions from Units 3 and 4 in a common stack, whereas DNR modeled the emissions from Units 3 and 4 separately. Second, Ameren used a pair of non-default beta options, ADJ_U* in AERMET and LowWind3 in AERMOD, which were added to the latest model release to address concerns regarding model performance under low wind speed conditions. Finally, Ameren used a background concentration based on a monitor in Nilwood, Illinois, that varies by season and hour-of-day instead of the uniform 9 ppb background concentration used by DNR, based on the monitor in East St. Louis.

As justification for merging the emissions from Units 3 and 4 in a common stack, Ameren cites EPA Model Clearinghouse Report 91-II-01. Model Clearinghouse Reports provide EPA's interpretation of modeling guidance as it applies to specific applications of air dispersion models. While often relevant to other, similar applications, Model Clearinghouse Reports do not serve as guidance of general applicability. EPA issues general guidance related to the Guideline on Air Quality Models ("Guideline") and technical aspects of dispersion models in formal "Clarification Memos." Furthermore, Model Clearinghouse Report 91-II-01 relates to the modeling of an unspecified stationary source using an unspecified model different from AERMOD.[20] Its relevance, if any, to the application of AERMOD to evaluate NAAQS compliance around the Labadie plant is speculative at best.[21] Therefore, it should not be relied upon as justification for merging the emissions from Units 3 and 4 in a common stack.

Regarding Ameren's use of non-default beta options in the latest release of AERMOD, EPA has acknowledged issues with the performance of AERMOD under low wind conditions and has proposed that these options be included as regulatory default options in a 2016 version of

[20] Development of AERMOD did not commence until 1991 and it was not adopted as EPA's preferred model for regulatory dispersion modeling until 2005. Therefore, it is inconceivable that AERMOD was used in the permit application that was the subject of Model Clearinghouse Report 91-II-01.

[21] The configuration of the stacks at the source discussed in the report was different from the configuration of the stacks at Labadie, and the report concluded that they could be merged based on an unverified assumption about the separation distance between the stacks relative to the lesser dimension of nearby structure(s), and only if the flow rates and temperatures were always the same for all three stacks. It is not known whether these conditions are met at Labadie.

AERMOD associated with a potential future final rule revising the Guideline.[22] However, they are only proposed options at this time, and EPA may or may not ultimately include either or both as regulatory defaults in the next version of AERMOD.[23] Furthermore, since they are non-default beta options in the latest release of AERMOD, their use presently requires an alternate model demonstration per Section 3.2.2 of the Guideline, which must be approved by the EPA Regional Administrator. Ameren's submission of its new modeling to DNR did not include an alternate model demonstration.

Apart from these questionable changes, the fatal flaw in Ameren's new modeling is the use of a cherry-picked "background" concentration below that used by DNR.

Ameren's background concentration is based on a monitor in Nilwood, Illinois, and varies by season and hour-of-day. This and other temporally-varying background options have been available in AERMOD since v11059. During most hours and seasons, Ameren's background concentration is significantly lower than DNR's uniform 9 ppb background concentration, which is the design value for the nearest ambient monitor (East St. Louis) based on readings for the sector with the least source influence.[24] (DNR also noted that it might be appropriate to use a more conservative background concentration of 18 ppb based on the fourth-high value of the Mott Street monitor in 2014.[25]) EPA guidance currently recommends using the overall highest hourly background SO_2 concentration from a representative monitor as a "first tier" background concentration,[26] which is a more conservative approach than DNR's. EPA's proposed revised Guideline regulations recommend using the design value as a uniform monitored background contribution across the project area, as DNR did. Ameren's use of temporally-varying background concentration does not comport with either EPA's current guidance or its proposed revised Guideline regulations.

In addition, it is noteworthy that the design value for the Nilwood monitor for the most recent three year period (2012-2014) was 9.3 ppb, slightly higher than the 9 ppb background concentration DNR used in its modeling. Previous design values for the Nilwood monitor were 8 ppb (2011-2013), 10 ppb (2010-2012), and 13 ppb (2009-2011).

The peak SO_2 concentration predicted by Ameren's new model is 73.7 ppb (approximately 193.3 ug/m^3) at a point roughly 3 kilometers northwest of the plant. This is slightly below the NAAQS, but only because Ameren used a less conservative background concentration than that used by DNR. **Using DNR's background concentration, the peak SO_2 concentration predicted by Ameren's new model exceeds the NAAQS.**

---

[22] EPA published a notice of proposed rulemaking proposing enhancements to the AERMOD dispersion modeling system and revisions to the Guideline on July 29, 2015. 80 Fed. Reg. 45399, available at http://www.gpo.gov/fdsys/pkg/FR-2015-07-29/pdf/2015-18075.pdf.
[23] George Bridgers, personal communication, September 1, 2015.
[24] Proposed 2016 Designation Options, Appendix A, at A-12.
25 Proposed 2016 Designation Options at 27.
[26] EPA, Applicability of Appendix W Modeling Guidance for the 1-hour $S0_2$ National Ambient Air Quality Standard, Aug. 23, 2010, at 3.

Ameren's new modeling appears to be "results-oriented" in that its inputs were apparently tailored to yield a desired result –the appearance of no NAAQS violations near the Labadie plant – and not to accurately determine the attainment status of the area. Most egregious is the substitution of a more favorable background concentration, in a form not sanctioned by EPA guidance or regulations, instead of the background concentration used by DNR. Ameren's request for an attainment designation based on its manipulated modeling should be rejected.

IV. DNR's Proposed Nonattainment Boundaries Should Be Modified.

In addition to recommending a designation of nonattainment around the Labadie plant, DNR should modify the proposed boundaries of the nonattainment area. Per EPA guidance, the analytical starting point for determining SO_2 nonattainment areas is county boundaries.[27] Modeled NAAQS violations due to Labadie occur in both Franklin and St. Charles Counties, making these counties the starting point for the nonattainment area boundary. Partial county boundaries are appropriate in this instance, however, due to the fairly limited geographic scope of the modeled violations. For defining partial county boundaries, EPA recommends the use of well-defined jurisdictional lines such as township borders or other geopolitical boundaries, immovable landmarks, and readily identifiable physical features.[28] DNR's proposed boundary includes only portions of the two townships containing the modeled violations – Boles Township in Franklin County and Boone Township in St. Charles County – cutting off portions of both townships along transecting roadways.[29] This results in dividing up the communities of Gray Summit and Pacific in the south and New Melle in the north, creating the potentially confusing situation where some portions of each community are inside the nonattainment area and other portions are outside. To avoid this situation, we recommend modifying the proposed boundaries of the nonattainment area to include all of Boone and Boles Townships. These townships encompass just 20 percent of the total combined area of Franklin and St. Charles Counties, and therefore represent reasonable partial county boundaries for the nonattainment area.

Alternatively, DNR should consider modifying the proposed boundaries of the nonattainment area to encompass a larger portion of northeast Franklin County, which DNR's modeling suggests encompasses most if not all modeled violations when potentially more representative meteorological data from the Spirit of St. Louis Airport in Chesterfield is used.[30] With Spirit of St. Louis Airport meteorological data, the locus of modeled violations shifts to the south and southwest of the plant. A more appropriate nonattainment area boundary based on these modeled violations would encompass Boles Township, a small portion of Boone Township (south of

---

[27] Updated SO_2 Designations Guidance at 5.
[28] *Id.* at 6.
[29] The northern portion of Boone Township is cut off by Missouri Route D and Highway 94; the southern portion of Boles Township is cut off by Interstate 44.
[30] Preliminary meteorological data from Ameren's Valley monitoring site suggest that the winds at Labadie may be more similar to the winds at Spirit of St. Louis Airport ("KSUS") in Chesterfield than the winds at Jefferson City Memorial Airport ("KJEF") in Jefferson City, which in turn suggests that KSUS surface meteorological data may be more representative of the area and more appropriate for modeling Labadie's emissions than KJEF data. See supplemental comments previously submitted to DNR on behalf of the Sierra Club regarding DNR's 2015 Monitoring Network Plan, attached hereto as Exhibit 3.

Missouri Highway 94), and the area west of Boles Township bounded by Missouri Route 47 and the municipal boundaries of Washington and Union, Missouri. This is shown in Figure 2, below.

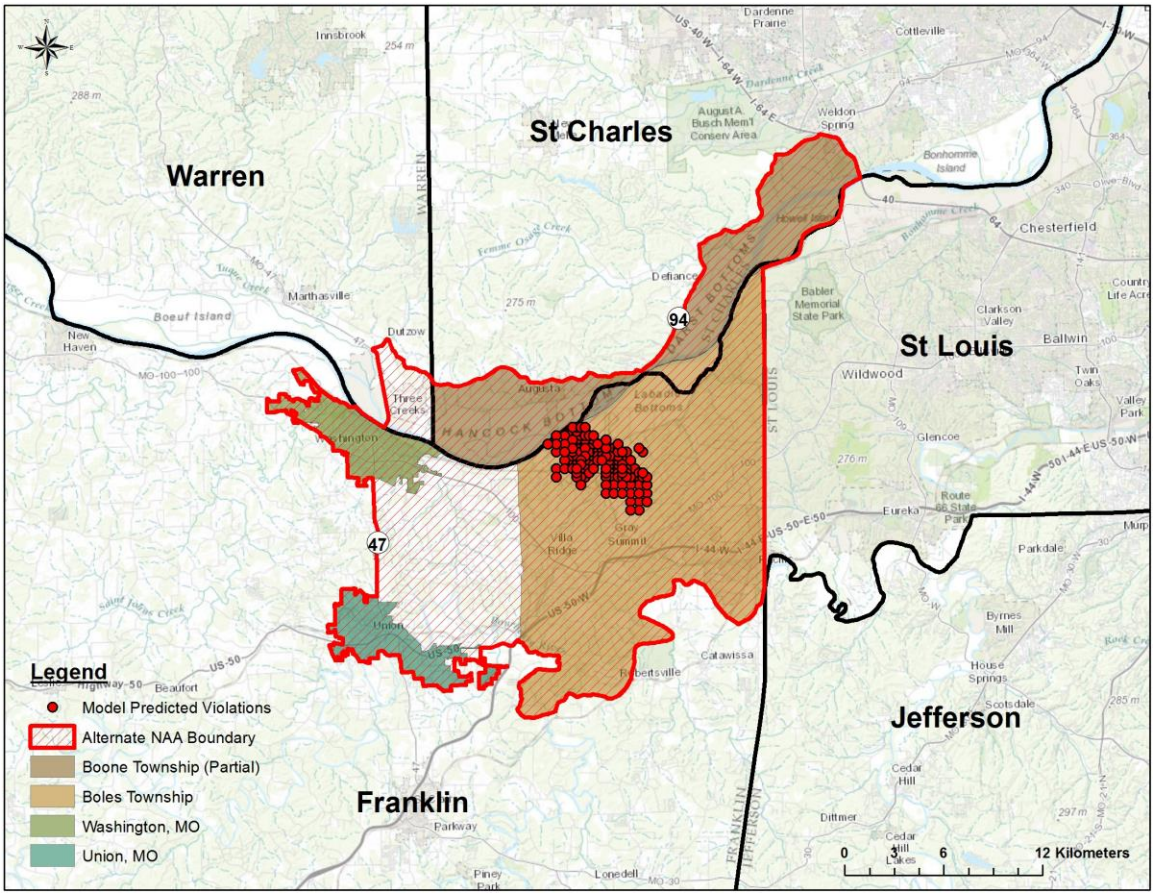


Figure 2. Alternative nonattainment area boundary based on Spirit of St. Louis Airport meteorological data.

Conclusion

We strongly urge the DNR to propose and the Air Conservation Commission to approve and submit to the EPA a recommended designation of nonattainment based on modeling for the Ameren Labadie Energy Center in Franklin County, Missouri. DNR's modeling demonstrates that the area surrounding the Labadie plant is not attaining the 2010 1-hour SO_2 national ambient air quality standard ("NAAQS") based on the most recent three years of actual emissions. This compels a nonattainment designation.

For the reasons set forth above, the unclassifiable designation option is inapplicable and inappropriate, and Ameren's suggestion for an attainment designation is fanciful.

Sincerely yours,

Maxine I. Lipeles, Director
Kenneth Miller, P.G., Environmental Scientist
Interdisciplinary Environmental Clinic
Washington University School of Law
One Brookings Drive – CB 1120
St. Louis, MO 63130
314-935-5837 (phone); 314-935-5171 (fax)
milipele@wustl.edu

Attorneys for the Sierra Club

Cc: Rebecca Weber, Director, Air & Waste Management Division, EPA Region 7
Chief, Air Planning & Development Branch, EPA Region 7
Kyra Moore, Director, Air Pollution Control Program, DNR

Washington University in St. Louis
SCHOOL OF LAW

Interdisciplinary Environmental Clinic

April 13, 2015

Ms. Patricia Maliro
Chief, Air Quality Monitoring Unit
Air Pollution Control Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176
Via email to patricia.maliro@dnr.mo.gov

Re: Comments on Ameren Missouri's Labadie Sulfur Reduction Project Quality Assurance Project Plan

Dear Ms. Maliro:

On behalf of the Sierra Club, we submit the following comments on Ameren Missouri's Labadie Sulfur Reduction Project Quality Assurance Project Plan (QAPP). The QAPP describes the methodology Ameren used to determine the locations of two proposed ambient sulfur dioxide (SO_2) monitoring stations around its Labadie Energy Center in connection with the 1-hour SO_2 National Ambient Air Quality Standard (NAAQS). We believe the QAPP should be disapproved because the proposed monitoring stations are improperly sited; they are outside areas where peak 1-hour SO_2 concentrations are expected to occur based on the modeling described in the QAPP. Furthermore, the modeling described in the QAPP does not comport with EPA guidance on characterizing ambient air quality in areas around or impacted by significant SO_2 emission sources such as the Labadie Energy Center and therefore may have failed to correctly identify areas of expected ambient, ground-level SO_2 concentration maxima.

I. Based on the Modeling Described in the QAPP, the Proposed Monitoring Stations are Improperly Sited Outside Areas Where Peak 1-Hour SO_2 Concentrations are Expected to Occur

Appendix 10 of the QAPP describes the modeling performed to determine the locations of the proposed ambient SO_2 monitoring stations around the Labadie Energy Center. The modeling was used to determine locations where peak 1-hour SO_2 concentrations are expected to occur due to the plant's SO_2 emissions given that the primary objective of source-oriented monitoring is to identify peak SO_2 concentrations in ambient air that are attributable to an identified emission source or group of sources.[1] Figure 1 shows all receptors with modeled design values greater than or equal to 75 percent of the maximum modeled design value. Figure 2 shows the receptors with the top 200, 100, 25, and 10 modeled design values.

[1] U.S. EPA, SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, at 2.

Campus Box 1120, One Brookings Drive, St. Louis, MO 63130-4899
(314) 935-7238, FAX: (314) 935-5171; www.law.wustl.edu

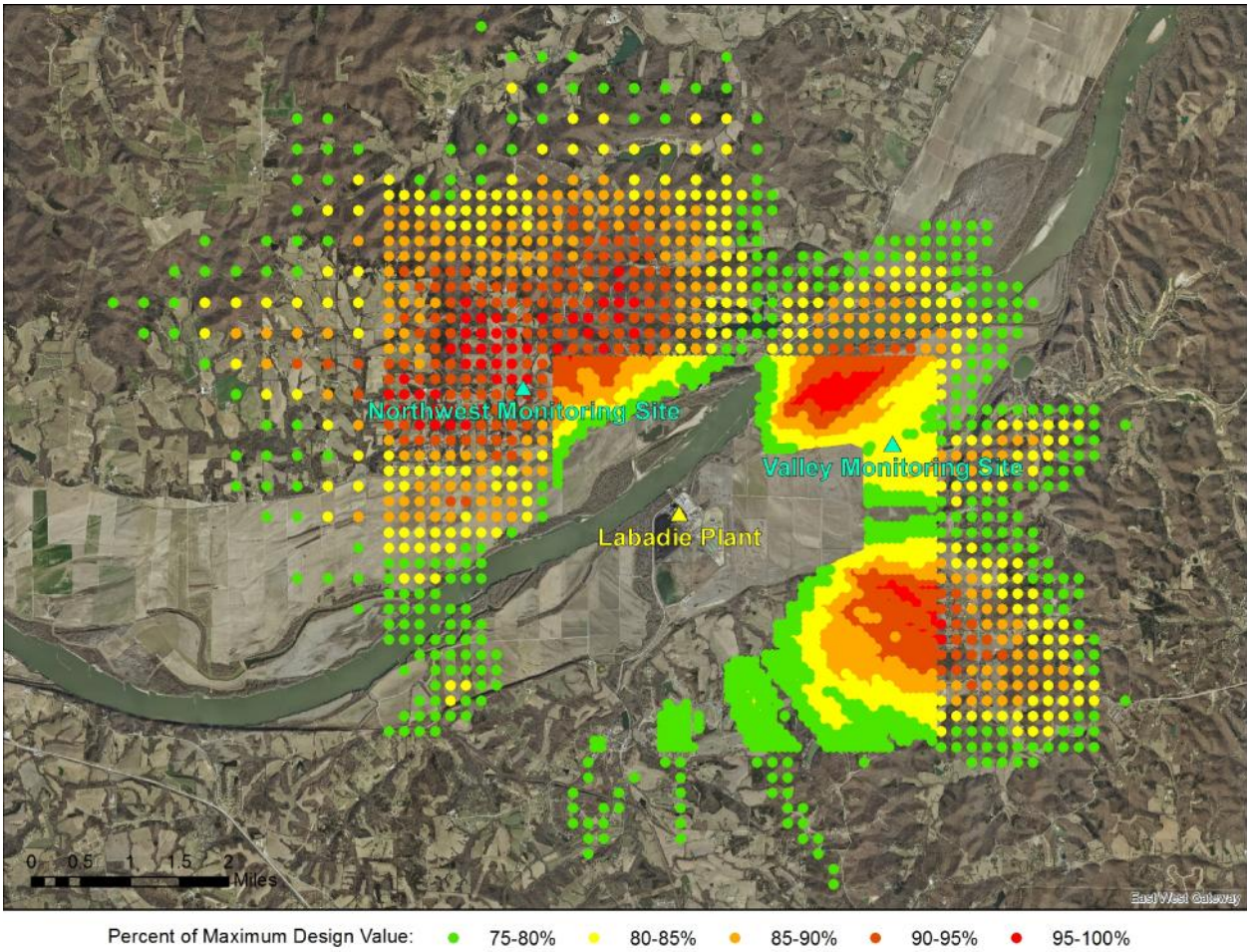


Figure 1. Receptors with modeled design values ≥75 percent of the maximum design value.

The modeling was also used to determine locations where elevated SO_2 concentrations are expected to occur most frequently given that the site selection process also needs to account for the frequency with which an area sees the daily maximum concentration.[2] Normally this involves counting the number of times each receptor sees the daily maximum 1-hour SO_2 concentration predicted by the model. However, the QAPP looks at it differently, counting instead the number of times the daily maximum 1-hour SO_2 concentration at each receptor exceeds 75 percent of the maximum modeled design value. Figure 3, which is reproduced from the QAPP,[3] shows the number of daily maximum 1-hour SO_2 concentrations at each receptor that exceed 75 percent of the maximum modeled design value.

[2] *Id.* at A-6.

[3] See Appendix 10, Figure 6, "Counts of Max Daily 1-Hour Concentrations Greater Than 75% of the Max Modeled Design Value* (Years 2005-2009)."

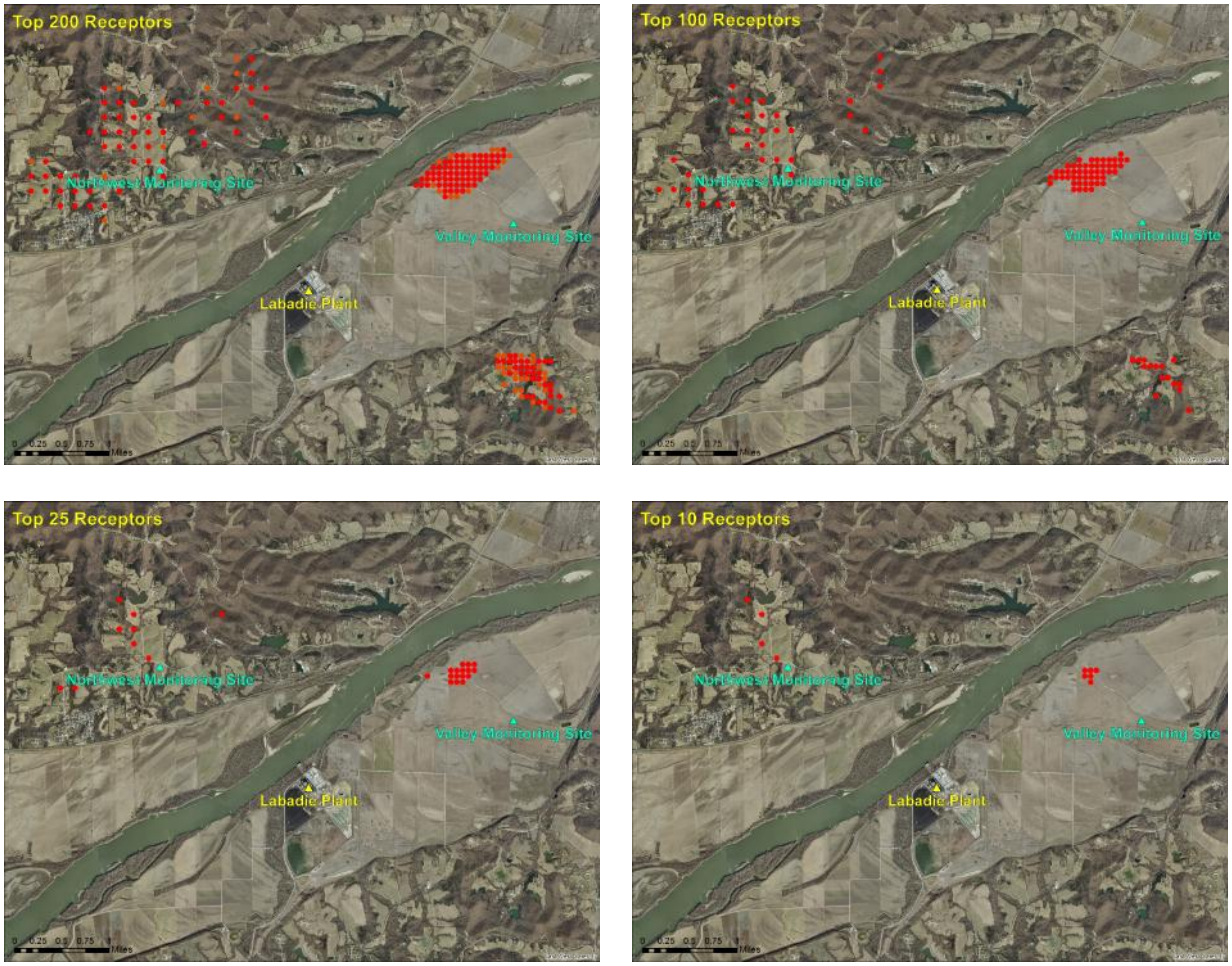


Figure 2. Receptors with the top 200, 100, 25, and 10 modeled design values.

Figures 1 and 2 reveal three distinct areas where modeled design values are in excess of 95 percent of the maximum modeled design value and where the majority of the top 200 receptors (and all of the top 100, 25 and 10 receptors) lie. These areas, located northwest, northeast, and southeast of the Labadie Energy Center, are where the modeling predicts peak 1-hour SO_2 concentrations are expected to occur. Furthermore, although a rigorous comparison is not possible without detailed receptor data, a simple visual comparison of Figures 1 and 3 indicates that the areas where peak 1-hour SO_2 concentrations are expected to occur (i.e., where modeled design values are in excess of 95 percent of the maximum modeled design value) overlap with the areas where daily maximum 1-hour SO_2 concentrations most frequently exceed 75 percent of the maximum modeled design value. Monitoring stations located in these areas would have the greatest chance of identifying peak SO_2 concentrations in ambient air, which is the primary objective of source-oriented monitoring and an absolute necessity when monitoring to assess compliance with the NAAQS.

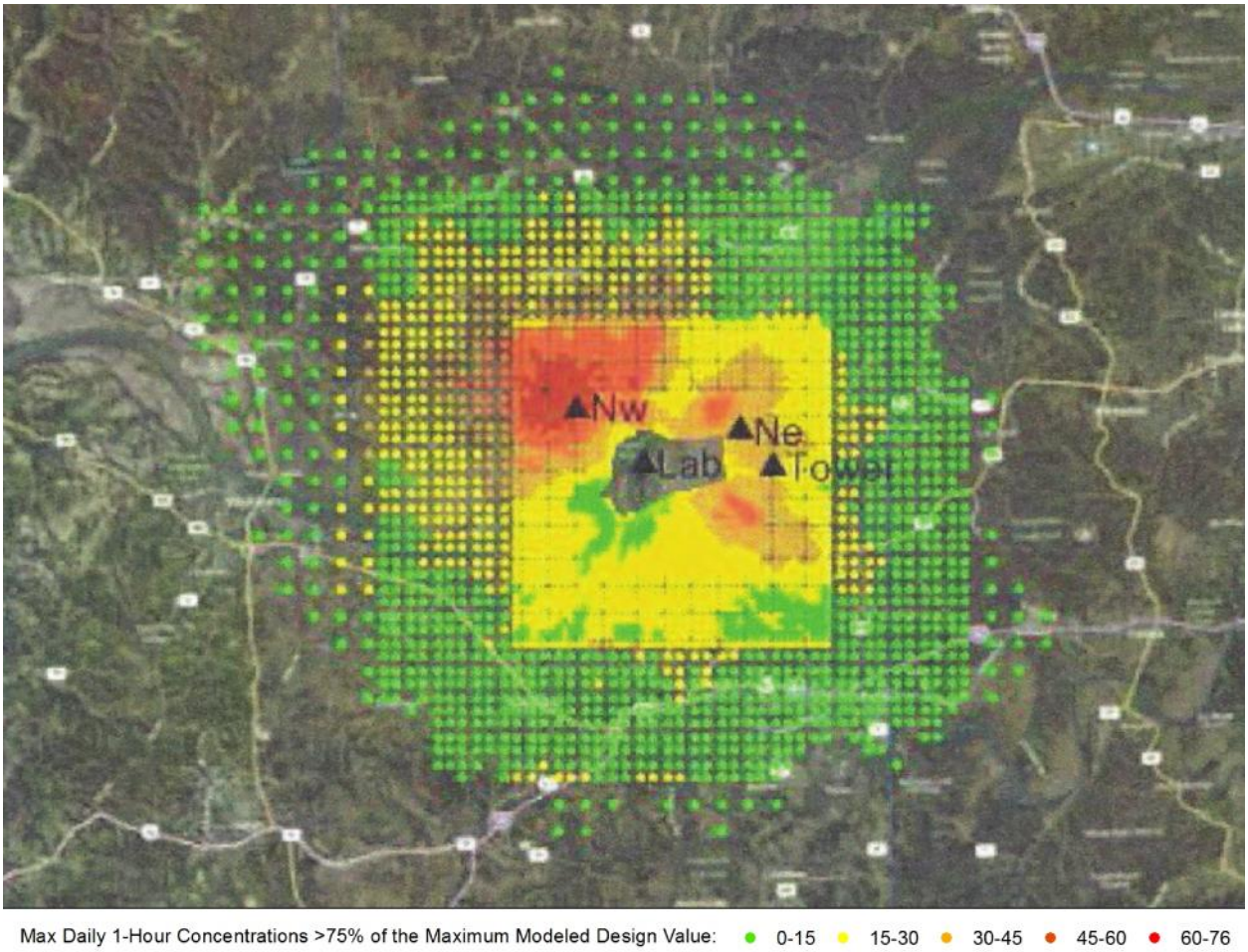


Figure 3. Number of maximum daily 1-hour SO_2 concentrations at each receptor that exceed 75 percent of the maximum modeled design value.

However, only one of Ameren's proposed monitoring sites, the northwest site, is located in one of the three peak concentration/high frequency areas predicted by the modeling (the one located northwest of the plant). No monitoring sites are proposed in the peak concentration/high frequency areas located northeast or southeast of the plant. Instead, Ameren's only other proposed monitoring site, the valley site, is located in an area where modeled design values are only about 80 percent of the maximum modeled design value and where daily maximum 1-hour SO_2 concentrations exceed 75 percent of the maximum modeled design value about half as often as they do in areas where this occurs with the greatest frequency. This makes the valley site an inappropriate site for a monitor to assess compliance with the NAAQS. Ameren's modeling predicts that ambient SO_2 concentrations will be as much as 25 percent higher in several areas around the plant than they will be at the valley site, meaning a monitoring station at the valley site could be in compliance with the NAAQS while significant violations were occurring nearby.

The QAPP states that a monitor could not be sited in the peak concentration/high frequency area northeast of the plant because it is an actively farmed area, physical access is almost impossible

without building additional infrastructure, and electric power is not available. These justifications do not stand up to the barest scrutiny. The entire Labadie Bottoms is an actively farmed area, accessible only by unimproved roads that severely limit vehicular access during wet weather conditions. As such, the proposed valley monitoring site is no more accessible than a site within the peak concentration/high frequency area northeast of the plant would be, and additional road infrastructure will likely be necessary for all-weather access regardless of where in the Labadie Bottoms the monitor is located.[4] Furthermore, electric power is not available anywhere within the Labadie Bottoms, including at the proposed valley monitoring site. Therefore, distribution infrastructure will have to be built to deliver power to any monitoring site in the Labadie Bottoms regardless of where it is located. The St. Albans Water and Sewer Authority/Franklin County PWSD #3 wastewater treatment facility, located approximately 1 kilometer east of the proposed valley monitoring site, appears to be the closest available source of electric power for monitoring sites in the Labadie Bottoms, and only a minimal amount of additional line would be necessary to deliver power to a monitor located in the peak concentration/high frequency area northeast of the plant compared to one located at the proposed valley monitoring site.

The QAPP's justification for not siting a monitor in the peak concentration/high frequency area southeast of the plant is equally flimsy. The QAPP states that the primary reason a monitor is not proposed in that area – despite the model predicting high design values and a high number of daily maximum 1-hour SO_2 concentrations in excess of 75 percent of the maximum modeled design value in that area – is because the elevated terrain there is similar to the terrain at the proposed northwest monitoring site and it was believed an additional elevated terrain site was not necessary. However, AERMOD accounts for terrain influences when calculating modeled design values, and variations in meteorological parameters, most notably wind direction, often result in peak 1-hour SO_2 concentrations occurring in different areas that have similar terrain (e.g., areas in different cardinal directions from the source). Therefore, the peak concentration/high frequency area southeast of the plant cannot be ignored simply because the terrain there is similar to the terrain in the peak concentration/high frequency area northwest of the plant. The purpose of an ambient SO_2 monitoring network is not to monitor different terrain types, but to monitor areas where peak 1-hour SO_2 concentrations are expected to occur regardless of the terrain in those areas. The QAPP also suggests that the high concentrations and frequencies predicted by the model southeast of plant are merely an artifact of the Jefferson City, MO Airport meteorology, which is influenced by the local orientation of the Missouri River valley at that met station. However, the wind roses provided in the QAPP for a number of met stations in eastern Missouri that are closer to Labadie, which the QAPP states better reflect the expected meteorology at Labadie, all show significant winds from the north or northwest, which is consistent with an area of peak concentration/high frequency southeast of the plant.

[4] The peak concentration/high frequency area northeast of the plant is arguably more accessible than the proposed valley monitoring site given its proximity to the agricultural levee adjacent to the south bank of the Missouri River. The road on the crest of this levee is higher and most likely drier than other unimproved roads in the Labadie Bottoms, including those roads leading to the proposed valley monitoring site.

II. The Modeling Described in the QAPP Does Not Comport With EPA's Source-Oriented SO_2 Monitoring Guidance and Therefore May Not Correctly Identify Areas of Expected Ambient, Ground-Level SO_2 Concentration Maxima

EPA's SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document (TAD) provides guidance on how to "appropriately and sufficiently monitor ambient air in areas proximate to or impacted by an SO_2 emissions source to create ambient monitoring data for comparison to the SO_2 NAAQS" and presents "recommended steps to aid in identifying source-oriented SO_2 monitor sites."[5] The modeling described in the QAPP fails to adhere to the TAD in one critical respect: it does not use hourly emission rates, which are readily available for Labadie's boilers from EPA's online Air Markets Program Data tool. Instead it uses constant emission rates, which the QAPP states were "selected to produce rational ambient levels to be used for establishing monitoring locations and does not reflect actual emissions." The consequence of using constant rather than hourly emission rates is that the effects of the interaction between hourly emissions and hourly variations in meteorological parameters is ignored completely, so that the predicted areas of peak concentration and/or high frequency are primarily a function of the meteorology used. For example, if peak hourly emissions coincide with times when strong winds blow from a direction other than the prevailing wind direction, a model that uses hourly emission rates might predict high concentrations in different areas than the same model would predict using constant emission rates. Therefore, using hourly emissions allows the areas where peak 1-hour SO_2 concentrations are expected to occur to be determined with greater confidence.

III. DNR Should Not Deprive The Public and EPA of an Opportunity to Participate in the Monitoring Site Selection Process.

While the area around the Labadie plant will necessarily be evaluated for nonattainment designation purposes based on modeling in order to meet the July 2016 deadline set by *Sierra Club et al. v. McCarthy*, Civil Action No. 3:13–cv–3953–SI (N.D. Cal., March 2, 2015), it is difficult to imagine why DNR and Ameren would agree to install monitoring sites near the Labadie plant unless they expect to consider using the results for future NAAQS compliance evaluations. Monitoring sites used for such purposes must be included in the state's monitoring network plan, which must be proposed by DNR after public notice and the opportunity for public comment, and submitted to EPA for its review and approval. 40 CFR § 58.10.

Contrary to these requirements, DNR has been working with Ameren to select the Labadie monitoring sites and allow Ameren to commence monitoring at these inappropriate locations without public notice and opportunity for public comment, and without submitting the plans to EPA for its review and approval. Documents obtained recently from DNR suggest that Ameren is already preparing to construct the monitoring sites identified in the Labadie QAPP. In addition, the Consent Agreement attached as Appendix J to the proposed Jefferson County State Implementation Plan requires Ameren to submit "final network site recommendations" to DNR regarding the Rush Island plant by May 1, 2015, with equipment to be installed and calibrated by

[5] U.S. EPA, SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, at 2.

December 31, 2015 – with no provisions for public comment or for EPA review and approval. Unlike Labadie, where Ameren has provided documentation to DNR as to its (flawed) basis for monitoring site selection, Ameren appears to be developing its "final network site recommendations" for Rush Island without the prior submission to DNR of modeling data to support the site selection.[6]

DNR should not approve monitoring locations for the Labadie or Rush Island plants without first providing public notice and opportunity for comment, and without submitting the proposed locations to EPA for its review and approval.

Conclusion

Based on the modeling described in the QAPP, Ameren's proposed valley monitoring site is improperly located in an area where peak 1-hour SO_2 concentrations are **not** expected to occur. Furthermore, Ameren has failed to propose monitoring sites in peak concentration/high frequency areas located northeast and southeast of the Labadie Energy Center, citing justifications that don't withstand the barest scrutiny, despite the facts that there are numerous private residences within the peak concentration/high frequency area southeast of the plant and the peak concentration/high frequency area northeast of the plant is situated between the nearby communities of St. Albans and Augusta Shores. Therefore, we urge DNR to disapprove the QAPP and require Ameren to make the following changes:

1) Relocate the proposed valley monitoring site to the peak concentration/high frequency area northeast of the plant; and
2) Add a third monitoring site in the peak concentration/high frequency area southeast of the plant.

We also urge DNR to require Ameren to rerun the air dispersion model described in the QAPP using hourly emission rates in order to determine whether the model correctly identified the areas of expected ambient, ground-level SO_2 concentration maxima around the plant and to require a wholesale reevaluation of potential monitoring sites if the model used for the QAPP failed to correctly identify such areas.

Finally, we urge DNR to provide public notice and opportunity for comment, and to submit the proposed monitoring locations to EPA for its review and approval, in accordance with 40 CFR Part 58.

[6] On behalf of the Sierra Club, the Clinic has submitted Sunshine Law requests for documents related to possible SO_2 monitoring at Labadie and Rush Island. The most recent request to which DNR has responded (submitted on February 19, 2015, with responsive documents provided April 2, 2015), requested: "All documents regarding the possible installation of SO_2 monitors at the Labadie and/or Rush Island power plants, including but not limited to Quality Assurance Project Plans and all related documents, and all AERMOD input and output files used in any modeling analysis performed to determine the locations of any proposed SO_2 monitoring sites." As of DNR's latest response (April 2, 2015), it has not provided any documents discussing or attempting to justify the selection of possible modeling sites at the Rush Island plant.

Respectfully submitted,

Interdisciplinary Environmental Clinic
Washington University School of Law
Maxine I. Lipeles, J.D.
Ken Miller, P.G.*
Alexander Chang, Mo.Sup.Ct.R.13 certified law student
Danelle Gagliardi, Mo.Sup.Ct.R.13 certified law student

On behalf of the Sierra Club

Cc: Rebecca Weber, Director, Air & Waste Management Division, EPA Region 7
Josh Tapp, Chief, Air Planning & Development Branch, EPA Region 7
Kyra Moore, Director, Air Pollution Control Program, DNR
Wendy Vit, Chief, Air Quality Planning Section, Air Pollution Control Program, DNR

*Engineering student Xiaodi "Daniel" Sun also participated in the preparation of this letter

Washington University in St. Louis
SCHOOL OF LAW

Interdisciplinary Environmental Clinic

July 20, 2015

Mr. Stephen Hall
Chief, Air Quality Analysis Section
Missouri Department of Natural Resources
Air Pollution Control Program
P.O. Box 176
Jefferson City, MO 65102
Via email to: cleanair@dnr.mo.gov

Re: 2015 Monitoring Network Plan

Dear Mr. Hall:

On behalf of the Sierra Club, we urge the Missouri Department of Natural Resources ("DNR") to revise the proposed 2015 Monitoring Network Plan[1] in order to satisfy the requirements of the Clean Air Act. In particular, DNR should refrain from proposing new sulfur dioxide ("SO_2") monitoring sites near Ameren's Labadie power plant until EPA completes an area designation for the plant. Monitors near Labadie should be sited based on the modeling that is used to determine the nonattainment area boundary, which will identify areas of expected peak ambient SO_2 concentrations around the plant based on current EPA guidance. Should DNR persist in proposing new SO_2 monitoring sites near the Labadie plant in the 2015 Monitoring Network Plan, then based on currently-available modeling, one of the two proposed new monitoring sites near the plant is not located in an area where peak SO_2 concentrations are expected to occur and should be relocated. A third monitoring site should also be added southeast of the plant. Similarly, based on currently-available modeling, two of the three proposed new monitoring sites near Ameren's Rush Island plant are not located in areas where peak SO_2 concentrations are expected to occur and should be relocated.[2] These changes are necessary to ensure that the Labadie and Rush Island monitors capture maximum ambient SO_2 concentrations near these large sources.

This letter highlights the following key points:

- It is premature to site and install new SO_2 monitors at the Labadie plant until EPA completes an area designation for the plant.
- While DNR plans to use the proposed new Labadie and Rush Island monitors as State and Local Air Monitoring Stations ("SLAMS"),[3] it is not submitting them for EPA approval as required for SLAMS.

[1] MO DEP'T OF NATURAL RES. AIR POLLUTION CONTROL PROGRAM, 2015 MONITORING NETWORK PLAN, June 12, 2015 ("2015 Monitoring Network Plan").
[2] The three proposed new SO_2 monitoring sites that should be relocated, as discussed more fully below, are the Valley site near Ameren's Labadie plant and the Natchez and Weaver-AA sites near Ameren's Rush Island plant.
[3] 2015 Monitoring Network Plan at 12.

Campus Box 1120, One Brookings Drive, St. Louis, MO 63130-4899
(314) 935-7238, FAX: (314) 935-5171; www.law.wustl.edu

Exhibit2

- Based on currently-available modeling, one of the two proposed new Labadie monitoring sites and two of the three proposed new Rush Island monitoring sites are unlikely to capture maximum ambient SO_2 concentrations because they are not located in areas where peak SO_2 concentrations are expected to occur.
- DNR has not adequately justified the locations of the proposed new Labadie and Rush Island monitoring sites. The support offered for the monitoring site locations in DNR's plan was provided by Ameren (Appendices 2 and 4). DNR visually observed the proposed sites at both plants but only performed independent modeling - which does not entirely support Ameren's proposed locations - regarding the Rush Island sites (Appendix 5). DNR did not perform independent modeling regarding the Labadie sites.

I. DNR Should Refrain From Proposing New SO_2 Monitoring Sites Near Ameren's Labadie Plant Until EPA Completes An Area Designation For The Plant.

It is premature to determine SO_2 monitoring site locations near the Labadie plant. DNR is about to propose a nonattainment area boundary recommendation for the Labadie plant,[4] and EPA must make a final area designation for the plant by July 2016.[5] While the Ameren modeling used to site the Labadie monitors in the 2015 Monitoring Network Plan was performed in a manner inconsistent with current EPA guidance, the modeling used to determine the nonattainment area boundary will identify areas of peak ambient SO_2 concentrations around the plant using current EPA guidance. It is likely that the Labadie monitors will ultimately be used to determine whether the nonattainment area comes into attainment, and they must be properly sited in order to provide reliable data.

The only modeling offered to support the proposed new Labadie monitoring sites was performed by Ameren in 2012.[6] Whereas DNR performed independent modeling to assess Ameren's proposed Rush Island monitoring sites (discussed in III.B. below), DNR did not perform independent modeling to assess Ameren's proposed Labadie monitoring sites. The 2015 Monitoring Network Plan states that DNR conducted "a review of relative dispersion modeling, local meteorological evaluation methodology submitted by Ameren UE, historical departmental SLAMS SO_2 monitoring data, nearby meteorological stations, and local topography."[7] However, only Ameren's modeling pointed to the proposed monitor locations. The other information either pointed to different locations or supported no particular monitoring site location. For example, the historical analysis of the former Augusta and Augusta Quarry monitors concluded where *not* to place monitors,[8] but did not point to a location that would accurately represent the highest ambient SO_2 concentration near the Labadie plant.[9] In addition, the analysis of wind

[4] DNR has announced that it will propose a Labadie designation by July 27, 2015.
[5] Sierra Club v. Gina McCarthy, No. 3:13-cv-3953-SI (Consent Decree, March 2, 2015).
[6] 2015 Monitoring Network Plan, Appendix 3.
[7] 2015 Monitoring Network Plan at 14.
[8] The Augusta Quarry data analysis suggests that the plant was responsible for high concentrations near the quarry. *Id.* at 15-19. Without comparative conditions between current proposed monitor locations and the historical monitor locations, the historical data is irrelevant to locating the proper sites for new monitors.
[9] *Id.*

direction through the valley points to placing monitor(s) either to the northeast or southwest of the plant,[10] but it is too vague to support any specific monitoring site location.

The reliance upon Ameren's modeling would not be so concerning if Ameren had proposed monitors in locations with the highest modeled SO_2 concentrations around Labadie. However, one of Ameren's two proposed monitoring sites is outside any of the three areas where its modeling predicted peak SO_2 concentrations are expected to occur, leaving two of the three peak concentration areas completely unmonitored. In addition, Ameren's modeling does not comport with EPA guidance.

In sum, DNR should not propose any Labadie monitoring sites until EPA completes an area designation for the plant because 1) DNR will have to perform modeling that comports with EPA guidance as part of the Labadie designation process; 2) DNR intends to use the Labadie monitoring data in assessing whether the nonattainment area ultimately comes into attainment;[11] and 3) the Clean Air Act requires that monitors sited for National Ambient Air Quality Standard ("NAAQS") compliance purposes be incorporated into the state's monitoring network, subject to EPA review and approval.[12]

II. DNR Should Seek EPA Approval For The Proposed New Labadie And Rush Island SO_2 Monitors Because It Intends To Use Them As SLAMS.

The 2015 Monitoring Network Plan adds two new SO_2 monitors near Ameren's Labadie plant[13] and three new SO_2 monitors near Ameren's Rush Island plant.[14] The plan labels these as Special Purpose Monitors ("SPMs"), but states that "it is the intention to convert these monitors to SLAMS" once EPA finalizes the proposed Data Requirements Rule.[15]

Because DNR plans to use data from these new monitors to assess compliance with the 2010 1-hour SO_2 NAAQS, and because the Rush Island monitors are part of the Jefferson County Nonattainment State Implementation Plan ("SIP"), the siting of these monitors should be subject to EPA approval as required for SLAMS.[16] Indeed, it is unclear why the 2015 Monitoring Network Plan does not formally propose these new monitors as SLAMS.

Ameren proposed the Labadie monitoring sites to DNR and then constructed and began operating them just before the 2015 Monitoring Network Plan was published.[17] DNR approved the Labadie monitoring sites without conducting an independent modeling analysis to determine whether they are located in areas where peak SO_2 concentrations are expected to occur, without

---

[10] *Id*. at 19-20.
[11] 2015 Monitoring Network Plan at 12.
[12] Clean Air Act § 110 (a)(2)(B), 42 U.S.C. § 7410(a)(2)(B); 40 CFR § 58.10.
[13] 2015 Monitoring Network Plan at 12-21.
[14] *Id*. at 22-23.
[15] EPA expects to publish the final Data Requirements Rule in October 2015. http://yosemite.epa.gov/opei/rulegate.nsf/byRIN/2060-AR19.
[16] 40 C.F.R. § 58.10(a)(2) and (e).
[17] DNR approved Ameren's proposed Labadie monitoring sites on May 1, 2015, and published the 2015 Monitoring Network Plan on June 12, 2015.

providing for public notice and comment, and without submitting the proposed monitor locations to EPA for its review and approval.

With respect to Rush Island, DNR submitted the Jefferson County Nonattainment SIP to EPA for review and approval on or about June 1. While it contained the requirement for Ameren to propose, build, and operate SO_2 monitoring sites at Rush Island, it did not identify the proposed Rush Island monitoring sites included in the 2015 Monitoring Network Plan published 11 days later on June 12, 2015.

Given DNR's stated intention to convert these monitors to SLAMS once EPA finalizes the proposed Data Requirements Rule – which it is expected to do in the next few months – the only salient difference between proposing them as SPMs rather than SLAMS in the 2015 Monitoring Network Plan is that EPA does not have to approve their locations. If DNR were to propose them as SLAMS in the 2015 Monitoring Network Plan or simply wait a few months and propose them as SLAMS after the final Data Requirements Rule is published, EPA *would* have to approve their locations. Proposing them as SPMs now when they will likely be converted to SLAMS in just a few months is suspect because, practically, it will be more difficult for EPA to object to the poor siting of the monitors and require that they be relocated after they are in operation.

The purpose of the NAAQS is to protect the public health.[18] Therefore, NAAQS compliance decisions must be based on properly-sited monitors designed to record maximum ambient SO_2 concentrations. Because one of the proposed new Labadie monitoring sites and two of the proposed new Rush Island monitoring sites are not located in areas of anticipated maximum ambient SO_2 concentrations (based on currently-available modeling), those monitors should be relocated – regardless of whether they are currently labeled SPMs or SLAMS. And EPA should notify DNR and Ameren that it will not accept data from those monitors for NAAQS compliance purposes unless they are appropriately relocated. Moreover, EPA should notify DNR and Ameren that it is premature to determine appropriate monitoring site locations for the Labadie plant until it completes an area designation for the plant.

III. Based On Currently-Available Modeling, Three Of The Five Proposed New Labadie And Rush Island Monitoring Sites Are Not Located In Areas Of Anticipated Maximum Ambient SO_2 Concentrations.

EPA regulations and guidance require ambient SO_2 monitors to be sited where peak concentrations are expected to occur.[19] With respect to source-oriented SO_2 monitoring, EPA guidance states:

> The primary objective is to place monitoring sites at the location or locations of expected peak concentrations.[20]

[18] Clean Air Act § 109(b)(1), 42 U.S.C. § 7409(b)(1).
[19] 40 C.F.R. Part 58, Appendix D, § 1.1.1(a), (c). See also U.S. EPA: OFFICE OF AIR AND RADIATION, OFFICE OF AIR QUALITY PLANNING AND STANDARDS, AIR QUALITY ASSESSMENT DIVISION, SO_2 NAAQS DESIGNATIONS SOURCE-ORIENTED MONITORING TECHNICAL ASSISTANCE DOCUMENT, Dec. 2013 ("SO_2 Monitoring TAD").
[20] SO_2 Monitoring TAD at 16.

Further, the Consent Agreement between DNR and Ameren that is included in both the Jefferson County SIP and the 2015 Monitoring Network Plan requires that the monitoring at Rush Island "represents ambient air quality in areas of maximum SO_2 impact from the Rush Island Energy Center."[21]

However, one of the two proposed new Labadie monitoring sites and two of the three proposed new Rush Island monitoring sites are not located in the areas where peak SO_2 concentrations are expected to occur based on Ameren's and DNR's modeling.

On behalf of the Sierra Club, we previously critiqued Ameren's proposed Labadie and Rush Island monitoring site locations in letters submitted to DNR. Those letters are attached as Exhibits 1 and 2 and hereby incorporated by reference.

A. Based On Currently-Available Modeling, One Of The Two Proposed New Labadie Monitoring Sites Should Be Relocated, And A Third Monitor Should Be Added Southeast of the Plant.

In our April 13, 2015 comments to DNR on Ameren's proposed new Labadie monitoring sites, attached as Exhibit 1, we demonstrated that one of the proposed sites – the Valley site – is not located in any of the areas where Ameren's modeling predicts peak SO_2 concentrations are expected to occur. Ameren's modeling identified three distinct areas where the highest SO_2 concentrations are expected to occur and where high concentrations are expected to occur most frequently. These areas are located northwest, northeast, and southeast of the plant and are shown in Figure 1 below. However, only one of the two proposed Labadie monitoring sites – the Northwest site – is located in one of these peak concentration areas (the one located northwest of the plant). The Valley site is located between the other two peak concentration areas, in an area where the modeled concentration is only about 80 percent of the maximum concentration predicted by the model. As a result, it is unlikely to capture maximum ambient SO_2 concentrations and should be relocated to the peak concentration area northeast of the plant.

In addition, DNR should also require the installation of a third monitor in the peak concentration area southeast of the plant lest anticipated maximum ambient SO_2 concentrations in this area – which are likely to have implications for NAAQS compliance – go undetected by the Labadie SO_2 monitoring network.

B. Two Of The Three Proposed New Rush Island Monitors Should Also Be Relocated.

In our May 29, 2015 comments to DNR on Ameren's proposed new Rush Island monitoring sites, attached as Exhibit 2, we demonstrated that all three of the proposed sites, but especially the Natchez and Weaver-AA sites, are located outside areas where Ameren's modeling predicts peak SO_2 concentrations are expected to occur. DNR has since performed an independent modeling evaluation of the proposed sites which follows EPA guidance more closely and is

[21] 2015 Monitoring Network Plan, Appendix 3, 2015 Ameren Missouri and Missouri Department of Natural Resources Consent Agreement, Appendix A, ¶ b, at 13 of 15.

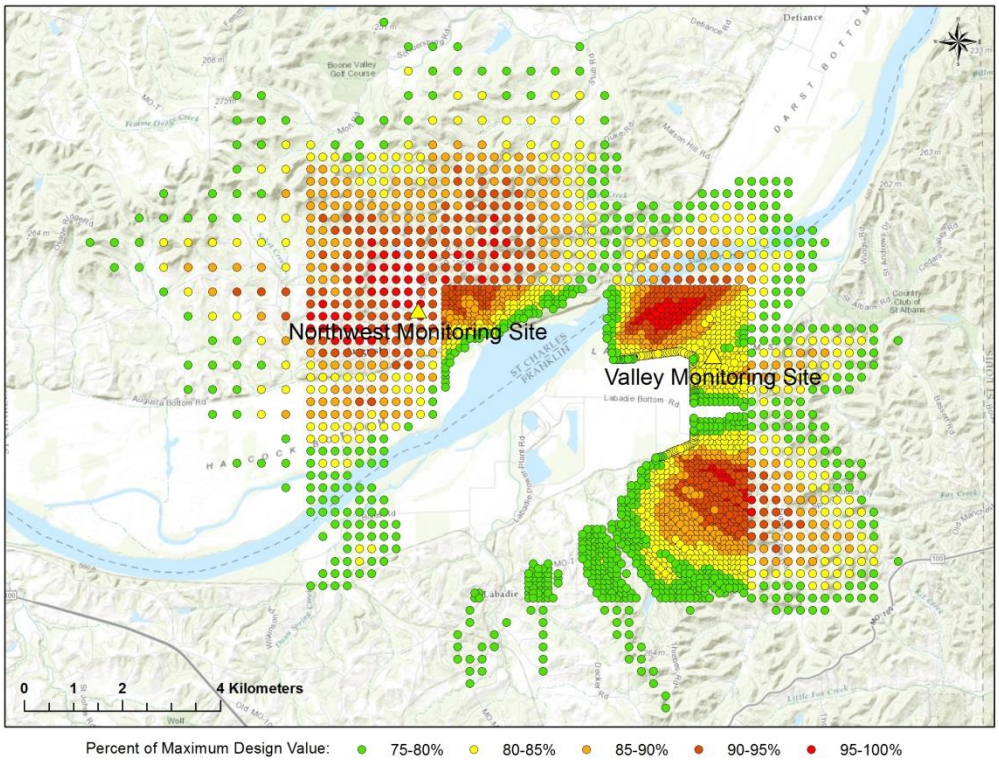


Figure 1. Modeled peak concentration areas near Ameren's Labadie plant.

therefore more reliable than Ameren's modeling. While DNR concluded that the proposed sites are properly located in areas where peak SO_2 concentrations are expected to occur, there is a significant flaw in DNR's analysis that, when corrected, confirms that the Natchez and Weaver-AA sites are located outside of peak concentration areas and should be relocated.

The stated purpose of DNR's evaluation of the proposed new Rush Island monitoring sites was to determine if the sites "will adequately represent Rush Island Energy Center's SO_2 air quality impact." DNR used hourly emission rates from EPA's Air Markets Program in its modeling as recommended in EPA's SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document whereas Ameren used constant emission rates.[22]

However, DNR's analysis of its modeling is based on a methodology that inherently biases the results. DNR used a telescoping receptor grid in its modeling; specifically, it used a 100-meter receptor spacing out to 1 kilometer, a 250-meter spacing out to 3.5 kilometers, a 500-meter spacing out to 10 kilometers, and a 1,000-meter spacing out to 50 kilometers. In order to identify areas where peak SO_2 concentrations are expected to occur, it plotted the predicted SO_2 design value at each receptor and drew polygons around high concentration areas by including all receptors with concentrations greater than 90 ug/m^3. This is shown in Figure 2 below. DNR then

[22] However, neither Ameren nor DNR included interactive sources as recommended by EPA guidance. See Exhibit 2 at 9.

counted the number of high concentration receptors (i.e., receptors with concentrations greater than 90 ug/m^3) in each polygon and ranked the polygons from highest to lowest in terms of the number of high concentration receptors they contained. The results of this analysis are summarized in Table 1 below.

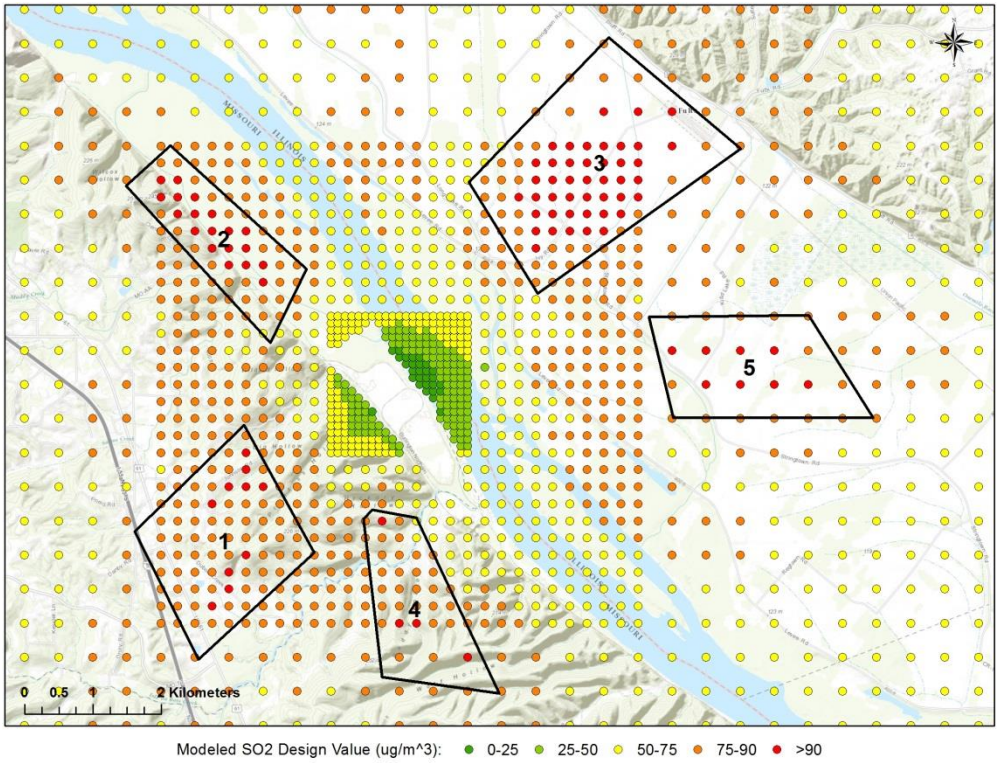


Figure 2. DNR model results and polygons drawn around high concentration areas.

Table 1. Number of high concentration receptors in DNR's polygons.

	Polygon 1	Polygon 2	Polygon 3	Polygon 4	Polygon 5
# of Receptors >90 ug/m^3	10	18	45	4	8
Ranking: 3>2>1>5>4					

Based on this analysis, DNR concluded that polygons 3 and 2, which contained the highest and second-highest number of high concentration receptors, represented "areas of maximum concentration" and were therefore "candidates for the location of SO_2 monitors."[23] It then determined, based on a qualitative analysis of wind speed and direction and the number of high

[23] 2015 Monitoring Network Plan, Appendix 5, Review of Proposed SO_2 and Meteorological Monitoring Stations Around Ameren Missouri's Rush Island Energy Center, at 4.

concentration receptors in the remaining three polygons (i.e., 1, 4 and 5), that polygon 1 was the best candidate of the remaining three for the location of a third SO_2 monitor. Based on these findings, DNR concluded that because the three new monitoring sites proposed by Ameren are located within polygons 1, 2 and 3, they are within areas where peak SO_2 concentrations are expected to occur and are therefore appropriately sited.

However, because DNR used a telescoping receptor grid, and because the polygons it drew to indicate areas of high concentration are located in a region where the receptor grid spacing varies from 250 to 500 meters, DNR's counts of high concentration receptors in each polygon and its subsequent ranking of the polygons based on those counts are significantly biased. Some of DNR's polygons are likely to have more high concentration receptors than others just by virtue of the fact that the receptors in those polygons are spaced more closely together than they are in other polygons. For example, almost all of the receptors in polygons 1 and 2 are spaced 250 meters apart, whereas all of the receptors in polygon 5 are spaced 500 meters apart. As a result there are many more receptors – including more high concentration receptors – in polygons 1 and 2 than in polygon 5 despite the fact that all three polygons are similar in size (polygon 5 is slightly larger than polygon 2 and slightly smaller than polygon 1).

One way to eliminate the counting bias resulting from DNR's use of a telescoping receptor grid is by ranking the polygons based on the percentage instead of the absolute number of high concentration receptors within each one. This effectively adjusts for the fact that certain polygons, e.g., polygons 1 and 2, are likely to have more high concentration receptors than others, e.g., polygon 5, just by virtue of the fact that the receptors in those polygons are spaced more closely together. The results of this analysis are summarized in Table 2 below. Polygon 3 is still ranked the highest. However, polygon 5 is ranked second-highest instead of polygon 2, which drops to third-highest – displacing polygon 1 from the top three.

Table 2. Percentage of high concentration receptors in DNR's polygons.

	Polygon 1	Polygon 2	Polygon 3	Polygon 4	Polygon 5
% of Receptors >90 ug/m^3	15	44	67	14	62
Ranking: 3>5>2>1>4					

A better way to eliminate the counting bias resulting from DNR's use of a telescoping receptor grid is to replace the telescoping grid with a uniform grid so the receptor spacing is the same in all five polygons. To determine how this would affect receptor counts and polygon ranks, we re-ran DNR's model using a uniform 250-meter receptor spacing and analyzed the results using DNR's methodology. The results are shown in Figure 3 below, and the number of high concentration receptors in each polygon and the ranking of polygons from highest to lowest in terms of the number of high concentration receptors they contain are summarized in Table 3 below. We also ranked the polygons based on the percentage instead of the absolute number of

high concentration receptors within each one. The results of this analysis are summarized in Table 4 below.

Figure 3. DNR model results for uniform 250-meter receptor grid.

Table 3. Number of high concentration receptors in DNR's polygons when modeled with a uniform receptor grid.

	Polygon 1	Polygon 2	Polygon 3	Polygon 4	Polygon 5
# of Receptors >90 ug/m^3	10	20	63	7	22
Ranking: 3>5>2>1>4					

Table 4. Percentage of high concentration receptors in DNR's polygons when modeled with a uniform receptor grid.

	Polygon 1	Polygon 2	Polygon 3	Polygon 4	Polygon 5
% of Receptors >90 ug/m^3	14	45	55	16	39
Ranking: 3>2>5>4>1					

When modeled with a uniform receptor grid, the three highest ranking polygons – both in terms of the number and percentage of high concentration receptors they contain – are 2, 3 and 5, **not** 1, 2 and 3 as DNR's flawed analysis concluded. These are the areas predicted to have the highest modeled impacts and thus where SO_2 monitoring sites should be located. An analysis of the top 10, 25, and 50 receptors supports this conclusion. All but one of the top 10 receptors are located within polygon 3, all but one of the top 25 receptors are located within polygons 2 and 3, and all but one of the top 50 receptors are located within polygons 2, 3 and 5. This is shown in Figure 4 below, which includes a filled contour plot of modeled design values that clearly shows how much larger the peak concentration areas are in polygons 2, 3 and 5 compared to the other polygons.

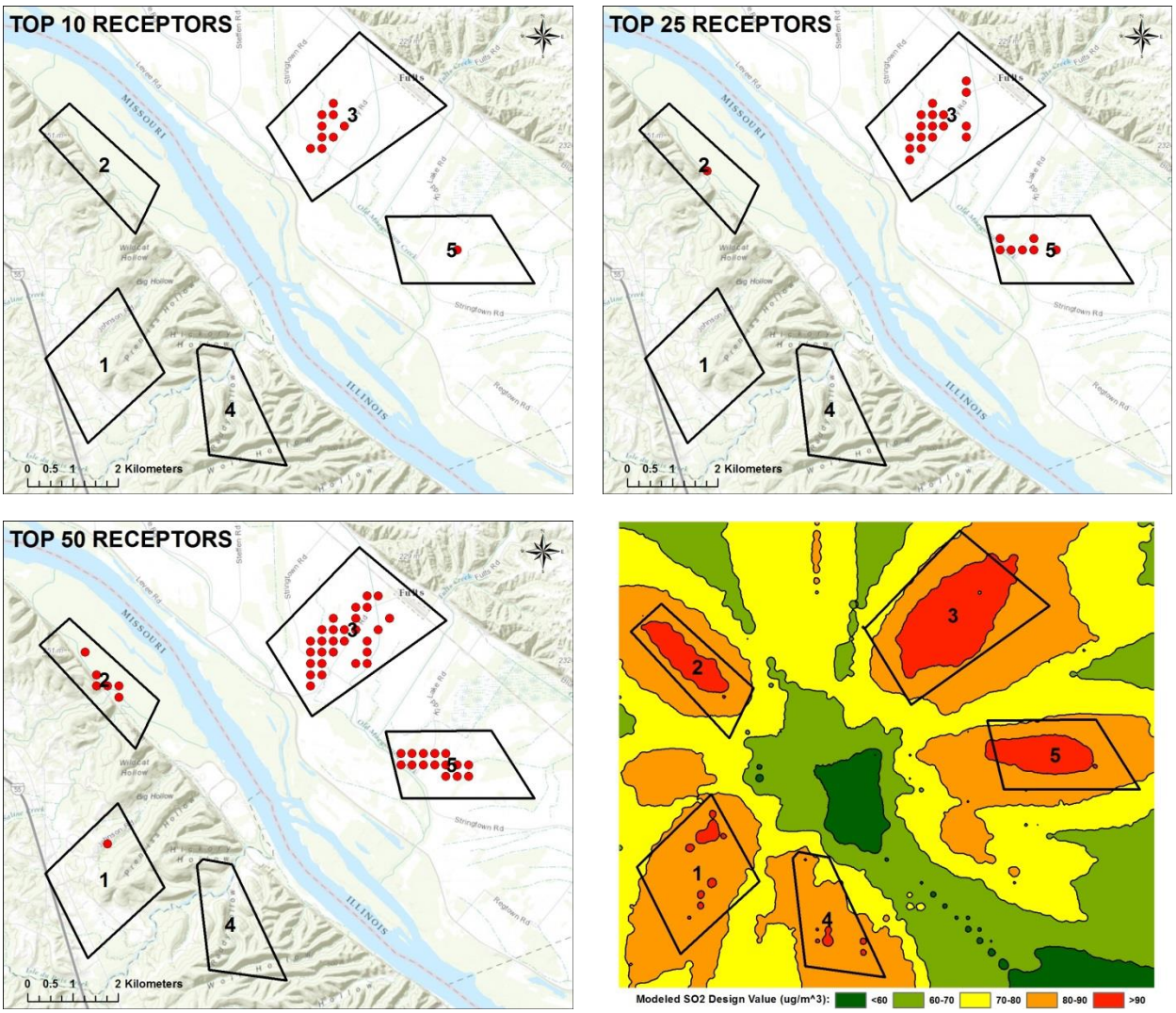


Figure 4. Top 10, 25 and 50 receptors and filled contour plot of modeled design values.

The locations of Ameren's proposed SO_2 monitoring sites – dubbed Fults, Natchez and Weaver-AA – relative to DNR's polygons are shown in Figure 5 below. Of the three proposed sites, only the Fults site, which is inside the peak concentration area within polygon 3, is properly located. The Weaver-AA site, which Figure 2 of Monitoring Network Plan Appendix 5 incorrectly shows being within polygon 2, is actually located outside of it based on the site coordinates provided in Plan Appendix 1. Hence it is not properly located. Nor is the Natchez site, which should be located within polygon 5 instead of polygon 1 because polygon 5 has higher modeled impacts.

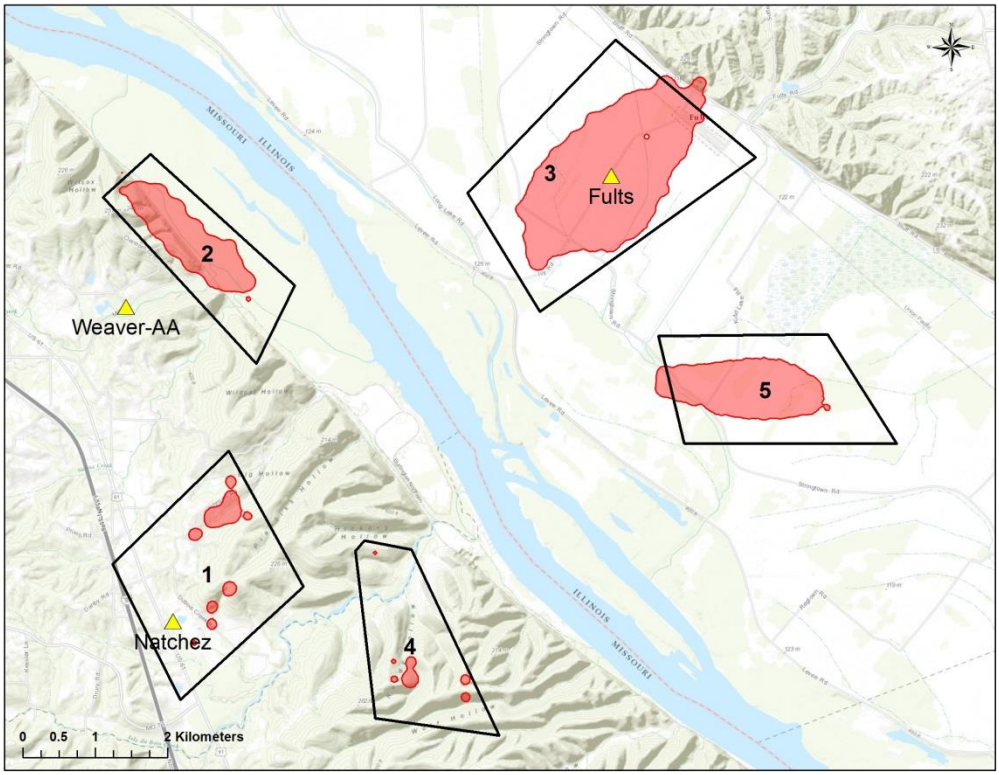


Figure 5. Ameren's proposed SO_2 monitoring sites relative to DNR's polygons. Peak concentration areas (>90 ug/m^3) are shaded red.

Because they are not properly located, neither the Natchez nor Weaver-AA monitoring sites will adequately represent Rush Island's SO_2 air quality impact. Therefore, both sites should be relocated. The Weaver-AA site should be located inside the peak concentration area within polygon 2 and the Natchez site should be located inside the peak concentration area within polygon 5 as shown in Figure 6 below. Alternatively, the Natchez site could be moved inside the peak concentration area within polygon 1 and a fourth monitor added inside the peak concentration area within polygon 5 as shown in Figure 7 below. The recommended monitor locations shown in Figures 6 and 7 are easily accessible and appear to meet EPA siting criteria and have ready access to power.

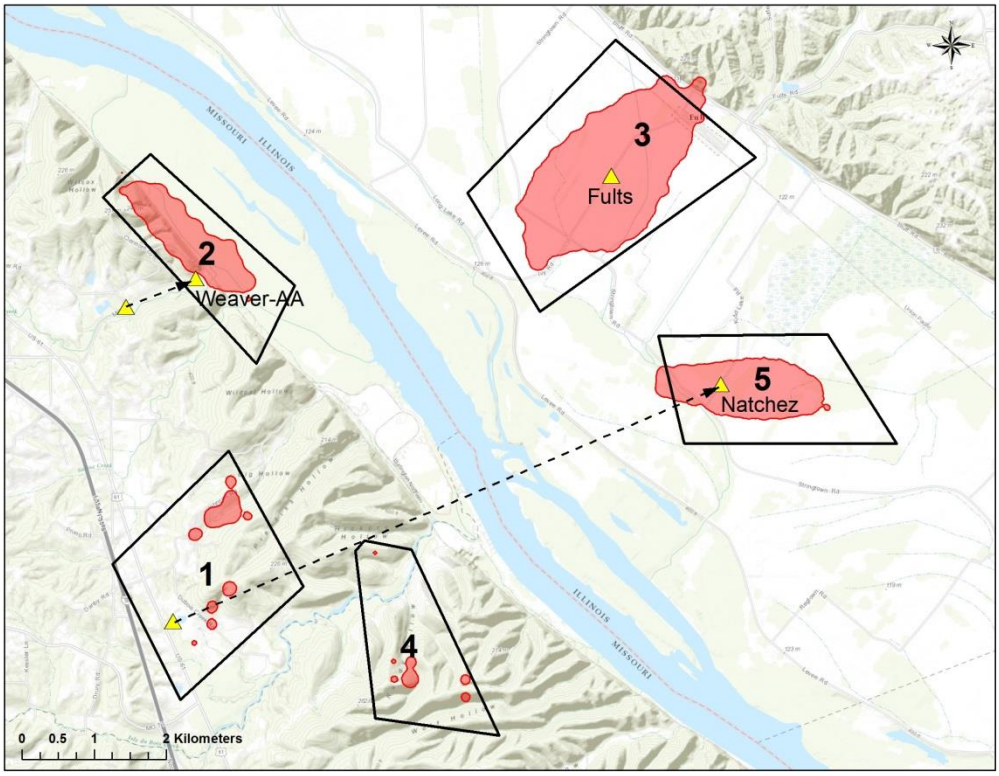


Figure 6. Appropriately located Rush Island monitors (three monitor configuration).

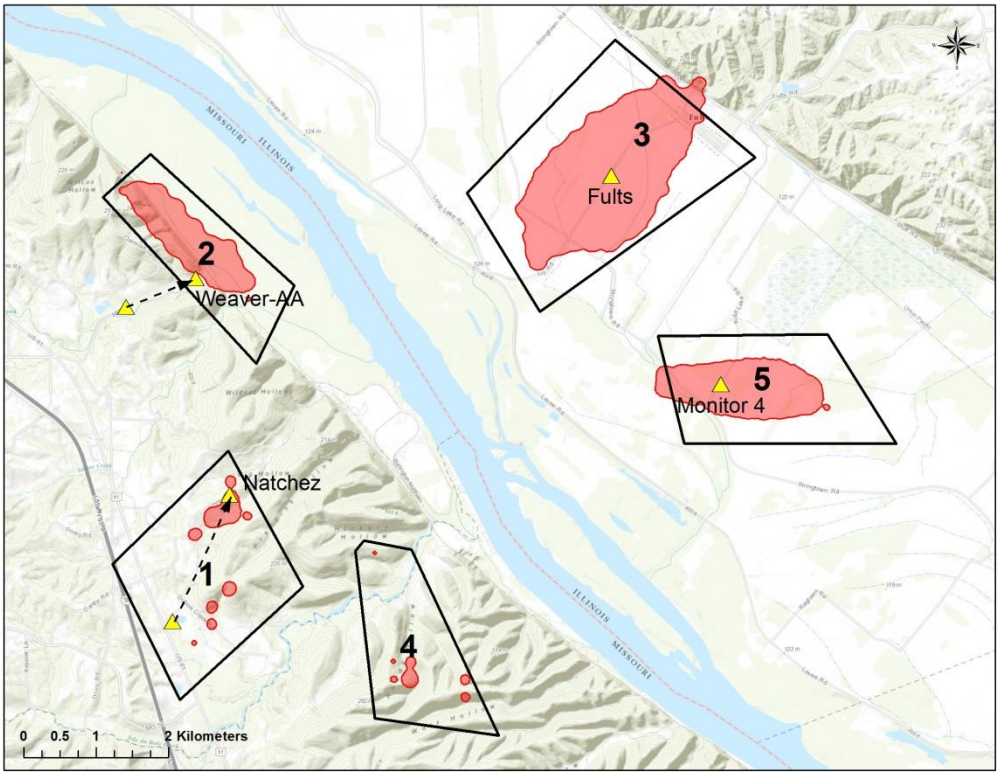


Figure 7. Appropriately located Rush Island monitors (four monitor configuration).

IV. Conclusion

For the reasons set forth above, DNR should withdraw the proposed Labadie SO_2 monitoring sites and EPA should not approve the 2015 Monitoring Network Plan with the inclusion of such sites pending the completion of the Labadie area designation process and the performance of appropriate modeling to determine the areas of peak ambient SO_2 concentrations around the plant using current EPA guidance. With respect to the Rush Island monitoring sites in the 2015 Monitoring Network Plan (and the Labadie monitoring sites if DNR does not withdraw them), DNR should not submit the plan to EPA, and EPA should not approve it, unless and until the proposed monitoring sites are relocated to areas of expected peak ambient SO_2 concentrations.

Sincerely yours,

Maxine I. Lipeles, Co-Director
Kenneth Miller, P.G., Environmental Scientist
Interdisciplinary Environmental Clinic
Washington University School of Law
One Brookings Drive – CB 1120
St. Louis, MO 63130
314-935-5837 (phone); 314-935-5171 (fax)
milipele@wustl.edu

Attorneys for the Sierra Club

Cc: Rebecca Weber, Director, Air & Waste Management Division, EPA Region 7
Josh Tapp, Chief, Air Planning & Development Branch, EPA Region 7
Kyra Moore, Director, Air Pollution Control Program, DNR
Wendy Vit, Chief, Air Quality Planning Section, Air Pollution Control Program, DNR

Washington University in St. Louis
SCHOOL OF LAW

Interdisciplinary Environmental Clinic

April 13, 2015

Ms. Patricia Maliro
Chief, Air Quality Monitoring Unit
Air Pollution Control Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176
Via email to patricia.maliro@dnr.mo.gov

Re: Comments on Ameren Missouri's Labadie Sulfur Reduction Project Quality Assurance Project Plan

Dear Ms. Maliro:

On behalf of the Sierra Club, we submit the following comments on Ameren Missouri's Labadie Sulfur Reduction Project Quality Assurance Project Plan (QAPP). The QAPP describes the methodology Ameren used to determine the locations of two proposed ambient sulfur dioxide (SO_2) monitoring stations around its Labadie Energy Center in connection with the 1-hour SO_2 National Ambient Air Quality Standard (NAAQS). We believe the QAPP should be disapproved because the proposed monitoring stations are improperly sited; they are outside areas where peak 1-hour SO_2 concentrations are expected to occur based on the modeling described in the QAPP. Furthermore, the modeling described in the QAPP does not comport with EPA guidance on characterizing ambient air quality in areas around or impacted by significant SO_2 emission sources such as the Labadie Energy Center and therefore may have failed to correctly identify areas of expected ambient, ground-level SO_2 concentration maxima.

I. Based on the Modeling Described in the QAPP, the Proposed Monitoring Stations are Improperly Sited Outside Areas Where Peak 1-Hour SO_2 Concentrations are Expected to Occur

Appendix 10 of the QAPP describes the modeling performed to determine the locations of the proposed ambient SO_2 monitoring stations around the Labadie Energy Center. The modeling was used to determine locations where peak 1-hour SO_2 concentrations are expected to occur due to the plant's SO_2 emissions given that the primary objective of source-oriented monitoring is to identify peak SO_2 concentrations in ambient air that are attributable to an identified emission source or group of sources.[1] Figure 1 shows all receptors with modeled design values greater than or equal to 75 percent of the maximum modeled design value. Figure 2 shows the receptors with the top 200, 100, 25, and 10 modeled design values.

[1] U.S. EPA, SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, at 2.

Campus Box 1120, One Brookings Drive, St. Louis, MO 63130-4899
(314) 935-7238, FAX: (314) 935-5171; www.law.wustl.edu

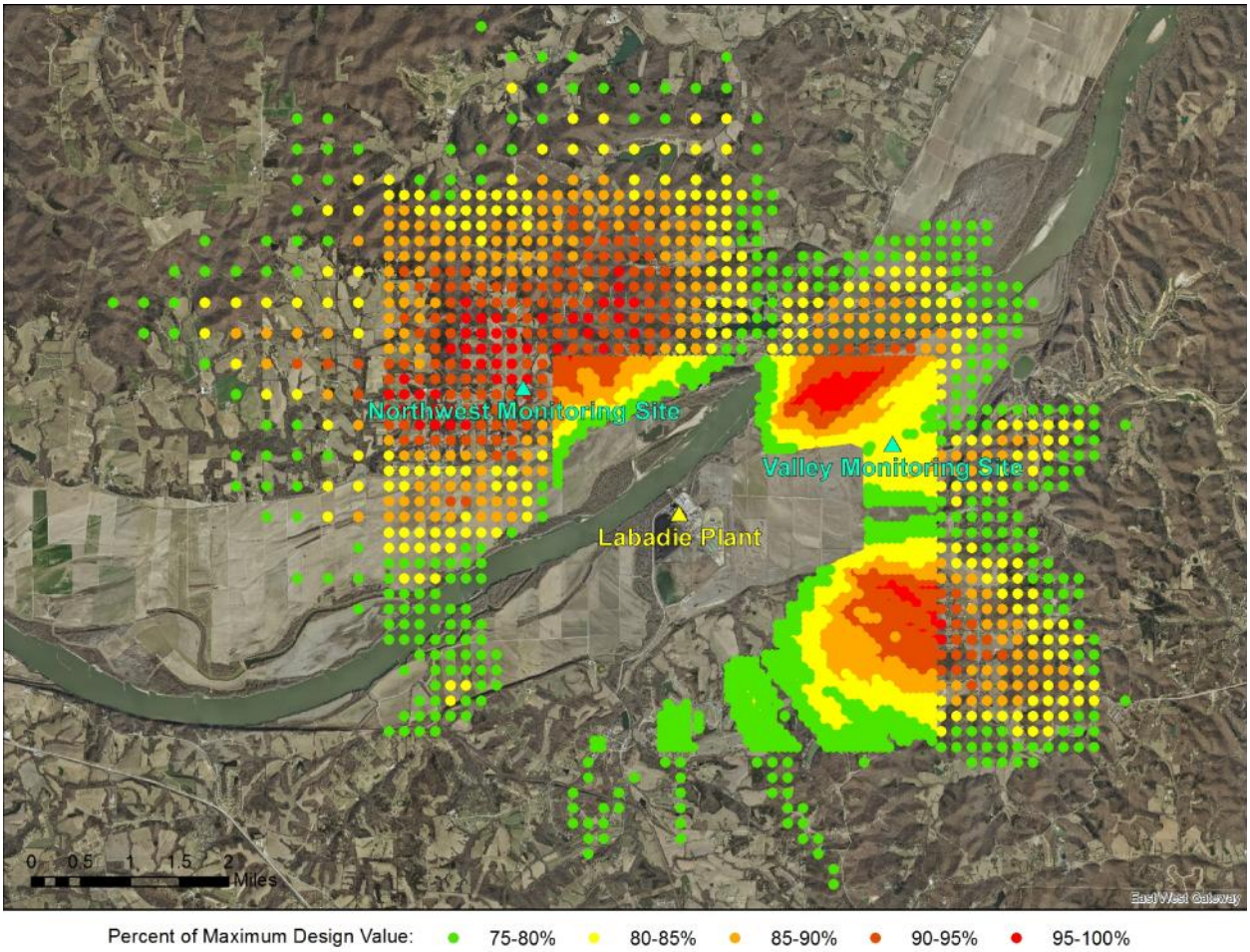


Figure 1. Receptors with modeled design values ≥75 percent of the maximum design value.

The modeling was also used to determine locations where elevated SO_2 concentrations are expected to occur most frequently given that the site selection process also needs to account for the frequency with which an area sees the daily maximum concentration.[2] Normally this involves counting the number of times each receptor sees the daily maximum 1-hour SO_2 concentration predicted by the model. However, the QAPP looks at it differently, counting instead the number of times the daily maximum 1-hour SO_2 concentration at each receptor exceeds 75 percent of the maximum modeled design value. Figure 3, which is reproduced from the QAPP,[3] shows the number of daily maximum 1-hour SO_2 concentrations at each receptor that exceed 75 percent of the maximum modeled design value.

[2] *Id.* at A-6.

[3] See Appendix 10, Figure 6, "Counts of Max Daily 1-Hour Concentrations Greater Than 75% of the Max Modeled Design Value* (Years 2005-2009)."

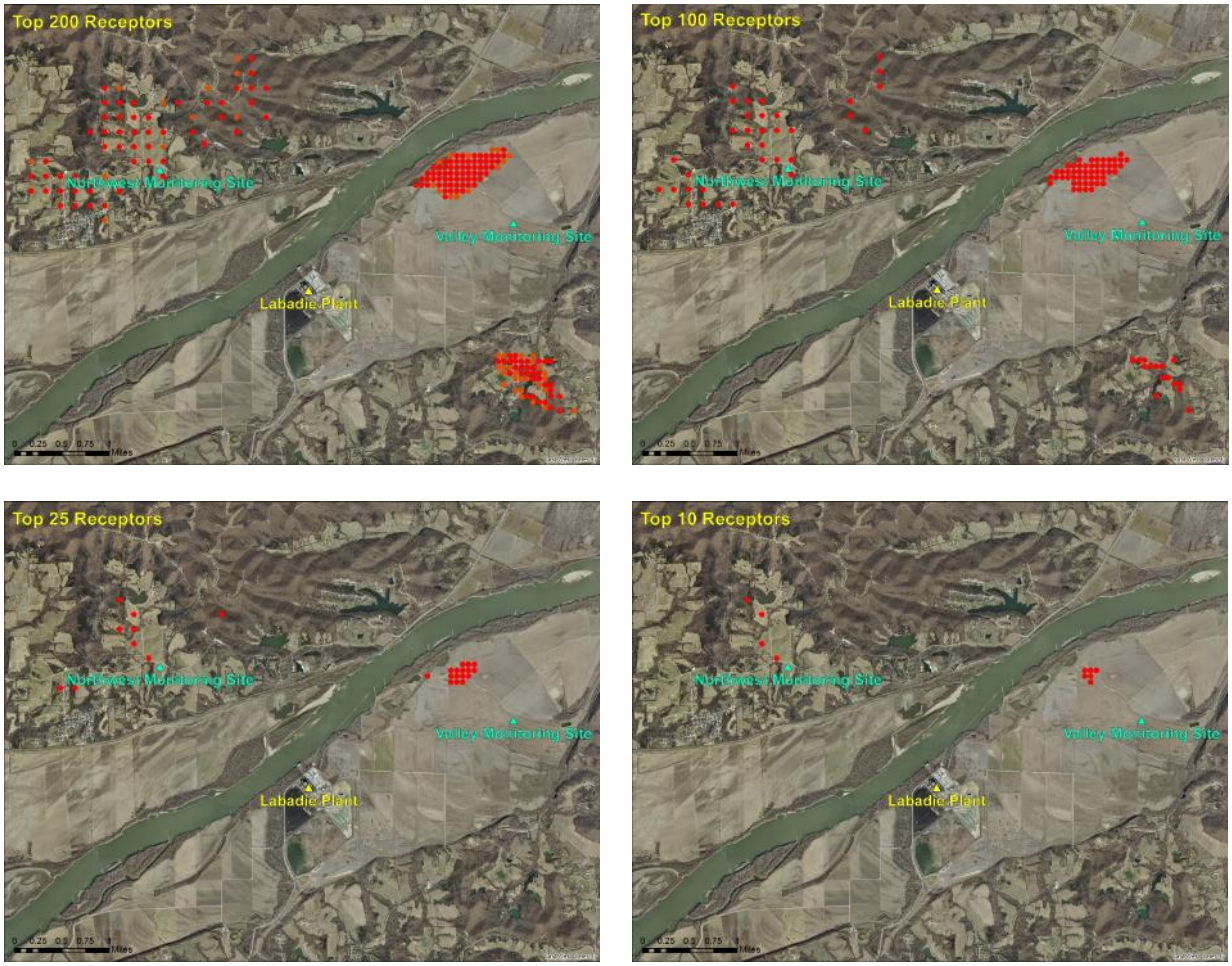


Figure 2. Receptors with the top 200, 100, 25, and 10 modeled design values.

Figures 1 and 2 reveal three distinct areas where modeled design values are in excess of 95 percent of the maximum modeled design value and where the majority of the top 200 receptors (and all of the top 100, 25 and 10 receptors) lie. These areas, located northwest, northeast, and southeast of the Labadie Energy Center, are where the modeling predicts peak 1-hour SO_2 concentrations are expected to occur. Furthermore, although a rigorous comparison is not possible without detailed receptor data, a simple visual comparison of Figures 1 and 3 indicates that the areas where peak 1-hour SO_2 concentrations are expected to occur (i.e., where modeled design values are in excess of 95 percent of the maximum modeled design value) overlap with the areas where daily maximum 1-hour SO_2 concentrations most frequently exceed 75 percent of the maximum modeled design value. Monitoring stations located in these areas would have the greatest chance of identifying peak SO_2 concentrations in ambient air, which is the primary objective of source-oriented monitoring and an absolute necessity when monitoring to assess compliance with the NAAQS.

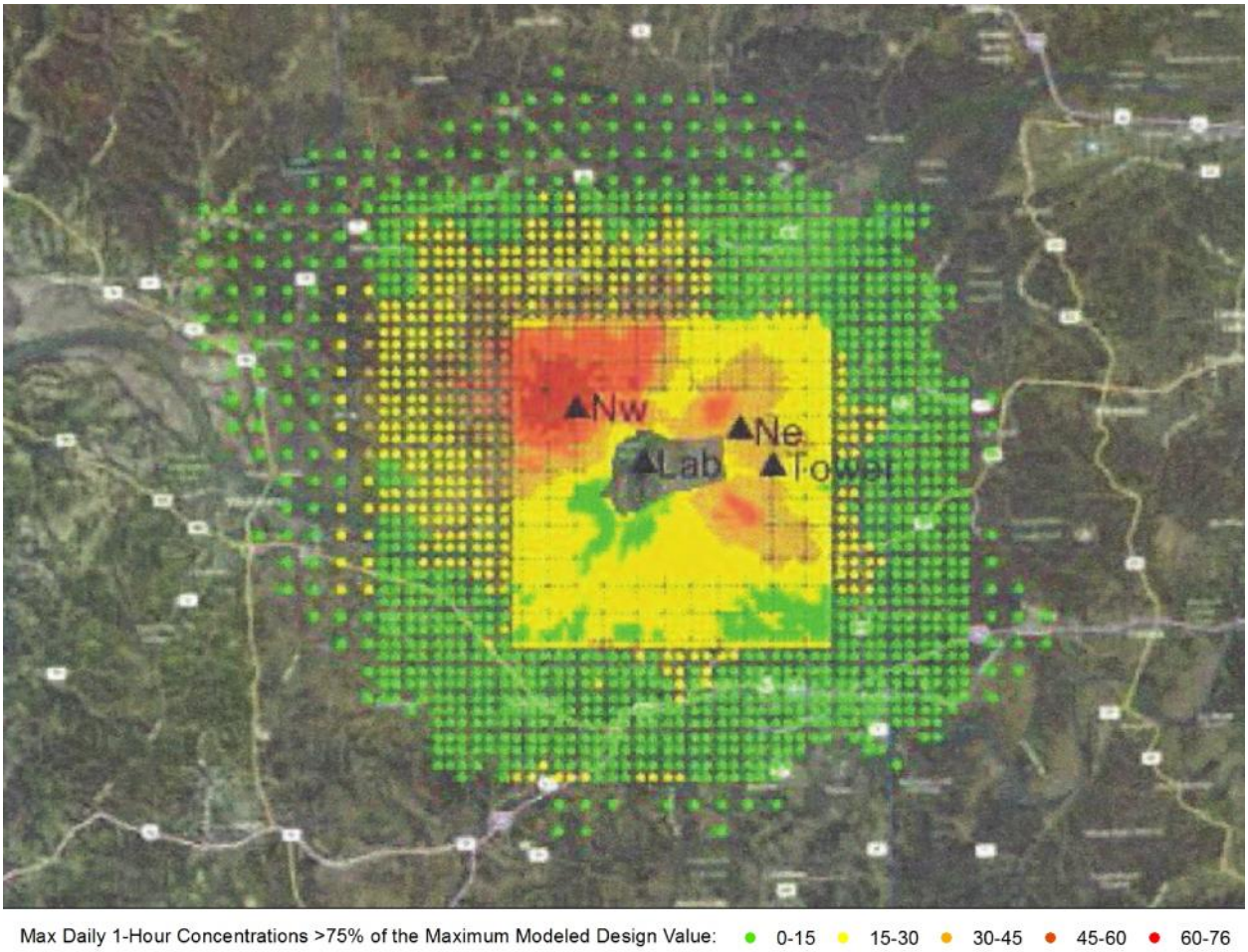


Figure 3. Number of maximum daily 1-hour SO_2 concentrations at each receptor that exceed 75 percent of the maximum modeled design value.

However, only one of Ameren's proposed monitoring sites, the northwest site, is located in one of the three peak concentration/high frequency areas predicted by the modeling (the one located northwest of the plant). No monitoring sites are proposed in the peak concentration/high frequency areas located northeast or southeast of the plant. Instead, Ameren's only other proposed monitoring site, the valley site, is located in an area where modeled design values are only about 80 percent of the maximum modeled design value and where daily maximum 1-hour SO_2 concentrations exceed 75 percent of the maximum modeled design value about half as often as they do in areas where this occurs with the greatest frequency. This makes the valley site an inappropriate site for a monitor to assess compliance with the NAAQS. Ameren's modeling predicts that ambient SO_2 concentrations will be as much as 25 percent higher in several areas around the plant than they will be at the valley site, meaning a monitoring station at the valley site could be in compliance with the NAAQS while significant violations were occurring nearby.

The QAPP states that a monitor could not be sited in the peak concentration/high frequency area northeast of the plant because it is an actively farmed area, physical access is almost impossible

without building additional infrastructure, and electric power is not available. These justifications do not stand up to the barest scrutiny. The entire Labadie Bottoms is an actively farmed area, accessible only by unimproved roads that severely limit vehicular access during wet weather conditions. As such, the proposed valley monitoring site is no more accessible than a site within the peak concentration/high frequency area northeast of the plant would be, and additional road infrastructure will likely be necessary for all-weather access regardless of where in the Labadie Bottoms the monitor is located.[4] Furthermore, electric power is not available anywhere within the Labadie Bottoms, including at the proposed valley monitoring site. Therefore, distribution infrastructure will have to be built to deliver power to any monitoring site in the Labadie Bottoms regardless of where it is located. The St. Albans Water and Sewer Authority/Franklin County PWSD #3 wastewater treatment facility, located approximately 1 kilometer east of the proposed valley monitoring site, appears to be the closest available source of electric power for monitoring sites in the Labadie Bottoms, and only a minimal amount of additional line would be necessary to deliver power to a monitor located in the peak concentration/high frequency area northeast of the plant compared to one located at the proposed valley monitoring site.

The QAPP's justification for not siting a monitor in the peak concentration/high frequency area southeast of the plant is equally flimsy. The QAPP states that the primary reason a monitor is not proposed in that area – despite the model predicting high design values and a high number of daily maximum 1-hour SO_2 concentrations in excess of 75 percent of the maximum modeled design value in that area – is because the elevated terrain there is similar to the terrain at the proposed northwest monitoring site and it was believed an additional elevated terrain site was not necessary. However, AERMOD accounts for terrain influences when calculating modeled design values, and variations in meteorological parameters, most notably wind direction, often result in peak 1-hour SO_2 concentrations occurring in different areas that have similar terrain (e.g., areas in different cardinal directions from the source). Therefore, the peak concentration/high frequency area southeast of the plant cannot be ignored simply because the terrain there is similar to the terrain in the peak concentration/high frequency area northwest of the plant. The purpose of an ambient SO_2 monitoring network is not to monitor different terrain types, but to monitor areas where peak 1-hour SO_2 concentrations are expected to occur regardless of the terrain in those areas. The QAPP also suggests that the high concentrations and frequencies predicted by the model southeast of plant are merely an artifact of the Jefferson City, MO Airport meteorology, which is influenced by the local orientation of the Missouri River valley at that met station. However, the wind roses provided in the QAPP for a number of met stations in eastern Missouri that are closer to Labadie, which the QAPP states better reflect the expected meteorology at Labadie, all show significant winds from the north or northwest, which is consistent with an area of peak concentration/high frequency southeast of the plant.

[4] The peak concentration/high frequency area northeast of the plant is arguably more accessible than the proposed valley monitoring site given its proximity to the agricultural levee adjacent to the south bank of the Missouri River. The road on the crest of this levee is higher and most likely drier than other unimproved roads in the Labadie Bottoms, including those roads leading to the proposed valley monitoring site.

II. The Modeling Described in the QAPP Does Not Comport With EPA's Source-Oriented SO_2 Monitoring Guidance and Therefore May Not Correctly Identify Areas of Expected Ambient, Ground-Level SO_2 Concentration Maxima

EPA's SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document (TAD) provides guidance on how to "appropriately and sufficiently monitor ambient air in areas proximate to or impacted by an SO_2 emissions source to create ambient monitoring data for comparison to the SO_2 NAAQS" and presents "recommended steps to aid in identifying source-oriented SO_2 monitor sites."[5] The modeling described in the QAPP fails to adhere to the TAD in one critical respect: it does not use hourly emission rates, which are readily available for Labadie's boilers from EPA's online Air Markets Program Data tool. Instead it uses constant emission rates, which the QAPP states were "selected to produce rational ambient levels to be used for establishing monitoring locations and does not reflect actual emissions." The consequence of using constant rather than hourly emission rates is that the effects of the interaction between hourly emissions and hourly variations in meteorological parameters is ignored completely, so that the predicted areas of peak concentration and/or high frequency are primarily a function of the meteorology used. For example, if peak hourly emissions coincide with times when strong winds blow from a direction other than the prevailing wind direction, a model that uses hourly emission rates might predict high concentrations in different areas than the same model would predict using constant emission rates. Therefore, using hourly emissions allows the areas where peak 1-hour SO_2 concentrations are expected to occur to be determined with greater confidence.

III. DNR Should Not Deprive The Public and EPA of an Opportunity to Participate in the Monitoring Site Selection Process.

While the area around the Labadie plant will necessarily be evaluated for nonattainment designation purposes based on modeling in order to meet the July 2016 deadline set by *Sierra Club et al. v. McCarthy*, Civil Action No. 3:13–cv–3953–SI (N.D. Cal., March 2, 2015), it is difficult to imagine why DNR and Ameren would agree to install monitoring sites near the Labadie plant unless they expect to consider using the results for future NAAQS compliance evaluations. Monitoring sites used for such purposes must be included in the state's monitoring network plan, which must be proposed by DNR after public notice and the opportunity for public comment, and submitted to EPA for its review and approval. 40 CFR § 58.10.

Contrary to these requirements, DNR has been working with Ameren to select the Labadie monitoring sites and allow Ameren to commence monitoring at these inappropriate locations without public notice and opportunity for public comment, and without submitting the plans to EPA for its review and approval. Documents obtained recently from DNR suggest that Ameren is already preparing to construct the monitoring sites identified in the Labadie QAPP. In addition, the Consent Agreement attached as Appendix J to the proposed Jefferson County State Implementation Plan requires Ameren to submit "final network site recommendations" to DNR regarding the Rush Island plant by May 1, 2015, with equipment to be installed and calibrated by

[5] U.S. EPA, SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, at 2.

December 31, 2015 – with no provisions for public comment or for EPA review and approval. Unlike Labadie, where Ameren has provided documentation to DNR as to its (flawed) basis for monitoring site selection, Ameren appears to be developing its "final network site recommendations" for Rush Island without the prior submission to DNR of modeling data to support the site selection.[6]

DNR should not approve monitoring locations for the Labadie or Rush Island plants without first providing public notice and opportunity for comment, and without submitting the proposed locations to EPA for its review and approval.

Conclusion

Based on the modeling described in the QAPP, Ameren's proposed valley monitoring site is improperly located in an area where peak 1-hour SO_2 concentrations are **not** expected to occur. Furthermore, Ameren has failed to propose monitoring sites in peak concentration/high frequency areas located northeast and southeast of the Labadie Energy Center, citing justifications that don't withstand the barest scrutiny, despite the facts that there are numerous private residences within the peak concentration/high frequency area southeast of the plant and the peak concentration/high frequency area northeast of the plant is situated between the nearby communities of St. Albans and Augusta Shores. Therefore, we urge DNR to disapprove the QAPP and require Ameren to make the following changes:

1) Relocate the proposed valley monitoring site to the peak concentration/high frequency area northeast of the plant; and
2) Add a third monitoring site in the peak concentration/high frequency area southeast of the plant.

We also urge DNR to require Ameren to rerun the air dispersion model described in the QAPP using hourly emission rates in order to determine whether the model correctly identified the areas of expected ambient, ground-level SO_2 concentration maxima around the plant and to require a wholesale reevaluation of potential monitoring sites if the model used for the QAPP failed to correctly identify such areas.

Finally, we urge DNR to provide public notice and opportunity for comment, and to submit the proposed monitoring locations to EPA for its review and approval, in accordance with 40 CFR Part 58.

[6] On behalf of the Sierra Club, the Clinic has submitted Sunshine Law requests for documents related to possible SO_2 monitoring at Labadie and Rush Island. The most recent request to which DNR has responded (submitted on February 19, 2015, with responsive documents provided April 2, 2015), requested: "All documents regarding the possible installation of SO_2 monitors at the Labadie and/or Rush Island power plants, including but not limited to Quality Assurance Project Plans and all related documents, and all AERMOD input and output files used in any modeling analysis performed to determine the locations of any proposed SO_2 monitoring sites." As of DNR's latest response (April 2, 2015), it has not provided any documents discussing or attempting to justify the selection of possible modeling sites at the Rush Island plant.

Respectfully submitted,

Interdisciplinary Environmental Clinic
Washington University School of Law
Maxine I. Lipeles, J.D.
Ken Miller, P.G.*
Alexander Chang, Mo.Sup.Ct.R.13 certified law student
Danelle Gagliardi, Mo.Sup.Ct.R.13 certified law student

On behalf of the Sierra Club

Cc: Rebecca Weber, Director, Air & Waste Management Division, EPA Region 7
Josh Tapp, Chief, Air Planning & Development Branch, EPA Region 7
Kyra Moore, Director, Air Pollution Control Program, DNR
Wendy Vit, Chief, Air Quality Planning Section, Air Pollution Control Program, DNR

*Engineering student Xiaodi "Daniel" Sun also participated in the preparation of this letter

Washington University in St. Louis
SCHOOL OF LAW

Interdisciplinary Environmental Clinic

May 29, 2015

Ms. Patricia Maliro
Chief, Air Quality Monitoring Unit
Air Pollution Control Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176
Via email to patricia.maliro@dnr.mo.gov

Re: Comments on Ameren Missouri's Analysis of SO_2 and Meteorological Monitoring Stations Around Its Rush Island Energy Center

Dear Ms. Maliro:

On behalf of the Sierra Club, we submit the following comments on the report by Ameren Missouri titled Analysis of SO_2 and Meteorological Monitoring Stations Around Ameren Missouri's Rush Island Energy Center (Ameren's Monitoring Stations Analysis), which it submitted to DNR on or about April 29, 2015. The report describes the methodology Ameren used to determine the locations of three proposed ambient SO_2 monitoring stations and one meteorological monitoring station around its Rush Island Energy Center in Jefferson County, Missouri. Pursuant to a March 23, 2015 Consent Agreement with DNR, Ameren is required to install and begin operation of an SO_2 monitoring network around the Rush Island plant on or before December 31, 2015.

We believe Ameren's proposed monitoring sites should be rejected because they are located outside areas where peak 1-hour SO_2 concentrations are expected to occur based on the modeling described in Ameren's report. Furthermore, the modeling described in the report does not comport with EPA guidance on characterizing ambient air quality in areas around or impacted by significant SO_2 emission sources such as the Rush Island Energy Center and therefore may have failed to correctly identify areas of expected ambient, ground-level SO_2 concentration maxima. We also have concerns regarding the appropriateness of the meteorological data used in the modeling.

I. Based on the Modeling Described in Ameren's Report, the Proposed Monitoring Sites are Located Outside Areas Where Peak 1-Hour SO_2 Concentrations are Expected to Occur

The Consent Agreement (Appendix 1, ¶b) requires that "the number and location of SO_2 monitors and meteorological station(s) shall ensure that the approved SO_2 monitoring network represents ambient air quality in areas of maximum SO_2 impact from the Rush Island Energy Center." Ameren's Monitoring Stations Analysis (p. 3) describes the modeling it performed to

Campus Box 1120, One Brookings Drive, St. Louis, MO 63130-4899
(314) 935-7238, FAX: (314) 935-5171; www.law.wustl.edu

"delineate areas where maximum concentrations are expected to occur for this type of source and thus where SO_2 monitoring systems should be placed."

Unfortunately, the monitoring sites proposed by Ameren are not, in fact, located in "areas of maximum SO_2 impact from the Rush Island Energy Center," as required by the Consent Agreement.

Figures 1 through 4 below show the results of Ameren's modeling, which we derived using model input files provided by DNR. Figure 1 shows modeled SO_2 design values in the vicinity of the plant; Figure 2 shows receptors with modeled design values greater than or equal to 75 percent of the maximum modeled design value (146.1 ug/m^3); Figure 3 shows the number of times the model-derived maximum daily 1-hour concentration exceeded 75 percent of the maximum modeled design value at each receptor; and Figure 4 shows the receptors with the top 200, 100, 25, and 10 modeled design values. The locations of the plant and the proposed Fults, Natchez, and Weaver-AA SO_2 monitoring stations and the proposed Tall Tower meteorological monitoring station are shown on all figures for reference.

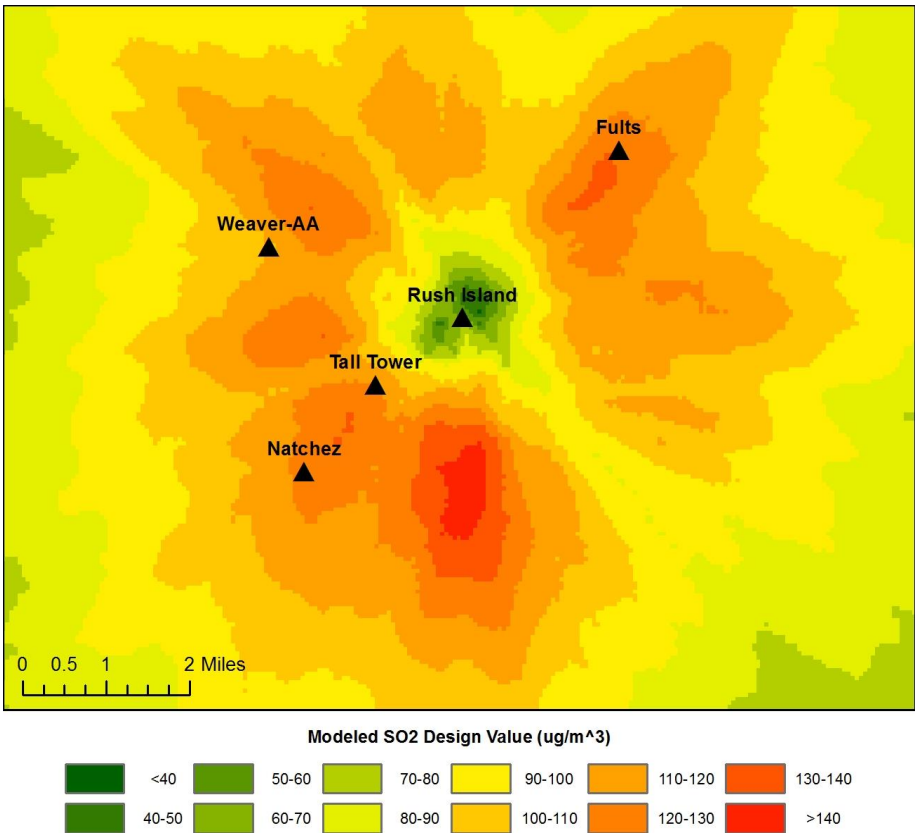


Figure 1. Modeled SO_2 design values in the vicinity of the Rush Island Energy Center.

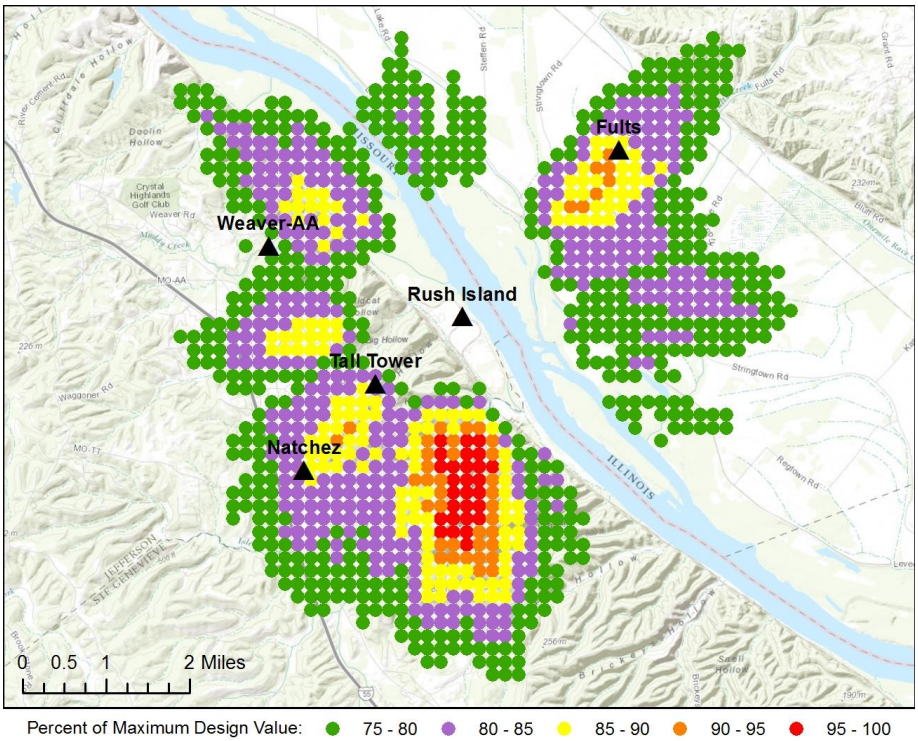


Figure 2. Receptors with modeled design values ≥75 percent of the maximum modeled design value.

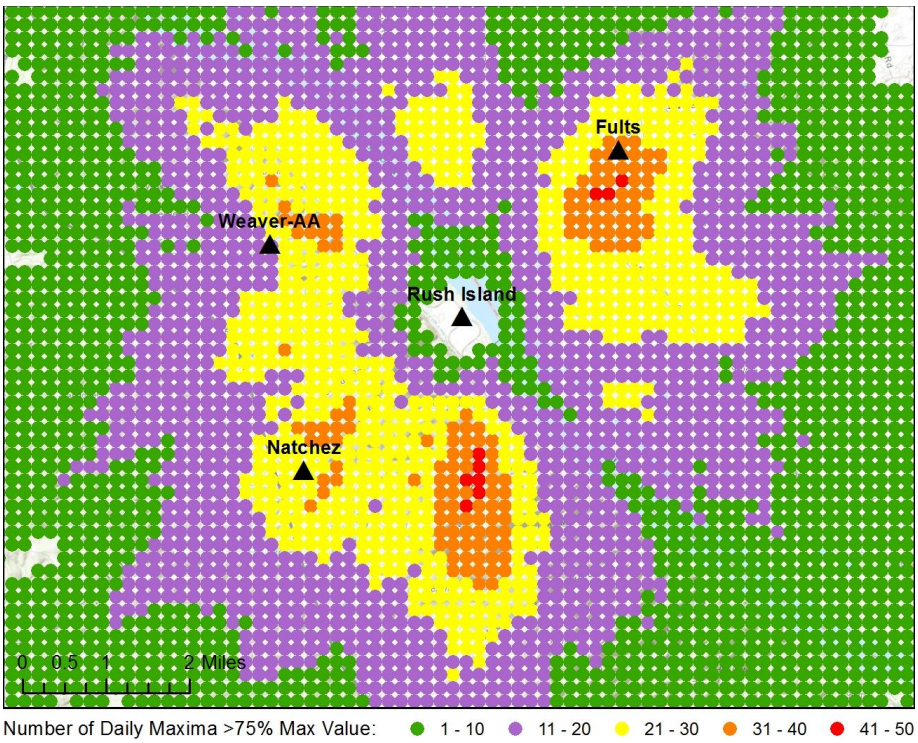


Figure 3. Number of maximum daily 1-hour concentrations ≥75 percent of the maximum modeled design value.

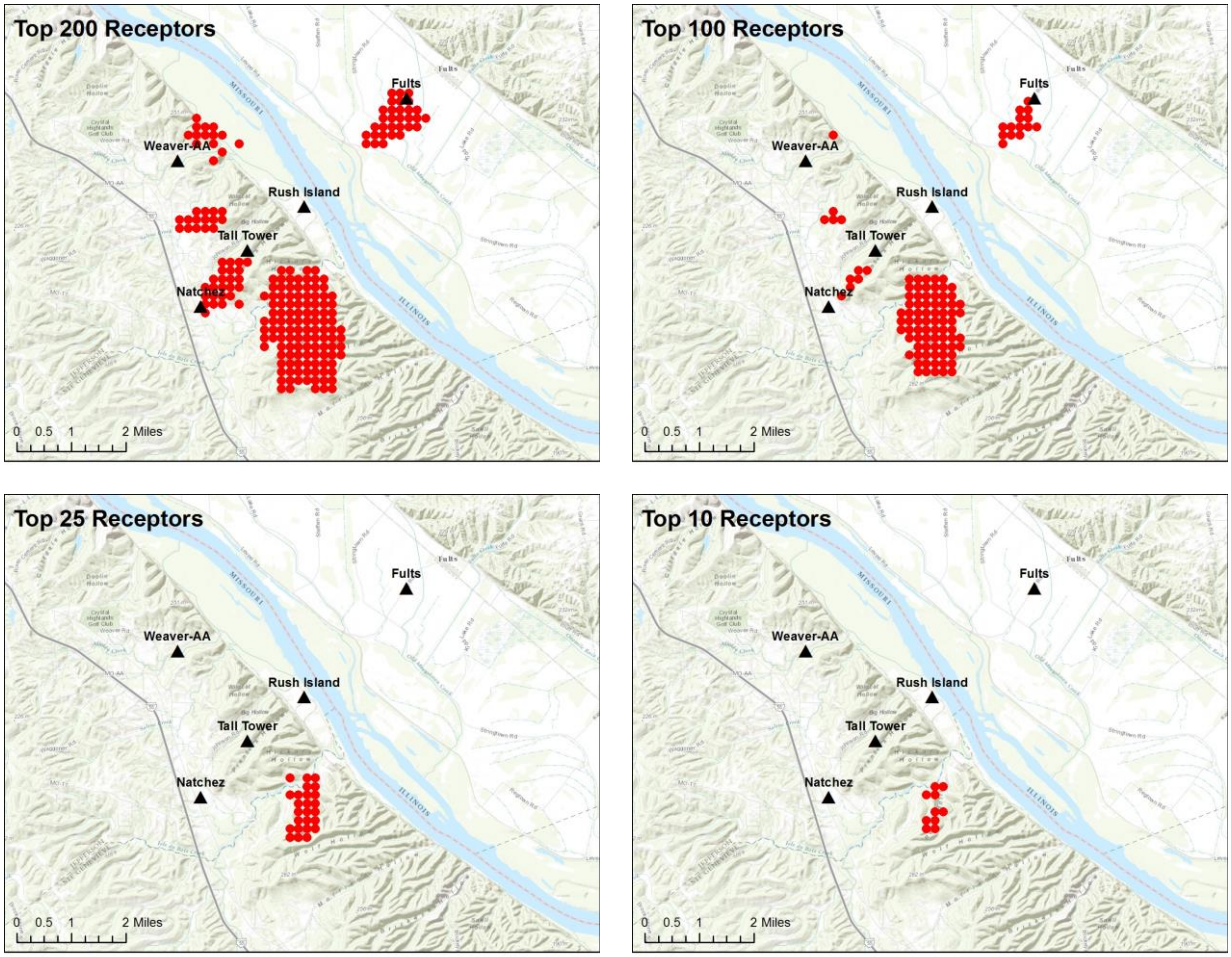


Figure 4. Receptors with the top 200, 100, 25, and 10 modeled design values.

Figures 1 through 4 all reveal a strikingly similar pattern regarding the areas where peak 1-hour SO_2 concentrations are expected to occur around the Rush Island Energy Center. There is a large area due south of the plant where modeled design values are the highest (in excess of 95 percent of the maximum modeled design value), where modeled maximum daily 1-hour concentrations frequently exceeded 75 percent of the maximum modeled design value, and where over half of the top 200 receptors (including all of the top 25 and three quarters of the top 100) are located. There are also four other areas where modeled design values are slightly lower but still very high (in excess of 85 percent of the maximum modeled design value), where modeled maximum daily 1-hour concentrations frequently exceeded 75 percent of the maximum modeled design value, and where the rest of the top 200 receptors are located. These four areas, located northeast, northwest, west, and southwest of the plant, plus the area south of the plant where modeled design values are the highest, are where Ameren's modeling predicts peak 1-hour SO_2 concentrations are expected to occur. Monitoring stations located in these areas would have the greatest chance of identifying peak SO_2 concentrations in ambient air, which is the primary objective of source-oriented monitoring and an absolute necessity when monitoring to assess

compliance with the NAAQS. However, none of Ameren's proposed monitoring stations is located in any of these areas of highest expected concentrations.

The most glaring omission is that there is no proposed monitoring station in the large area of highest expected concentrations south of the plant. This omission renders the proposed monitoring network inadequate for its intended purpose of assessing compliance with the NAAQS because a) NAAQS violations are most likely to occur in this area, and b) violations could occur in this area even when concentrations are below the NAAQS in other high concentration areas, given that the modeling predicts lower SO_2 concentrations in those areas. Ameren's Monitoring Stations Analysis claims that this area is "not accessible" because it hosts an industrial plant (Holcim). The Analysis does not indicate whether Ameren sought Holcim's permission to site a monitor on the Holcim property, and does not delineate the Holcim property boundary in terms of the modeling results. In other words, it does not document the claim that this large area of maximum expected concentrations is inaccessible for monitoring. Nor does it evaluate the nearest non-Holcim site that might be available.

While we understand that the Consent Agreement between DNR and Ameren calls for monitoring, it requires that such monitoring "represents ambient air quality in areas of maximum SO_2 impact from the Rush Island Energy Center." If no monitoring site is in fact accessible in this large area of the very highest expected concentrations, then the proposed monitoring network will not fulfill Ameren's obligation under the Consent Agreement. Instead, DNR should employ modeling, which provides 360-degree coverage and can predict concentrations at otherwise-inaccessible locations, to ensure that SO_2 emissions from the Rush Island plant do not cause or contribute to NAAQS exceedances either inside or outside of the Jefferson County nonattainment area.

Furthermore, two of the proposed monitoring stations – Fults and Natchez – are located near but outside of areas of modeled peak concentration/high frequency instead of near the center of such areas, where concentrations are expected to be higher. The third proposed station – Weaver-AA – is located entirely outside of modeled peak concentration/high frequency areas. Figure 5 shows the locations of the proposed monitoring stations on a hybrid basemap comprised of Figures 1 (modeled design values) and 2 (receptors with modeled design values ≥75 percent of the maximum design value). Receptors that are among the 200 with the highest modeled design values are outlined for reference. All three monitoring stations could easily be sited in areas where higher 1-hour SO_2 concentrations are expected to occur with greater frequency, thereby increasing their chances of detecting any NAAQS exceedances that might occur around the Rush Island Energy Center. As discussed below, we urge DNR to consider these proposed optimized locations in lieu of Ameren's proposed Fults, Natchez, and Weaver-AA locations.

Fults – Of the three proposed monitoring stations, the Fults monitoring station is closest to an area where peak 1-hour SO_2 concentrations are expected to occur. However, moving the monitor less than one kilometer southwest of its current location would move it from an area with modeled design values in the 120-130 ug/m^3 range to an area with modeled design values in the 130-140 ug/m^3 range and place it near the center of a small group of receptors with modeled design values equal to 90-95 percent of the maximum modeled design value (the receptors

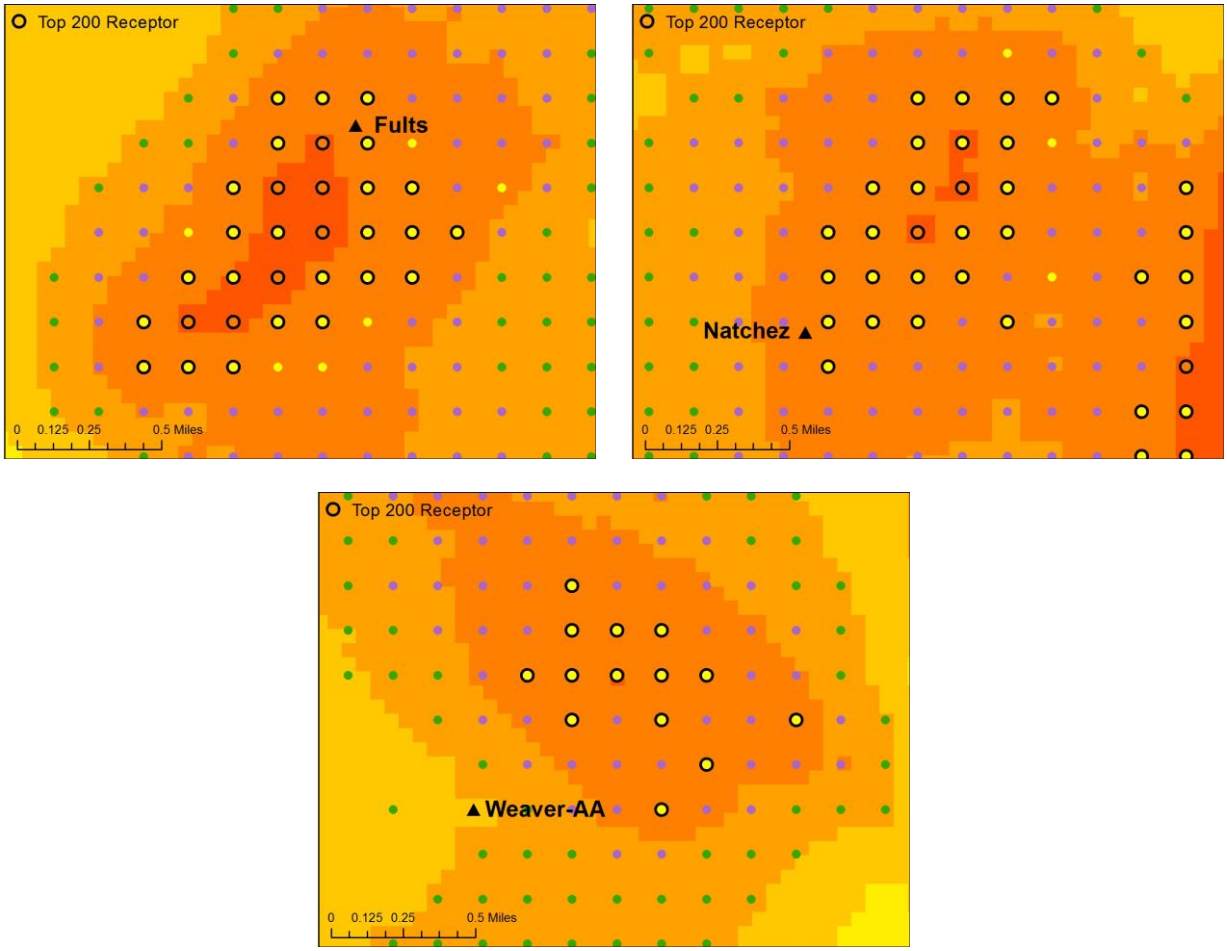


Figure 5. Modeled design values, receptors with design values ≥75 percent of the maximum modeled design value, and proposed monitoring station locations.

surrounding its current location generally have modeled design values equal to 85-90 percent of the maximum modeled design value). The entire area is floodplain/agricultural and Ivy Road, oriented northeast-southwest, runs through the middle of it, making the proposed optimized location as accessible as Ameren's proposed location and equally easy to provide power to.

Natchez – The Natchez monitoring station is outside/on the outer edge of an area where peak 1-hour SO_2 concentrations are expected to occur. Moving it approximately one kilometer northeast of its current location would move it from an area with modeled design values in the 120-130 ug/m^3 range to an area with modeled design values in the 130-140 ug/m^3 range, and place it between a pair of receptors with modeled design values equal to 90-95 percent of the maximum modeled design value (the receptors surrounding its current location have modeled design values equal to 80-90 percent of the maximum modeled design value). It would also move it to an area where higher concentrations are expected to occur with slightly greater frequency. The proposed optimized location is accessible via transmission right of way, and power is available along Dubois Creek Road to the south-southwest.

Weaver-AA – The Weaver-AA station is located completely outside of all areas where peak 1-hour SO2 concentrations are expected to occur. Modeled design values at its location are only in the 100-110 ug/m^3 range, and it is surrounded by receptors with modeled design values equal to just over 75 percent of the maximum modeled design value. Moving the monitor just over one kilometer east-northeast of its current location would place it in an area where modeled design values are 15-20 ug/m^3 higher, in the midst of a slightly dispersed group of receptors with modeled design values equal to 85-90 percent of the maximum modeled design value. At this optimized location, concentrations in excess of 75 percent of the maximum modeled design value are expected to occur roughly twice as often as at Ameren's proposed Weaver-AA location. The proposed optimized location is readily accessible via State Highway AA, and power is available along the highway.

Figure 6 compares the locations of Ameren's proposed Fults, Natchez, and Weaver-AA monitoring stations with optimized locations more likely to record maximum SO_2 concentrations in the area.

II. The Modeling Described in the Report Does Not Comport With EPA's Source-Oriented SO_2 Monitoring Guidance and Therefore May Not Correctly Identify Areas of Expected Ambient, Ground-Level SO_2 Concentration Maxima

EPA's SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document (TAD) provides guidance on how to "appropriately and sufficiently monitor ambient air in areas proximate to or impacted by an SO_2 emissions source to create ambient monitoring data for comparison to the SO_2 NAAQS" and presents "recommended steps to aid in identifying source-oriented SO_2 monitor sites."[1] The modeling performed to determine the locations of the proposed ambient SO_2 monitoring stations around the Rush Island Energy Center fails to adhere to the TAD in two important respects: 1) it does not use hourly emission rates, which are readily available for Rush Island's boilers from EPA's online Air Markets Program Data tool; and 2) it does not include nearby sources that may contribute significantly to ambient SO_2 concentrations in the vicinity of the plant and therefore should be included in the modeling.

EPA suggests using hourly emissions when available in order to represent the variability of actual emissions as accurately as possible,[2] which is important given the short-term nature of the SO_2 NAAQS. However, instead of using readily-available hourly emissions as recommended by EPA's monitoring TAD, Ameren's modeling uses constant emission rates for Rush Island's boilers. The consequence of using constant rather than hourly emission rates is that the effects of the interaction between hourly emissions and hourly variations in meteorological parameters are not captured by the model, so that the predicted areas of peak concentration are primarily a function of the meteorology used. For example, if peak hourly emissions coincide with times when strong winds blow from a direction other than the prevailing wind direction, a model that uses hourly emission rates might predict peak concentrations in different areas than the same

[1] U.S. EPA, SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, Dec. 2013 Draft, at 2, available at http://epa.gov/airquality/sulfurdioxide/pdfs/SO2MonitoringTAD.pdf.
[2] *Id*. at 11, referencing U.S. EPA, SO_2 NAAQS Designations Modeling Technical Assistance Document, Dec. 2013 Draft, at 10, available at http://epa.gov/airquality/sulfurdioxide/pdfs/SO2ModelingTAD.pdf.

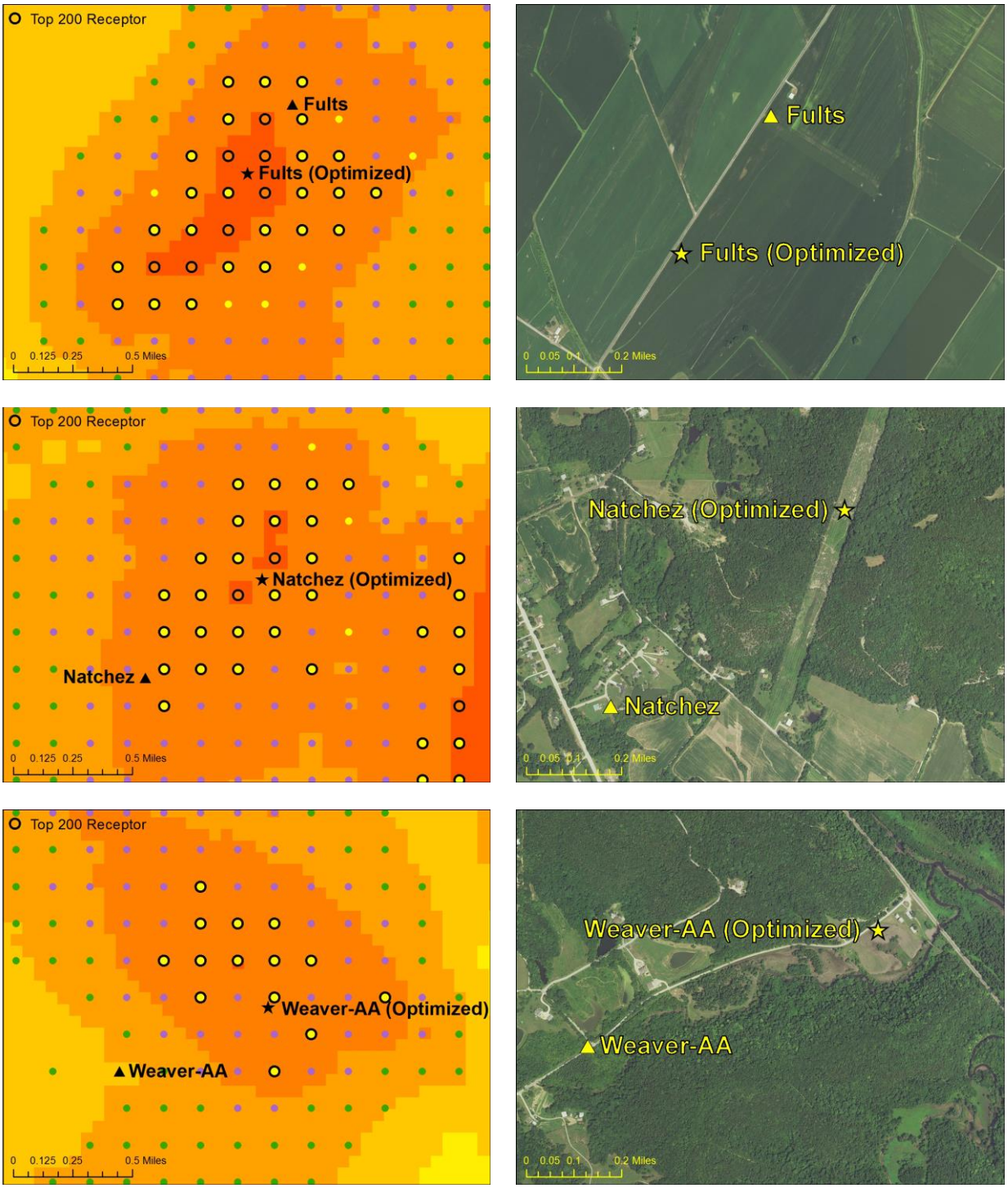


Figure 6. Current and optimized locations of the Fults, Natchez, and Weaver-AA monitoring stations

model would predict using constant emission rates. Therefore, using hourly emissions allows the areas where peak 1-hour SO_2 concentrations are expected to occur to be determined with greater confidence.

Regarding which sources to model, EPA suggests identifying and including all sources that may contribute significantly to ambient SO_2 concentrations – and thus to NAAQS exceedances – around the source of interest. The monitoring TAD notes that it is important to "understand the setting and surroundings of the SO_2 source" including determining "if the source is isolated or in an area with multiple SO_2 sources," and it affirms that the primary objective of monitoring is "to identify peak SO_2 concentrations in the ambient air that are attributable to an identified source *or group of sources*."[3] The Rush Island Energy Center is located in an SO_2 nonattainment area with numerous sources of varying magnitude. There are also a number of larger sources that are nearby but just outside of the nonattainment area, including River Cement, St. Gobain Containers, Holcim, Mississippi Lime, Dynegy's Baldwin Energy Complex, and Ameren's Meramec Energy Center. These sources may contribute significantly to ambient SO_2 concentrations in the vicinity of the Rush Island plant and should be included in the modeling unless it can be demonstrated that they do not have a significant influence on areas where peak 1-hour SO_2 concentrations are expected to occur.

III. The Meteorological Data Used in the Modeling May Not be Appropriate

Ameren's modeling uses National Weather Service (NWS) meteorological data from the Cahokia, Illinois airport located approximately 50 kilometers north of the plant. This is different from the meteorological data DNR used in its attainment demonstration modeling for the Jefferson County SO_2 nonattainment SIP. In its SIP modeling, DNR used onsite meteorological data from the now-closed Doe Run primary lead smelter in Herculaneum, approximately 18 kilometers northwest of the Rush Island plant. The Rush Island Energy Center is in the Jefferson County SO_2 nonattainment area, and the Jefferson County SIP states that the onsite meteorological data from Herculaneum is "considered more representative of the entire [nonattainment] area compared to a more distant NWS site."[4] Therefore, the Cahokia meteorological data used in Ameren's modeling may not be appropriate, particularly if – as suggested above – other nearby SO_2 sources are included in the modeling, given that DNR determined – based on the distribution of these sources – that the onsite Herculaneum meteorological data is more representative of the area that encompasses them.

Conclusion

Based on the modeling described in Ameren's report, the proposed locations of the Fults, Natchez, and Weaver-AA monitoring stations are not in modeled peak concentration/high frequency areas. Furthermore, Ameren has not proposed a monitoring station in the highest concentration area due south of the Rush Island Energy Center, citing the claimed but not

[3] *Id*. at 2, 4 (emphasis added).

[4] DNR, Nonattainment Plan for the 2010 1-Hour Sulfur Dioxide National Ambient Air Quality Standard, Jefferson County Sulfur Dioxide Nonattainment Area, May 28, 2015, at 26.

documented inaccessibility of potential monitoring sites in that area. The absence of a monitor in this large area of expected maximum concentration calls into question whether the proposed SO_2 monitoring network is an appropriate means of assessing compliance with the NAAQS in the area around the plant.

Ameren's proposed monitoring network does not fulfill its requirement under the Consent Agreement to install a monitoring network designed to record maximum expected SO_2 concentrations in the vicinity of the Rush Island plant. Nor is it designed to achieve Ameren's purported goal of obtaining "a good quality data set with representative SO_2 measurements and meteorological information"[5] or DNR's stated goal "to true-up modeling results further away from the Mott Street monitor … to confirm our assessment that the nonattainment area is in compliance with the 1-hour SO2 standard farther away from the violating monitor."[6]

We urge DNR to reject the proposed monitoring sites and require Ameren to add a monitoring station in the highest concentration area due south of the plant as well as to relocate the proposed Fults, Natchez, and Weaver-AA monitoring stations to the optimized locations shown in Figure 5. We also urge DNR to require Ameren to 1) rerun the air dispersion model described in the report using Rush Island's actual hourly emissions; 2) evaluate the effects of nearby interactive sources (including, at a minimum, River Cement, St. Gobain Containers, Holcim, Mississippi Lime, Dynegy's Baldwin Energy Complex, and Ameren's Meramec Energy Center) on modeled peak concentration/high frequency areas; and 3) evaluate the appropriateness of using meteorological data from the Cahokia, Illinois airport instead of Doe Run Herculaneum given DNR's determination that the latter is more representative of the modeled area.[7] We further urge DNR to require any necessary adjustments to the proposed monitoring network based on the results of these analyses.

Respectfully submitted,

Maxine I. Lipeles, J.D.
Ken Miller, P.G.
Interdisciplinary Environmental Clinic
Washington University School of Law

On behalf of the Sierra Club

---

[5] DNR, Comments and Responses on Proposed Revision to Missouri State Implementation Plan – Nonattainment Plan for the 2010 1-Hour Sulfur Dioxide National Ambient Air Quality Standard – Jefferson County Sulfur Dioxide Nonattainment Area, Comment #21, p. 10, available at http://dnr.mo.gov/env/apcp/docs/comments-and-responses-jeffco.pdf.

[6] *Id*., Response to Comment #4, p. 3.

[7] This analysis should consider and make use of the corrected Herculaneum meteorological data set processed in AERMET with the Bulk Richardson Number option invoked.

Cc: Rebecca Weber, Director, Air & Waste Management Division, EPA Region 7
Josh Tapp, Chief, Air Planning & Development Branch, EPA Region 7
Kyra Moore, Director, Air Pollution Control Program, DNR
Wendy Vit, Chief, Air Quality Planning Section, Air Pollution Control Program, DNR

Washington University in St. Louis
SCHOOL OF LAW

Interdisciplinary Environmental Clinic

August 11, 2015

Mr. Stephen Hall
Chief, Air Quality Analysis Section
Missouri Department of Natural Resources
Air Pollution Control Program
P.O. Box 176
Jefferson City, MO 65102
Via email to: stephen.hall@dnr.mo.gov

Re: Supplemental Comments on 2015 Monitoring Network Plan

Dear Mr. Hall:

On behalf of the Sierra Club, we submit these supplemental comments on the Missouri Department of Natural Resources' ("DNR") proposed 2015 Monitoring Network Plan.[1] We previously submitted comments on the plan on July 20, 2015, urging DNR to refrain from proposing new sulfur dioxide ("SO_2") monitoring sites near Ameren's Labadie power plant until EPA completes an area designation for the plant by July 2016.

These supplemental comments are based on new information provided in DNR's proposed 2010 1-Hour Sulfur Dioxide Standard, Proposed Options for Area Boundary Recommendations, July 2016 Designations.[2] This information includes new modeling of Labadie's emissions performed by DNR, as well as new wind climatology data from a recently-installed meteorological monitoring station near the plant. The new DNR modeling confirms that at least one of the two new Labadie SO_2 monitoring sites is unlikely to capture maximum ambient SO_2 concentrations because it is not located in an area where peak SO_2 concentrations are expected to occur. The new wind climatology data calls into doubt the siting of the other Labadie SO_2 monitoring site as well and suggests that neither monitor may be appropriately sited for use in future NAAQS compliance evaluations. This further demonstrates why DNR should wait until EPA completes an area designation for Labadie before proposing new SO_2 monitoring sites near the plant.

I. New Modeling By DNR Confirms That The Valley Monitoring Site Is Not Located In An Area Where Peak SO_2 Concentrations Are Expected To Occur.

As described in our July 20, 2015 comments on the proposed 2015 Monitoring Network Plan, Ameren's modeling of Labadie's emissions for purposes of locating the new monitoring sites

[1] DNR, 2015 Monitoring Network Plan, June 12, 2015, available at http://dnr.mo.gov/env/apcp/docs/2015-monitoring-network-plan.pdf.
[2] DNR, 2010 1-Hour Sulfur Dioxide Standard, Proposed Options For Area Boundary Recommendations, July 2016 Designations, July 24, 2015 ("2016 Area Boundary Recommendations"), available at http://dnr.mo.gov/env/apcp/docs/2010-so2-options-for-july-2016-desig-aug-27-2015-pub-hrg.pdf.

Campus Box 1120, One Brookings Drive, St. Louis, MO 63130-4899
(314) 935-7238, FAX: (314) 935-5171; www.law.wustl.edu

Exhibit3

identified three distinct areas where peak SO_2 concentrations are expected to occur. These areas, demarcated by orange and red receptors, are located northwest, northeast, and southeast of the plant and are shown in Figure 1 below. However, only one of the two new monitoring sites – the Northwest site – is located in a peak concentration area as modeled by Ameren. The Valley monitoring site is located between the other two Ameren-modeled peak concentration areas, in an area where the modeled concentration is only about 80 percent of the maximum concentration predicted by Ameren's model.

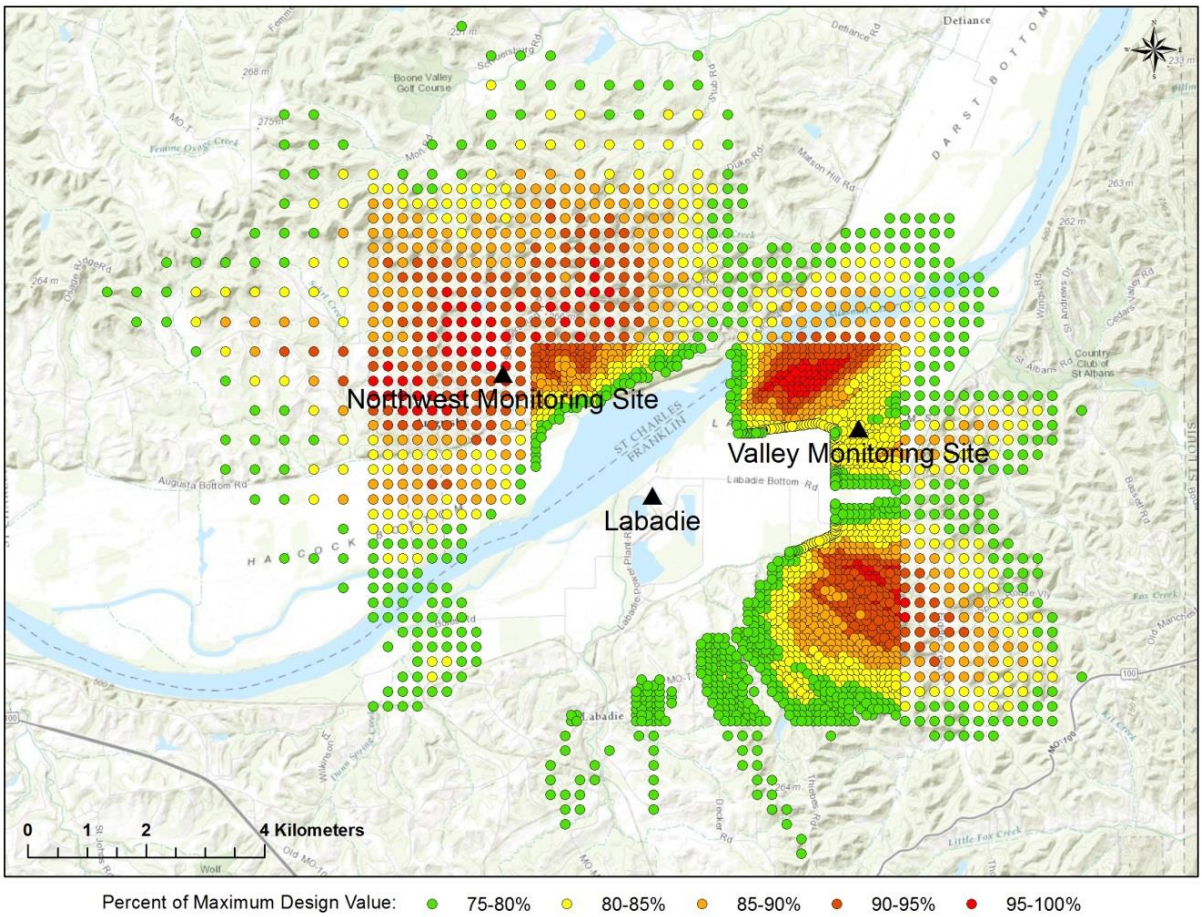


Figure 1. Expected peak SO_2 concentration areas per Ameren's modeling.

Moreover, Ameren's modeling was inconsistent with EPA guidance. In more detailed comments we submitted to DNR on April 13, 2015 critiquing Ameren's proposed monitoring site locations,[3] we noted that Ameren had failed to adhere to EPA's source-oriented SO_2 monitoring guidance in its modeling of the plant's emissions and therefore may have failed to correctly identify areas where peak concentrations are expected to occur. In particular, Ameren's modeling

[3] These comments were attached to and incorporated by reference into our July 20 comments on the 2015 Monitoring Network Plan.

used constant emission rates instead of hourly emission rates as recommended by EPA.[4] Using hourly emission rates, which are readily available from EPA's online Air Markets Program Data tool, allows areas where peak SO_2 concentrations are expected to occur to be determined with greater confidence because the interaction between hourly emissions and hourly variations in meteorological parameters is accounted for by the model. This interaction is ignored when constant emission rates are used.

In its recently-proposed 2010 1-Hour Sulfur Dioxide Standard, Proposed Options for Area Boundary Recommendations, July 2016 Designations ("2016 Area Boundary Recommendations"), DNR describes the modeling of Labadie's emissions that it performed for purposes of making an SO_2 area designation and boundary recommendation to EPA for the area around the plant. DNR's modeling is identical to Ameren's in most respects and uses meteorological data from the same National Weather Service site (Jefferson City Memorial Airport in Jefferson City, MO).[5] However, unlike Ameren, DNR used hourly emission rates per EPA guidance in its modeling. The peak concentration areas, demarcated by orange and red receptors, predicted by DNR's model are shown in Figure 2 (see next page). DNR's receptors violating the 2010 1-hour SO_2 NAAQS are shown in Figure 3 (see page 5).

DNR's modeling, as illustrated by Figures 2 and 3, confirms that the Valley monitoring site is not located in an area where peak SO_2 concentrations are expected to occur. To the contrary, the Valley site is in an area where the modeled concentration is less than 75 percent of the maximum concentration predicted by DNR's model. DNR's modeling also confirms that there is an expected peak concentration area southeast of the plant with considerably higher modeled SO_2 design values than at the Valley monitoring site, yet with no monitor. DNR's model predicts NAAQS exceedances in this other area, but not at the Valley site.

In summary, DNR's modeling – which, unlike Ameren's, adhered to EPA guidance as to the use of variable hourly emission rates – makes clear that the Valley site is not an appropriate location for an SO_2 monitor.

II. New Wind Climatology Data From the Valley Monitoring Site Demonstrates The Need To Collect Additional On-Site Meteorological Data Before DNR Proposes New SO_2 Monitors Near The Labadie Plant.

The Valley monitoring site, which began operating in April, includes both an ambient SO_2 monitor and a meteorological monitoring station that monitors various meteorological parameters including horizontal wind speed and direction. Preliminary data from the Valley meteorological monitoring station for the period April 22 – July 13, 2015 is included in Appendix F of DNR's 2016 Area Boundary Recommendations. Analysis of this data suggests

[4] U.S. EPA, SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, Dec. 2013 Draft, at 11, referencing U.S. EPA, SO2 NAAQS Designations Modeling Technical Assistance Document, Dec. 2013 Draft, at 10, available at http://epa.gov/airquality/sulfurdioxide/pdfs/SO2ModelingTAD.pdf.
[5] DNR's modeling includes an emergency diesel generator at Labadie and a pair of interactive sources south of the plant that were not included in Ameren's modeling. However, these sources have very low emissions and do not contribute significantly to modeled concentrations near the plant.

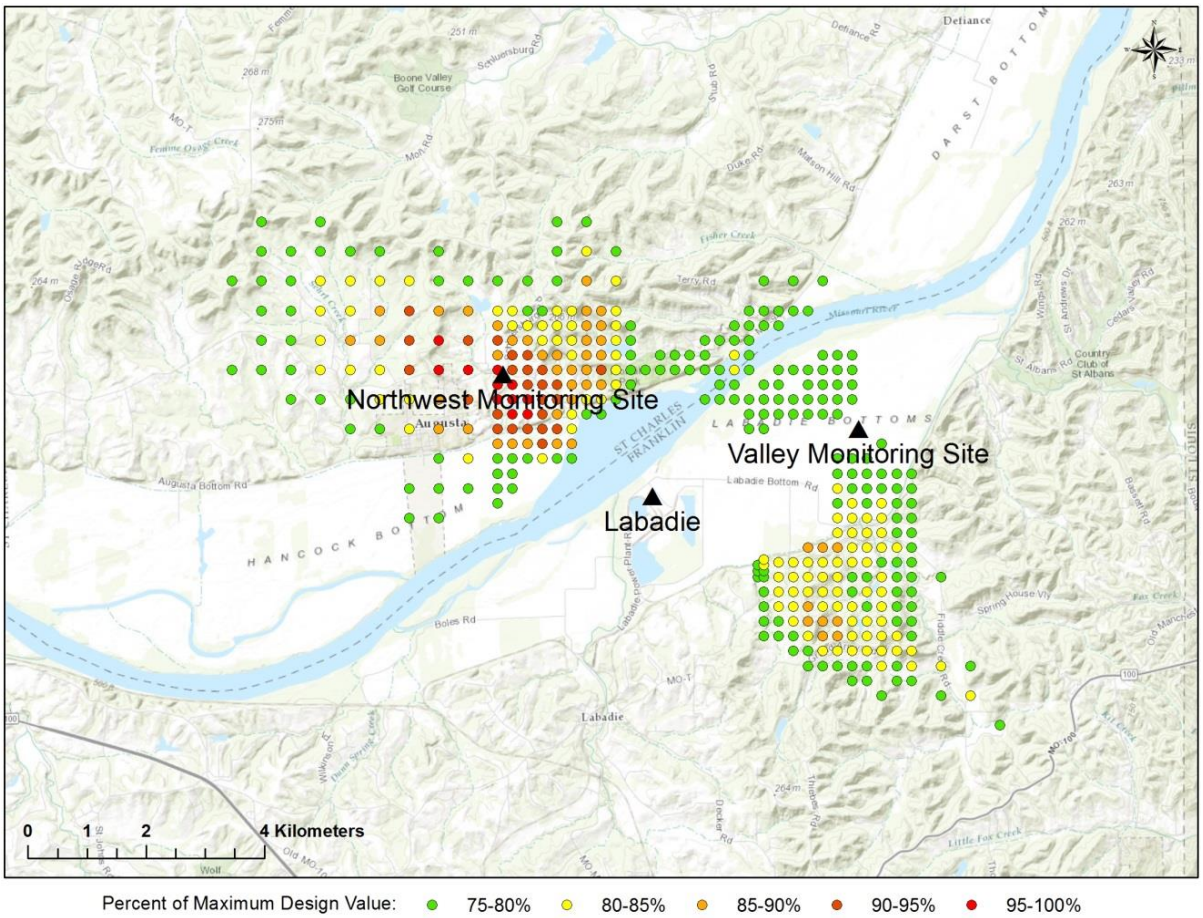


Figure 2. Expected peak SO_2 concentration areas per DNR's modeling.

that the surface meteorological data used in both Ameren's and DNR's modeling of Labadie's emissions may not be representative of the area.

Ameren and DNR both used surface meteorological data from the Jefferson City Memorial Airport ("KJEF"), located approximately 115 kilometers west of Labadie, in their modeling of the plant's emissions instead of data from the much closer Spirit of St. Louis Airport ("KSUS"), located just 19 kilometers northeast of the plant. In making the decision to use KJEF instead of KSUS surface meteorological data, DNR relied exclusively on a comparison of surface characteristics (surface roughness, Bowen ratio, and albedo) at each airport to surface conditions at Labadie. Despite stating in its 2016 Area Boundary Recommendations that "other meteorological parameters, including wind speed and direction as influenced by terrain, must also be used when choosing a representative meteorological site,"[6] DNR did not compare available wind climatology data from the Valley monitoring site to contemporaneous wind climatology data from KJEF and KSUS to see which airport's winds are most similar to those at Labadie.

[6] 2016 Area Boundary Recommendations at D-2.

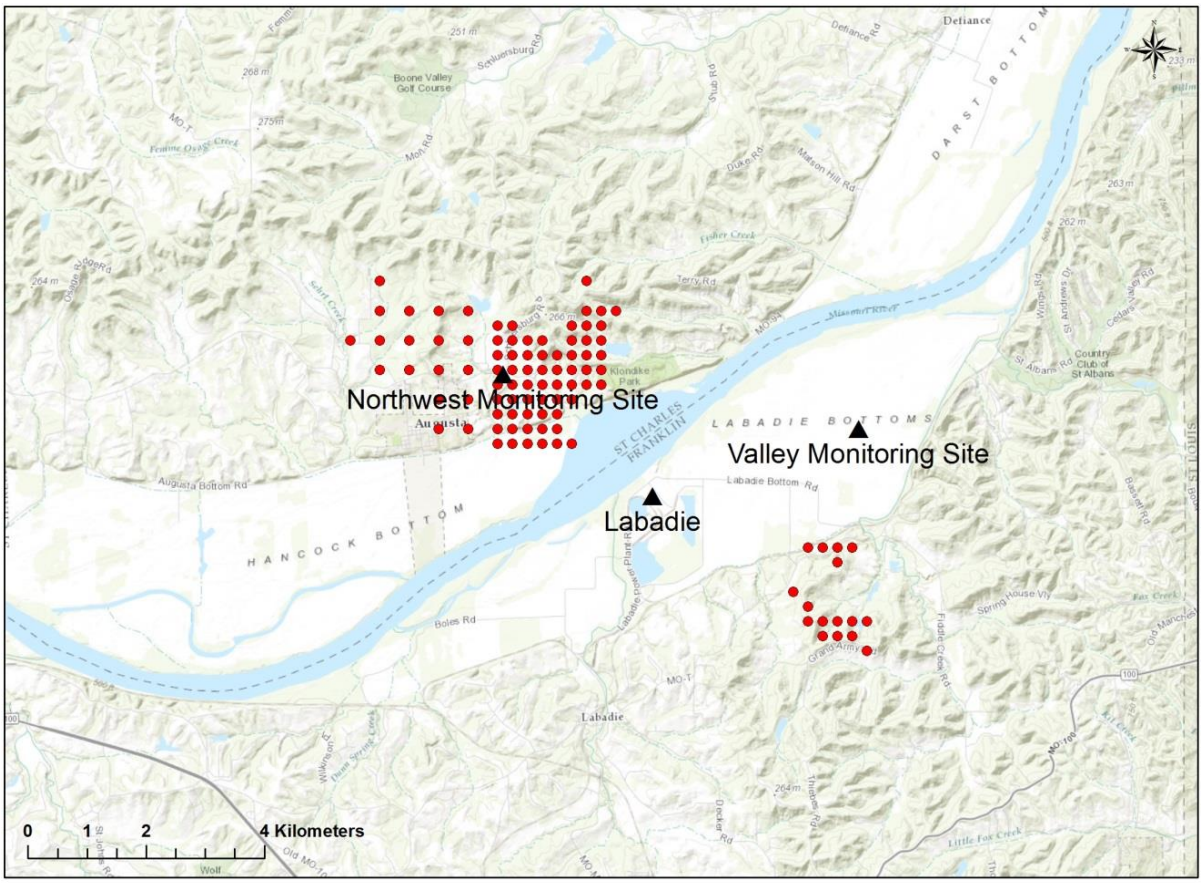


Figure 3. DNR receptors violating the 2010 1-hour SO_2 NAAQS.

Figures 4 and 5 (see next page) show the wind rose for the Valley monitoring site compared to the wind roses for KSUS and KJEF, respectively, for the period April 22 – July 13, 2015. As illustrated by Figures 4 and 5, during the first few months the Valley meteorological monitoring station was in operation, the most frequent winds at both Labadie and KSUS were from the south, south-southwest, and southwest, whereas the most frequent winds at KJEF were from the east and east-southeast. Furthermore, the strongest winds at both Labadie and KSUS were generally from the predominant wind directions whereas the strongest winds at KJEF were from the south and south-southwest, orthogonal to the predominant wind directions.

Therefore, the preliminary meteorological data from the Labadie area suggest that the winds at Labadie may be more similar to the winds at KSUS than the winds at KJEF, which in turn suggests that KSUS surface meteorological data may be more representative of the area and more appropriate for modeling Labadie's emissions than KJEF data.

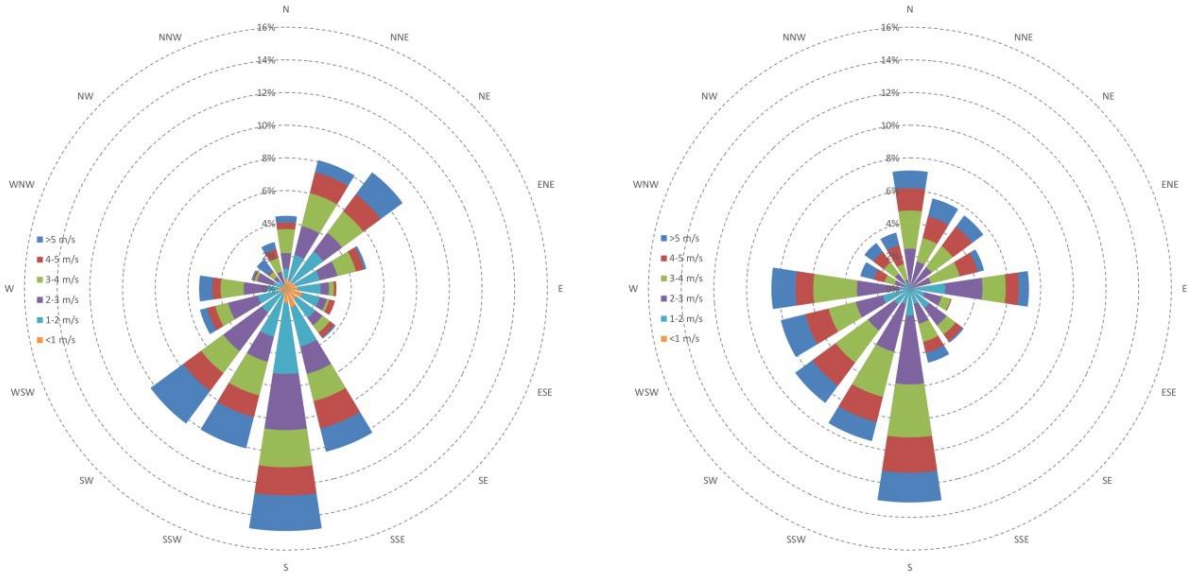


Figure 4. Valley monitoring site (left) and KSUS (right) wind rose comparison.

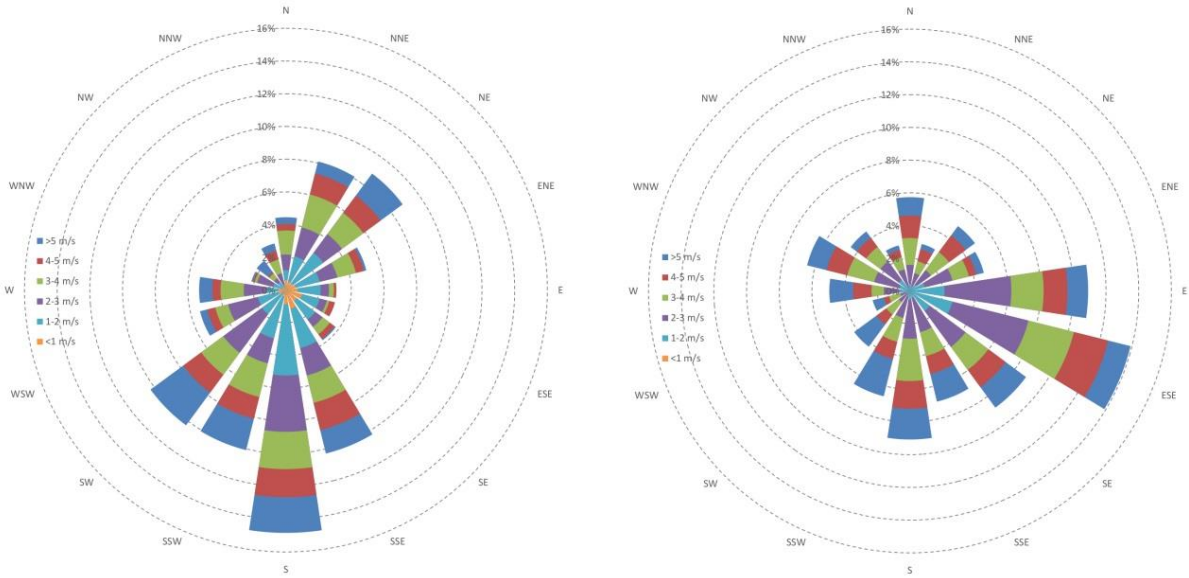


Figure 5. Valley monitoring site (left) and KJEF (right) wind rose comparison.

Figure 6 (see next page) shows peak concentration areas, demarcated by orange and red receptors, predicted by DNR's model when KSUS surface meteorological data is used instead of KJEF data. The results are striking; *if KSUS data is in fact more representative of the area than KJEF data, then neither the Valley monitoring site nor the Northwest monitoring site is located in an area where peak SO_2 concentrations are expected to occur and neither is appropriately sited for use in future NAAQS compliance evaluations*.

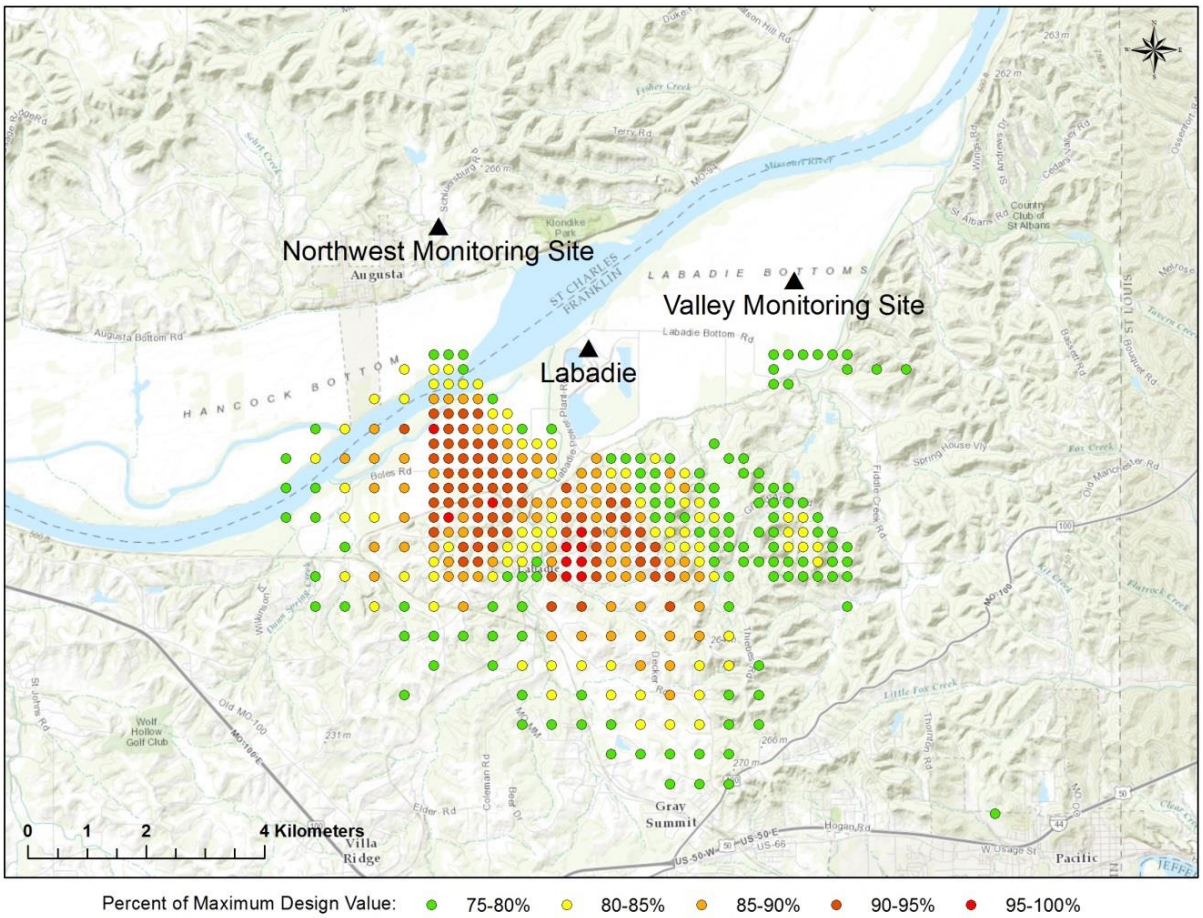


Figure 6. Expected peak SO_2 concentration areas per DNR's modeling using KSUS instead of KJEF surface meteorological data.

We recognize that the wind climatology data from the Valley meteorological monitoring site included in Appendix F of DNR's 2016 Area Boundary Recommendations is not yet quality assured and that, given the short-term nature of the data, it is by no means certain that the winds at Labadie will prove to be more similar to the winds at KSUS than at KJEF over the long term. However, this only demonstrates further why DNR should wait until EPA completes an area designation for Labadie before proposing new SO_2 monitoring sites near the plant. EPA must make a final area designation for the plant by July 2016.[7] By that time, DNR will have over a year of on-site meteorological data from the Valley monitoring site and a second meteorological monitoring station at the nearby Osage Ridge monitoring site,[8] which it can then use to model Labadie's emissions for monitor-siting purposes or to make a more definitive determination regarding which airport site has the most representative meteorological data and should be used in such modeling.

[7] *Sierra Club v. Gina McCarthy*, No. 3:13-cv-3953-SI (Consent Decree, March 2, 2015).
[8] No data from the Osage Ridge site was included in the 2016 Area Boundary Recommendations so it is unknown how winds at the site compare to winds at the Valley monitoring site, KSUS, or KJEF.

Conclusion

For the reasons set forth above and in our July 20 comments on the 2015 Monitoring Network Plan, DNR should withdraw both of the new Labadie SO_2 monitoring sites pending the completion of the Labadie area designation process, the collection of additional on-site meteorological data from the Valley and Osage Ridge meteorological monitoring stations, and the performance of additional modeling using the most representative surface meteorological data to determine the areas of expected peak ambient SO_2 concentrations around the plant. Furthermore, EPA should not approve the 2015 Monitoring Network Plan with the inclusion of the new Labadie SO_2 monitoring sites and should reject it pending their withdrawal by DNR.

Sincerely yours,

Maxine I. Lipeles, Director
Kenneth Miller, P.G., Environmental Scientist
Interdisciplinary Environmental Clinic
Washington University School of Law
One Brookings Drive – CB 1120
St. Louis, MO 63130
314-935-5837 (phone); 314-935-5171 (fax)
milipele@wustl.edu

Attorneys for the Sierra Club

Cc: Rebecca Weber, Director, Air & Waste Management Division, EPA Region 7
Josh Tapp, Chief, Air Planning & Development Branch, EPA Region 7
Kyra Moore, Director, Air Pollution Control Program, DNR
Wendy Vit, Chief, Air Quality Planning Section, Air Pollution Control Program, DNR

Ameren Labadie Plant

Labadie, Missouri

Evaluation of Compliance with the 1-hour NAAQS for SO_2

September 3, 2015

Conducted by:

Steven Klafka, P.E., BCEE

Wingra Engineering, S.C.

Madison, Wisconsin

1. Introduction

Wingra Engineering, S.C. was hired by Sierra Club to conduct an air modeling impact analysis to help the U.S. Environmental Protection Agency (USEPA) and state and local air agencies identify facilities that are likely causing exceedances of the 1-hour sulfur dioxide (SO_2) national ambient air quality standard (NAAQS). This document describes the results and procedures for an evaluation conducted for the Ameren Labadie Plant located in Labadie, Missouri.

To ensure the modeling analysis reflected the cumulative concentration of SO_2 emissions, it included emissions from the following additional sources of SO_2 emissions located within 50 kilometers of the Ameren Labadie Plant:

- Purina Animal Nutrition Center - Gray Summit, Missouri
- N.B. West Contracting Company Inc.NC – Pacific, Missouri

The dispersion modeling analysis predicted ambient air concentrations for comparison with the 1-hour SO_2 NAAQS. The modeling was performed using the most recent version of AERMOD, AERMET, and AERMINUTE, with data provided to Sierra Club by regulatory air agencies or obtained through other publicly-available sources as documented below. The analysis was conducted in adherence to all available USEPA guidance for evaluating source impacts on attainment of the 1-hour SO_2 NAAQS via aerial dispersion modeling, including the AERMOD Implementation Guide; USEPA's Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard, August 23, 2010; modeling guidance promulgated by USEPA in Appendix W to 40 CFR Part 51; USEPA's March 2011 Modeling Guidance for SO_2 NAAQS Designations; [1] and USEPA's December 2013 SO_2 NAAQS Designations Technical Assistance Document.[2]

2. Compliance with the 1-hour SO_2 NAAQS

2.1 1-hour SO_2 NAAQS

The 1-hour SO_2 NAAQS takes the form of a three-year average of the 99th percentile of the annual distribution of daily maximum 1-hour concentrations, which cannot exceed 75 parts per billion (ppb).[3] Compliance with this standard was verified using USEPA's AERMOD air dispersion model, which produces air concentrations in units of $\mu g/m^3$. The 1-hour SO_2 NAAQS of 75 ppb equals 196.2 $\mu g/m^3$, and this is the value used for determining whether modeled impacts exceed the

---

[1] http://www.epa.gov/scram001/so2_modeling_guidance.htm
[2] http://www.epa.gov/oaqps001/sulfurdioxide/pdfs/SO2ModelingTAD.pdf
[3] USEPA, Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard, August 23, 2010.

NAAQS.[4] The 99th percentile of the annual distribution of daily maximum 1-hour concentrations corresponds to the fourth-highest value at each receptor for a given year.

2.2 Modeling Results

Model results for all sources included in the SO_2 analysis are summarized in Table 1. Results are provided for Labadie alone and for all sources combined.

Modeling results for Ameren Labadie Plant and the other two facilities are summarized in Table 1. It was determined that based on either current allowable emissions or measured actual emissions, the Ameren Labadie Plant is estimated to create downwind SO_2 concentrations which exceed the 1-hour NAAQS.

More specifically, the modeling results presented in Table 1, show exceedances of the NAAQS by the plant's allowable and actual emissions. "Allowable" is the peak emission rate from each unit as approved by the current air quality operation permit for the facility. "Actual" are the measured emissions for each hour between January 1, 2012 and December 31, 2014 as taken from USEPA *Air Markets Program Data*.[5]

Air quality impacts in Missouri are based on a background concentration of 23.5 µg/m^3. This is the 2011-13 design value for Monroe County, Missouri – the lowest measured background concentration in the state. This is the most recently available design value. See Section 5 for further discussion of the background concentrations used for this analysis.

Table 1 - SO_2 Modeling Results for Ameren Labadie Plant Modeling Analysis

Emission Rates	Facility	99th Percentile 1-hour Daily Maximum (µg/m^3)				Complies with NAAQS?
		Impact	Background	Total	NAAQS	
Allowable	Labadie	2,559.7	23.5	2,583.2	196.2	No
Actual	Labadie	212.2	23.5	235.7	196.2	No
Actual	All	212.2	23.5	235.7	196.2	No

[4] The ppb to µg/m^3 conversion is found in the source code to AERMOD v. 14134, subroutine Modules. The conversion calculation is 75/0.3823 = 196.2 µg/m^3.
[5] http://ampd.epa.gov/ampd/

The emissions used for the modeling analysis are summarized in Table 2.

Table 2 - Modeled SO_2 Emissions [6]

Stack ID	Unit ID	Allowable Emissions 1-hour Average (lbs/hr)
S01	B1	29,678.4
S02	B2	29,678.4
S03	B3	29,313.6
S04	B4	29,313.6
Stack Total	All Units	117,984.0

Based on the modeling results, Table 3 provides the emission reductions from current allowable rates necessary to achieve compliance with the 1-hour NAAQS. This assumes a one-hour averaging period for the emission rate and that the emission rate is binding at all times. However, given the conservative aspects of this modeling protocol, it is extremely likely that this limit is too high to protect the NAAQS. For example, startup or shutdown periods were not evaluated. During these periods, decreased gas velocities and temperatures may lead to greater ambient impacts at ground level. Further, the hypothetical emission limitation in Table 3 would allow Ameren Labadie Plant to consume the entire NAAQS, leaving little to no room for any other source of SO_2 in the area. No margin of safety has been included in the hypothetical emission limitation.

Table 3 - Required Emission Reductions from Ameren Labadie Plant for Compliance with the 1-hour NAAQS for SO_2

Acceptable Impact (NAAQS - Background) 99th Percentile 1-hour Daily Max ($\mu g/m^3$)	Required Total Facility Reduction Based on Allowable Emissions (%)	Required Total Facility Emission Rate (lbs/hr)	Required Total Facility 1-hour Average Emission Rate (lbs/mmbtu)
172.7	93%	7,960.2	0.43

Predicted exceedances of the 1-hour NAAQS for SO_2 based on allowable emissions extend throughout the region to a maximum distance of 50 kilometers.

Figure 1 shows the extent of NAAQS violations based on allowable emissions from the Ameren Labadie Plant.

Figure 2 shows the extent of NAAQS violations based on actual hourly emissions from all sources.

[6] Allowable emissions are based on the 4.8 lbs/mmbtu limitation in Title V Permit to Operate No. OP2011-020 issued by

2.3 Conservative Modeling Assumptions

A dispersion modeling analysis requires the selection of numerous parameters which affect the predicted concentrations. For the enclosed analysis, several parameters were selected which under-predict facility impacts.

Assumptions used in this modeling analysis which likely under-estimate concentrations include the following:

- Allowable emissions are based on a limitation with an averaging period which is greater than the 1-hour average used for the SO_2 air quality standard. Emissions and impacts during any 1-hour period may be higher than assumed for the modeling analysis.

- No consideration of facility operation at less than 100% load. Stack parameters such as exit flow rate and temperature are typically lower at less than full load, reducing pollutant dispersion and increasing predicted air quality impacts.

- No consideration of building or structure downwash. These downwash effects typically increase predicted concentrations near the facility.

- Except for Purina Animal Nutrition Center and N.B. West Contracting, no consideration of other off-site sources. These other off-site sources of SO_2 will increase the predicted impacts.

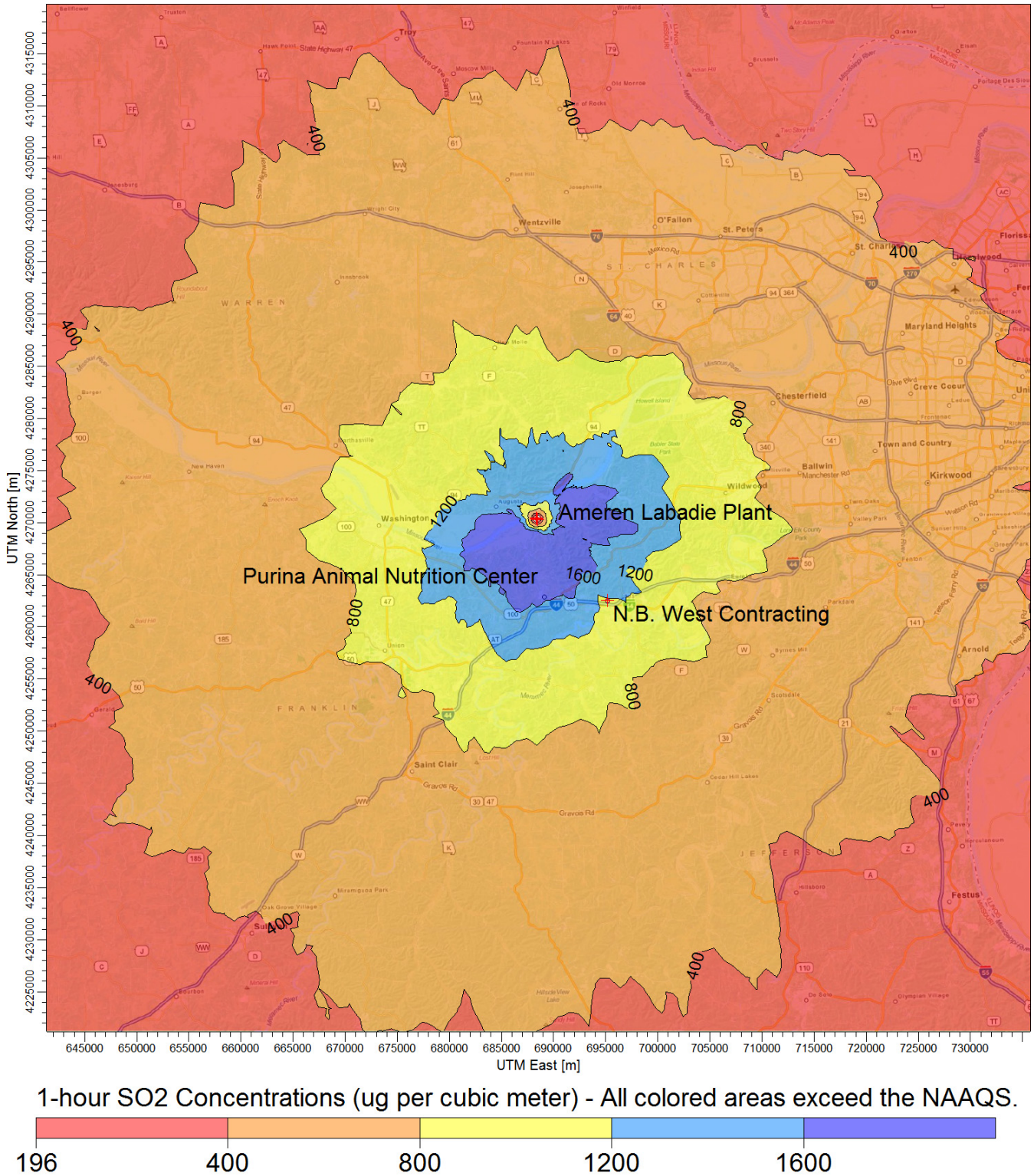


Figure 1 - Regional View of Impacts Due to Allowable Emissions from Ameren Labadie Plant

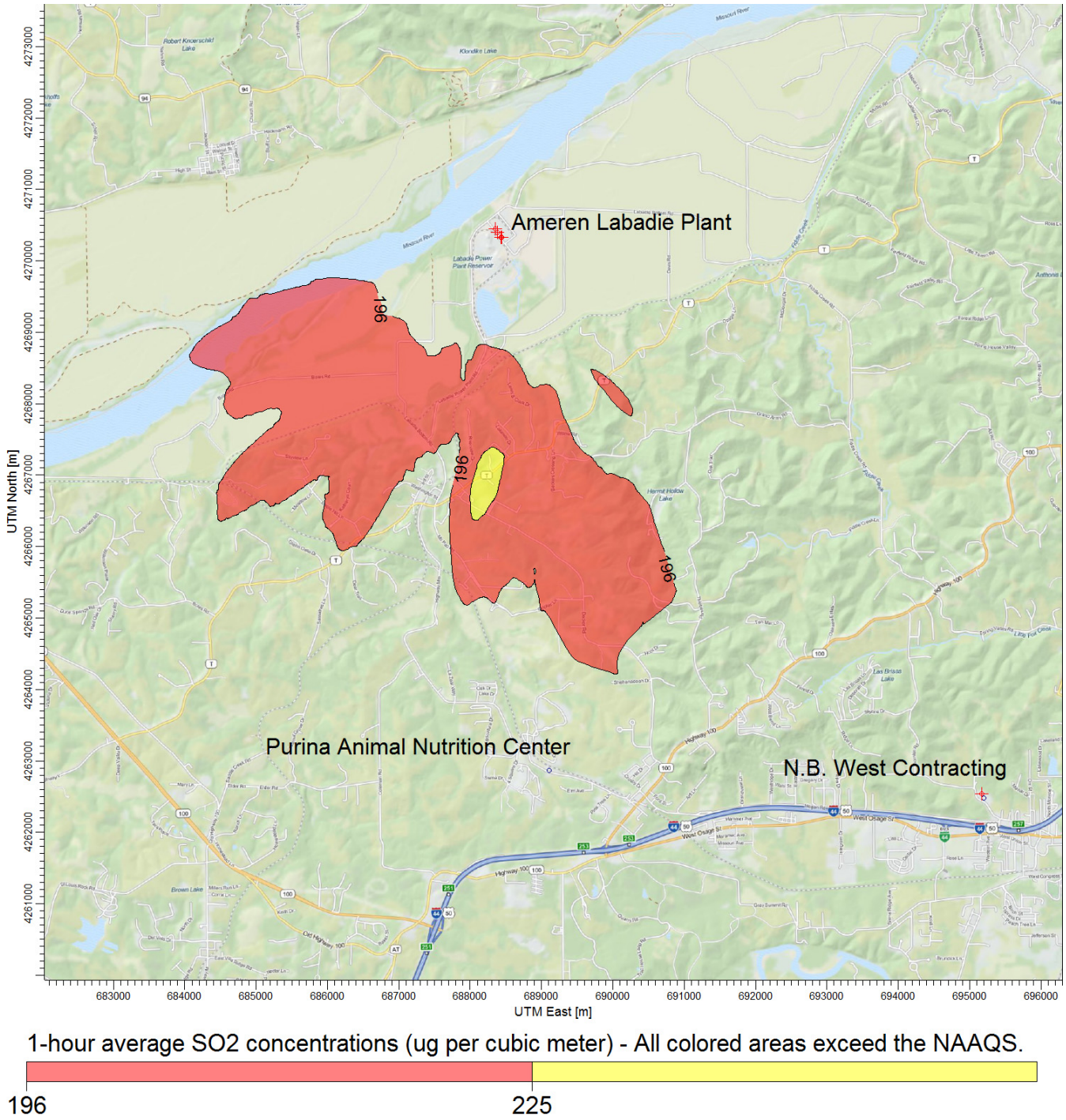


Figure 2 - Regional View of Impacts Due to Actual Emissions from All Sources

3. Modeling Methodology

3.1 Air Dispersion Model

The modeling analysis used USEPA's AERMOD program, v. 14134. AERMOD, as available from the Support Center for Regulatory Atmospheric Modeling (SCRAM) website, was used in conjunction with a third-party modeling software program, *AERMOD View*, sold by Lakes Environmental Software.

3.2 Control Options

The AERMOD model was run with the following control options:

- 1-hour average air concentrations
- Regulatory defaults
- Flagpole receptors

To reflect a representative inhalation level, a flagpole height of 1.5 meters was used for all modeled receptors. This parameter was added to the receptor file when running AERMAP, as described in Section 4.4.

An evaluation was conducted to determine if the modeled facility was located in a rural or urban setting using USEPA's methodology outlined in Section 7.2.3 of the Guideline on Air Quality Models.[7] For urban sources, the URBANOPT option is used in conjunction with the urban population from an appropriate nearby city and a default surface roughness of 1.0 meter. Methods described in Section 4.1 were used to determine whether rural or urban dispersion coefficients were appropriate for the modeling analysis.

3.3 Output Options

The AERMOD analysis was based on three years of recent meteorological data. The modeling analyses used one run with three years of sequential meteorological data from 2012-2014. Consistent with USEPA's Modeling Guidance for SO_2 NAAQS Designations, AERMOD provided a table of fourth-high 1-hour SO_2 impacts concentrations consistent with the form of the 1-hour SO_2 NAAQS.[8]

Please refer to Table 1 for the modeling results.

---

[7] USEPA, Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions, Appendix W to 40 CFR Part 51, November 9, 2005.
[8] USEPA, Area Designations for the 2010 Revised Primary Sulfur Dioxide National Ambient Air Quality Standards, Attachment 3, March 24, 2011, pp. 24-26.

4. Model Inputs

4.1 Geographical Inputs

The "ground floor" of all air dispersion modeling analyses is establishing a coordinate system for identifying the geographical location of emission sources and receptors. These geographical locations are used to determine local characteristics (such as land use and elevation), and also to ascertain source to receptor distances and relationships.

The Universal Transverse Mercator (UTM) NAD83 coordinate system was used for identifying the easting (x) and northing (y) coordinates of the modeled sources and receptors. Stack locations were obtained from facility permits and prior modeling files provided by the state regulatory agency. The stack locations were then verified using aerial photographs.

The facility was evaluated to determine if it should be modeled using the rural or urban dispersion coefficient option in AERMOD. A Geographic Information System (GIS) was used to determine whether rural or urban dispersion coefficients apply to a site. Land use within a three-kilometer radius circle surrounding the facility was considered. USEPA guidance states that urban dispersion coefficients are used if more than 50% of the area within 3 kilometers has urban land uses. Otherwise, rural dispersion coefficients are appropriate.[9]

USEPA's AERSURFACE v. 13016 was used to develop the meteorological data for the modeling analysis. This model was also used to evaluate surrounding land use within 3 kilometers. Based on the output from the AERSURFACE, approximately 5.5% of surrounding land use around the modeled facility was of urban land use types including Type 21 – Low Intensity Residential, Type 22 – High Intensity Residential and Type 23 – Commercial / Industrial / Transportation.

This is less than the 50% value considered appropriate for the use of urban dispersion coefficients. Based on the AERSURFACE analysis, it was concluded that the rural option would be used for the modeling summarized in this report. Please refer to Section 4.5.3 for a discussion of the AERSURFACE analysis.

[9] USEPA, Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions, Appendix W to 40 CFR Part 51, November 9, 2005, Section 7.2.3.

4.2 Emission Rates and Source Parameters

The modeling analysis considered SO_2 emissions from the Labadie, and the other two facilities. Other off-site sources were not considered. Concentrations were predicted for the scenarios shown in Tables 1 and 2:

1) allowable emissions based on the current permit issued by the regulatory agency, and

2) actual hourly emissions measured at the Ameren Labadie Plant each hour between January 1, 2012 and December 31, 2014 as taken from USEPA *Air Markets Program Data*.[10] Actual emissions for Purina Animal Nutrition Center and N.B. West Contracting were reported to Missouri DNR for 2013.

Stack parameters and emissions used for the modeling analysis are summarized in Table 4.

The above stack parameters and emissions were obtained from regulatory agency documents and databases identified in Section 2.2. The analysis was conducted based on 100% operating load using maximum exhaust flow rates and temperatures. Operation at less than full capacity loads was not considered. This assumption tends to under-predict impacts since stack parameters such as exit flow rate and temperature are typically lower at less than full load, reducing pollutant dispersion and increasing predicted air quality impacts. Stack location, height and diameter were verified using aerial photographs, and flue gas flow rate and temperature were verified using combustion calculations.

[10] http://ampd.epa.gov/ampd/

Table 4 – Facility Stack Parameters and Emissions [11]

Facility	Labadie					N.B. West	
Stack	S01	S02	S03	S04	E01	EP5	NB2
Description	Boiler 1	Boiler 2	Boiler 3	Boiler 4	Generator	Dryer	Heater
X Coord. [m]	688352.17	688387.01	688435.47	688439.28	688439.28	695174.86	695174.86
Y Coord. [m]	4270445.59	4270400.4	4270332.33	4270327.43	4270327.43	4262540.03	4262540.03
Base Elevation [m]	149.66	149.66	149.66	149.66	149.66	159	159
Release Height [m]	213.36	213.36	213.36	213.36	9.14	7.62	2.74
Gas Exit Temperature [°K]	443.065	442.49	433.204	441.708	866.483	376.15	298.15
Gas Exit Velocity [m/s]	34.72	35.558	34.517	34.946	7.112	5.526	0.001
Inside Diameter [m]	6.248	6.248	6.248	6.248	0.305	0.914	0.244
Allowable Emission Rate [g/s]	3,739	3,739	3,693	3,693	-	-	-
Actual Emission Rate [g/s]	-	-	-	-	0.002308	0.0116	0.01759

Facility	Purina	N.B. West
Volume Source	EU_10	EP17
Description	Boiler	N.B. West Drag Slat Conveyor
X Coord. [m]	689107.65	695196.75
Y Coord. [m]	4262863.7	4262475.07
Base Elevation [m]	172	159
Release Height [m]	5	5
Side Length [m]	1.524	1.524
Building Height [m]	-	-
Initial Lateral Dimension [m]	1.16	1.16
Initial Vertical Dimension [m]	4.65	4.65
Actual Emission Rate [g/s]	0.0409	0.07385

[11] Stack parameters obtained from Missouri DNR modeling file: Ameren Missouri Labadie Facility Hourly Emissions File Run 12-14 20 km multi tier rec grid including Interactive sources.

4.3 Building Dimensions

This modeling analysis did not address the effects of downwash and this may under-predict impacts.

4.4 Receptors

For Ameren Labadie Plant, three receptor grids were employed:

1. A 100-meter Cartesian receptor grid centered on Ameren Labadie Plant and extending out 5 kilometers.
2. A 500-meter Cartesian receptor grid centered on Ameren Labadie Plant and extending out 10 kilometers.
3. A 1,000-meter Cartesian receptor grid centered on Ameren Labadie Plant and extending out 50 kilometers. 50 kilometers is the maximum distance accepted by USEPA for the use of the AERMOD dispersion model.[12]

A flagpole height of 1.5 meters was used for all these receptors.

Elevations from stacks and receptors were obtained from National Elevation Dataset (NED) GeoTiff data. GeoTiff is a binary file that includes data descriptors and geo-referencing information necessary for extracting terrain elevations. These elevations were extracted from 1 arc-second (30 meter) resolution NED files. The USEPA software program AERMAP v. 11103 is used for these tasks.

4.5 Meteorological Data

To improve the accuracy of the modeling analysis, recent meteorological data for the 2012-2014 period were prepared using the USEPA's program AERMET which creates the model-ready surface and profile data files required by AERMOD. Required data inputs to AERMET included surface meteorological measurements, twice-daily soundings of upper air measurements, and the micrometeorological parameters surface roughness, albedo, and Bowen ratio. One-minute ASOS data were available so USEPA methods were used to reduce calm and missing hours.[13] The USEPA software program AERMINUTE v. 14237 is used for these tasks.

This section discusses how the meteorological data was prepared for use in the 1-hour SO_2 NAAQS modeling analyses. The USEPA software program AERMET v. 14134 is used for these tasks.

---

[12] USEPA, Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions, Appendix W to 40 CFR Part 51, Section A.1.(1), November 9, 2005.
[13] USEPA, Area Designations for the 2010 Revised Primary Sulfur Dioxide National Ambient Air Quality Standards, Attachment 3, March 24, 2011, p. 19.

4.5.1 Surface Meteorology

Surface meteorology was obtained for Spirit of St. Louis Airport located near the Ameren Labadie Plant. Integrated Surface Hourly (ISH) data for the 2012-2014 period were obtained from the National Climatic Data Center (NCDC). The ISH surface data was processed through AERMET Stage 1, which performs data extraction and quality control checks.

4.5.2 Upper Air Data

Upper-air data are collected by a "weather balloon" that is released twice per day at selected locations. As the balloon is released, it rises through the atmosphere, and radios the data back to the surface. The measuring and transmitting device is known as either a radiosonde, or rawindsonde. Data collected and radioed back include: air pressure, height, temperature, dew point, wind speed, and wind direction. The upper air data were processed through AERMET Stage 1, which performs data extraction and quality control checks.

For Ameren Labadie Plant, the concurrent 2012-2014 upper air data from twice-daily radiosonde measurements obtained at the most representative location were used. This location was the Lincoln, Illinois measurement station. These data are in Forecast Systems Laboratory (FSL) format and were downloaded in ASCII text format from NOAA's FSL website.[14] All reporting levels were downloaded and processed with AERMET.

4.5.3 AERSURFACE

AERSURFACE is a program that extracts surface roughness, albedo, and daytime Bowen ratio for an area surrounding a given location. AERSURFACE uses land use and land cover (LULC) data in the U.S. Geological Survey's 1992 National Land Cover Dataset to extract the necessary micrometeorological data. LULC data was used for processing meteorological data sets used as input to AERMOD.

AERSURFACE v. 13016 was used to develop surface roughness, albedo, and daytime Bowen ratio values in a region surrounding the meteorological data collection site. AERSURFACE was used to develop surface roughness in a one kilometer radius surrounding the data collection site. Bowen ratio and albedo was developed for a 10 kilometer by 10 kilometer area centered on the meteorological data collection site. These micrometeorological data were processed for seasonal periods using 30-degree sectors. Seasonal moisture conditions were considered average with winter months having no continuous snow cover.

[14] Available at: http://esrl.noaa.gov/raobs/

4.5.4 Data Review

Missing meteorological data were not filled as the data file met USEPA's 90% data completeness requirement.[15] The AERMOD output file shows there were 0.42% missing data.

To confirm the representativeness of the airport meteorological data, the surface characteristics of the airport data collection site and the modeled source location were compared. Since the Spirit of St. Louis Airport is located close to Ameren Labadie Plant, this meteorological data set was considered appropriate for this modeling analysis. [16] Additionally, this weather station provided high quality surface measurements for the most recent 3-year time, and had similar land use, surface characteristics, terrain features and climate.

5. Background SO_2 Concentrations

Background concentrations were determined consistent with USEPA's Modeling Guidance for SO_2 NAAQS Designations.[17, 18] To preserve the form of the 1-hour SO_2 standard, based on the 99th percentile of the annual distribution of daily maximum 1-hour concentrations averaged across the number of years modeled, the background fourth-highest daily maximum 1-hour SO_2 concentration was added to the modeled fourth-highest daily maximum 1-hour SO_2 concentration.[19] Background concentrations were based on the 2011-13 design value measured by the ambient monitors located in Missouri.[20]

6. Reporting

All files from the programs used for this modeling analysis are available to regulatory agencies. These include analyses prepared with AERSURFACE, AERMET, AERMAP, and AERMOD.

---

[15] USEPA, Meteorological Monitoring Guidance for Regulatory Modeling Applications, EPA-454/R-99-05, February 2000, Section 5.3.2, pp. 5-4 to 5-5.
[16] USEPA, AERMOD Implementation Guide, March 19, 2009, pp. 3-4.
[17] USEPA, Area Designations for the 2010 Revised Primary Sulfur Dioxide National Ambient Air Quality Standards, Attachment 3, March 24, 2011, pp. 20-23.
[18] USEPA, SO_2 NAAQS Designations Modeling Technical Assistance Document, Dec. 2013, section 8.1, pp 27-28.
[19] USEPA, Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard, August 23, 2010, p. 3.
[20] http://www.epa.gov/airtrends/values.html

G.4 – Sierra Club Modeling for Sibley Generating Station

Washington University in St. Louis
SCHOOL OF LAW

Interdisciplinary Environmental Clinic

September 3, 2015

Ms. Wendy Vit
Chief, Air Quality Planning Section
Air Pollution Control Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176
Via email to apcpsip@dnr.mo.gov

Re: 2010 1-Hour Sulfur Dioxide Standard, Proposed Options for Area Boundary Recommendations, July 2016 Designations

Dear Ms. Vit:

On behalf of the Sierra Club, we submit the attached modeling report prepared by Wingra Engineering regarding the SO_2 designation for the Sibley power plant. This report documents that the area around Sibley should be designated nonattainment based on the most recent actual emissions.

Sincerely yours,

Maxine I. Lipeles, Director
Interdisciplinary Environmental Clinic
Washington University School of Law
One Brookings Drive – CB 1120
St. Louis, MO 63130
314-935-5837 (phone); 314-935-5171 (fax)
milipele@wustl.edu

Attorneys for the Sierra Club

Cc: Rebecca Weber, Director, Air & Waste Management Division, EPA Region 7
Chief, Air Planning & Development Branch, EPA Region 7
Kyra Moore, Director, Air Pollution Control Program, DNR

Sibley Generating Station

Sibley, Missouri

Evaluation of Compliance with the 1-hour NAAQS for SO_2

September 3, 2015

Conducted by:

Steven Klafka, P.E., BCEE

Wingra Engineering, S.C.

Madison, Wisconsin

1. Introduction

Wingra Engineering, S.C. was hired by Sierra Club to conduct an air modeling impact analysis to help the U.S. Environmental Protection Agency (USEPA) and state and local air agencies identify facilities that are likely causing exceedances of the 1-hour sulfur dioxide (SO_2) national ambient air quality standard (NAAQS). This document describes the results and procedures for an evaluation conducted for the Sibley Generating Station located in Sibley, Missouri.

To ensure the modeling analysis reflected the cumulative concentration of SO_2 emissions, it included emissions from the following additional sources of SO_2 emissions located within 50 kilometers of the Sibley Generating Station:

- Hawthorne Generating Station - Kansas City, Missouri
- Veolia Energy - Kansas City - Kansas City, Missouri
- Nearman Creek Power Station - Kansas City, Kansas

The dispersion modeling analysis predicted ambient air concentrations for comparison with the 1-hour SO_2 NAAQS. The modeling was performed using the most recent version of AERMOD, AERMET, and AERMINUTE, with data provided to Sierra Club by regulatory air agencies or obtained through other publicly-available sources as documented below. The analysis was conducted in adherence to all available USEPA guidance for evaluating source impacts on attainment of the 1-hour SO_2 NAAQS via aerial dispersion modeling, including the AERMOD Implementation Guide; USEPA's Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard, August 23, 2010; modeling guidance promulgated by USEPA in Appendix W to 40 CFR Part 51; USEPA's March 2011 Modeling Guidance for SO_2 NAAQS Designations; [1] and USEPA's December 2013 SO_2 NAAQS Designations Technical Assistance Document.[2]

2. Compliance with the 1-hour SO_2 NAAQS

2.1 1-hour SO_2 NAAQS

The 1-hour SO_2 NAAQS takes the form of a three-year average of the 99th-percentile of the annual distribution of daily maximum 1-hour concentrations, which cannot exceed 75 parts per billion (ppb).[3] Compliance with this standard was verified using USEPA's AERMOD air dispersion model, which produces air concentrations in units of $\mu g/m^3$. The 1-hour SO_2 NAAQS of 75 ppb equals

---

[1] http://www.epa.gov/scram001/so2_modeling_guidance.htm
[2] http://www.epa.gov/oaqps001/sulfurdioxide/pdfs/SO2ModelingTAD.pdf
[3] USEPA, Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard, August 23, 2010.

196.2 μg/m^3, and this is the value used for determining whether modeled impacts exceed the NAAQS.[4] The 99th-percentile of the annual distribution of daily maximum 1-hour concentrations corresponds to the fourth-highest value at each receptor for a given year.

2.2 Modeling Results

Model results for all sources included in the SO_2 analysis are summarized in Table 1. Results are provided for each source alone, and for all sources combined.

Modeling results for Sibley Generating Station and the other three power plants are summarized in Table 1. It was determined that based on either current allowable emissions or measured actual emissions, the Sibley Generating Station is estimated to create downwind SO_2 concentrations which exceed the 1-hour NAAQS.

More specifically, the modeling results presented in Table 1, show exceedances of the NAAQS by the plant's allowable and actual emissions. "Allowable" is the peak emission rate from each unit as approved by the current air quality operation permit for the facility. "Actual" are the measured emissions for each hour between January 1, 2012 and December 31, 2014 as taken from USEPA *Air Markets Program Data*.[5]

In addition, the emissions from the Hawthorne, Nearman Creek and Veolia plants significantly contribute to the ambient SO_2 concentration in the area impacted by Sibley Generating Station.

Air quality impacts in Missouri are based on a background concentration of 23.5 μg/m^3. This is the 2011-13 design value for Monroe County, Missouri – the lowest measured background concentration in the state. This is the most recently available design value. See Section 5 for further discussion of the background concentrations used for this analysis.

---

[4] The ppb to μg/m^3 conversion is found in the source code to AERMOD v. 14134, subroutine Modules. The conversion calculation is 75/0.3823 = 196.2 μg/m^3.
[5] http://ampd.epa.gov/ampd/

Table 1 - SO_2 Modeling Results for Sibley Generating Station Modeling Analysis

Emission Rates	Averaging Period	99th Percentile 1-hour Daily Maximum (µg/m³)				Complies with NAAQS?
		Impact	Background	Total	NAAQS	
Allowable	Sibley Boiler 70	1,197.1	23.5	1,220.6	196.2	No
Actual		47.8	23.5	71.3	196.2	Yes
Allowable	Sibley Boilers 50, 60 & 70	1,411.9	23.5	1,435.4	196.2	No
Actual		50.8	23.5	74.3	196.2	Yes
Allowable	Hawthorne	379.7	23.5	403.2	196.2	No
Actual		23.5	23.5	47.0	196.2	Yes
Allowable	Nearman Creek	126.3	23.5	149.8	196.2	Yes
Actual		81.4	23.5	104.9	196.2	Yes
Allowable	Veolia	1,614.5	23.5	1,638.0	196.2	No
Actual		407.6	23.5	431.1	196.2	No
Allowable	All With Sibley Boiler 70	1,706.5	23.5	1,730.0	196.2	No
Actual		411.7	23.5	435.2	196.2	No
Allowable	All With Sibley Boilers 50, 60 & 70	1,739.0	23.5	1,762.5	196.2	No
Actual		411.7	23.5	435.2	196.2	No

The emissions used for the modeling analysis are summarized in Table 2.

Table 2 - Modeled SO_2 Emissions [6]

Stack ID	Unit ID	Allowable Emissions (lbs/hr)
S01	Boiler 50	5,486.4
	Boiler 60	5,645.7
	Boiler 70	36,576.9
Sibley	Subtotal	47,709.0
H01	Unit 5A	10,792.0
Hawthorne	Subtotal	10,792.0
N01	Unit 1	2,919.7
Nearman Creek	Subtotal	2,919.7
V02	Boiler 6	3,434.3
	Boiler 8	3,604.0
Veolia	Subtotal	7,038.2
Facility	Total	68,459.0

Based on the modeling results, Table 3 provides the emission reductions from current allowable rates necessary to achieve compliance with the 1-hour NAAQS. This assumes a one-hour averaging period for the emission rate and that the emission rate is binding at all times. However, given the conservative aspects of this modeling protocol, it is extremely likely that this limit is too high to protect the NAAQS. For example, startup or shutdown periods were not evaluated. During these periods, decreased gas velocities and temperatures may lead to greater ambient impacts at ground level. Further, the hypothetical emission limitation in Table 3 would allow Sibley Generating Station to consume the entire NAAQS, leaving little to no room for any other source of SO_2 in the area. No margin of safety has been included in the hypothetical emission limitation.

[6] Sibley allowable emissions were taken from Missouri DNR, Part 70 Permit to Operate, No. OP2006-063, August 31, 2006. Hawthorne allowable emissions were taken from Missouri DNR, Part 70 Permit to Operate, No. OP2013-0024, July 12, 2013. Nearman Creek allowable emissions were taken from Kansas, Air Emission Source Class I Operating Permit, ID 2090008, March 24, 2004. Veolia allowable emissions were taken from Missouri DNR, Part 70 Permit to Operate, No. OP2012-050, No. OP2012-050, March 4, 2013.

Table 3 - Required Emission Reductions from Sibley Generating Station for Compliance with the 1-hour NAAQS for SO_2

Acceptable Impact (NAAQS - Background) 99th Percentile 1-hour Daily Max ($\mu g/m^3$)	Required Total Facility Reduction Based on Allowable Emissions (%)	Required Total Facility Emission Rate (lbs/hr)	Required Total Facility 1-hour Average Emission Rate (lbs/mmbtu)
172.7	90%	4,738.0	0.89

Predicted exceedances of the 1-hour NAAQS for SO_2 based on allowable emissions extend throughout the region to a maximum distance of 50 kilometers.

Figure 1 shows the extent of NAAQS violations based on allowable emissions from all sources.

Figure 2 shows the extent of NAAQS violations based on actual hourly emissions from all sources.

2.3 Conservative Modeling Assumptions

A dispersion modeling analysis requires the selection of numerous parameters which affect the predicted concentrations. For the enclosed analysis, several parameters were selected which under-predict facility impacts.

Assumptions used in this modeling analysis which likely under-estimate concentrations include the following:

- Allowable emissions are based on a limitation with an averaging period which is greater than the 1-hour average used for the SO_2 air quality standard. Emissions and impacts during any 1-hour period may be higher than assumed for the modeling analysis.
- No consideration of facility operation at less than 100% load. Stack parameters such as exit flow rate and temperature are typically lower at less than full load, reducing pollutant dispersion and increasing predicted air quality impacts.
- No consideration of building or structure downwash. These downwash effects typically increase predicted concentrations near the facility.
- Except for the Hawthorne, Nearman Creek and Veolia plants, no consideration of off-site sources. Any other off-site sources of SO_2 will increase the predicted impacts.

2.4 Comparison with Existing Ambient Monitoring

An ambient monitor for SO_2 is operated approximately 1.2 km or 0.7 miles southeast of Veolia Energy. The USEPA database for ambient monitoring measurements identifies Monitor

#7290950034 as the TROOST: 724 Troost (Rear), Kansas City, MO 64106 monitor.[7] The 2012-14 design value measured at this monitor was 150 ppb or 392.4 $\mu g/m^3$.

Based on actual hourly emissions from the Sibley plant and other regional sources, the modeling analysis predicted a concentration near the monitor location of 382.5 $\mu g/m^3$. Minus the assumed background of 23.5 $\mu g/m^3$ the predicted impact due to regional SO_2 sources is 359 $\mu g/m^3$. Since the predicted and actual measured design values are in close agreement, this comparison supports the accuracy of the modeling results presented in this report.

[7] http://www.epa.gov/airtrends/pdfs/SO2_DesignValues_20122014_FINAL_8_3_15.xlsx

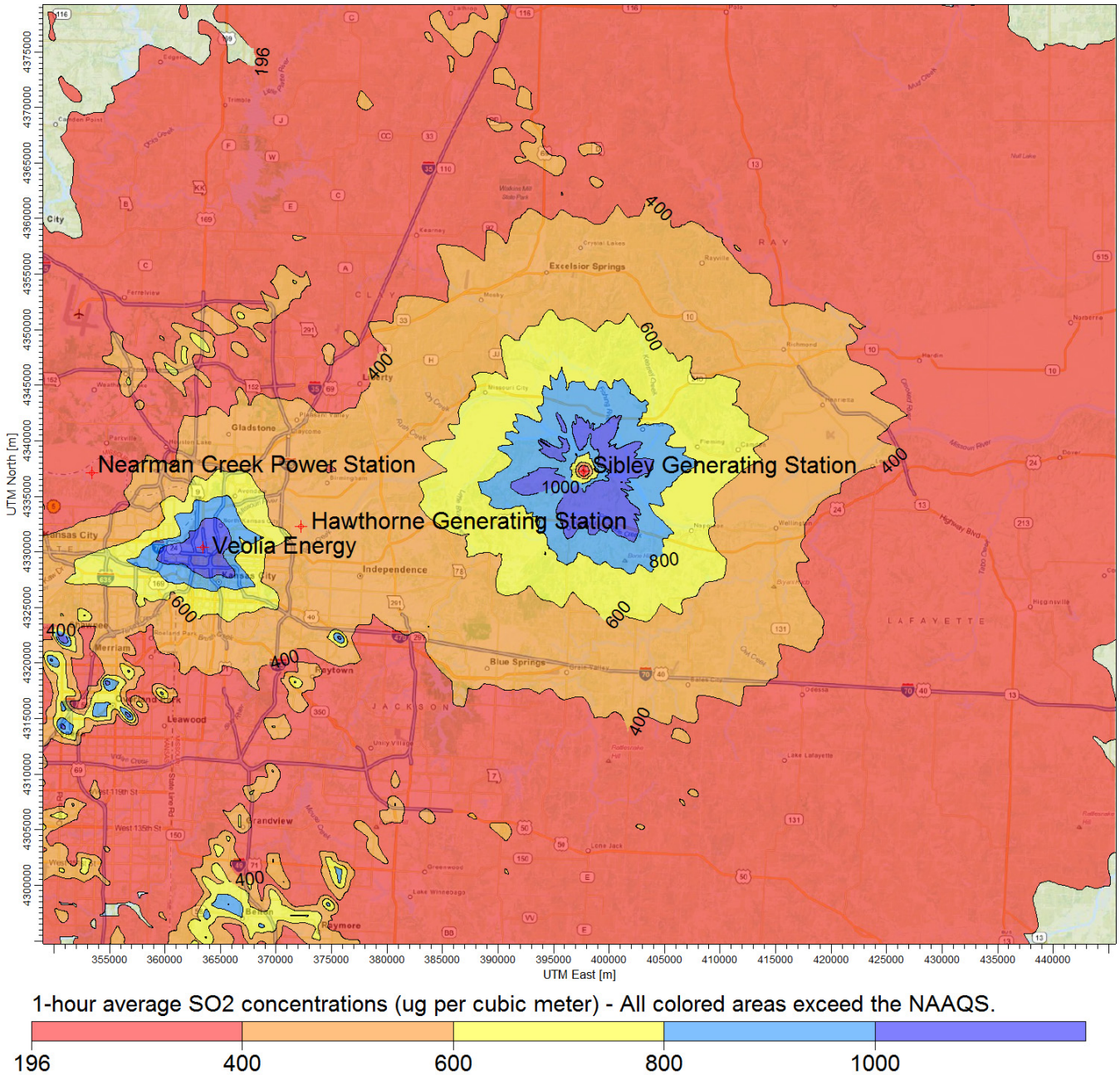


Figure 1 - Regional View of Impacts Based on Allowable Emissions from All Sources

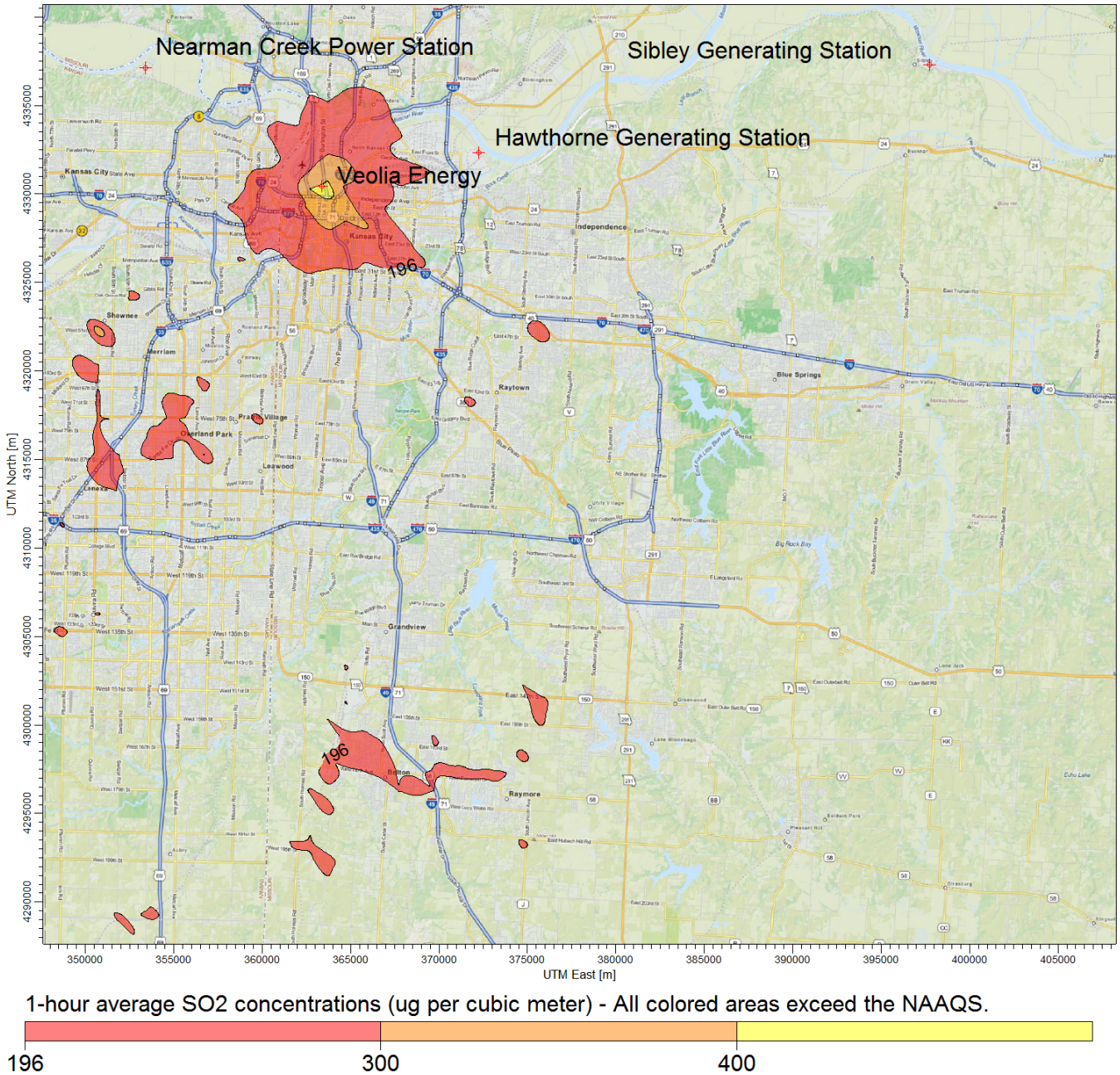


Figure 2 - Regional View of Impacts Based on Actual Emissions from All Sources

3. Modeling Methodology

3.1 Air Dispersion Model

The modeling analysis used USEPA's AERMOD program, v. 14134. AERMOD, as available from the Support Center for Regulatory Atmospheric Modeling (SCRAM) website, was used in conjunction with a third-party modeling software program, *AERMOD View*, sold by Lakes Environmental Software.

3.2 Control Options

The AERMOD model was run with the following control options:

- 1-hour average air concentrations
- Regulatory defaults
- Flagpole receptors

To reflect a representative inhalation level, a flagpole height of 1.5 meters was used for all modeled receptors. This parameter was added to the receptor file when running AERMAP, as described in Section 4.4.

An evaluation was conducted to determine if the modeled facility was located in a rural or urban setting using USEPA's methodology outlined in Section 7.2.3 of the Guideline on Air Quality Models.[8] For urban sources, the URBANOPT option is used in conjunction with the urban population from an appropriate nearby city and a default surface roughness of 1.0 meter. Methods described in Section 4.1 were used to determine whether rural or urban dispersion coefficients were appropriate for the modeling analysis.

3.3 Output Options

The AERMOD analysis was based on three years of recent meteorological data. The modeling analyses used one run with three years of sequential meteorological data from 2012-2014. Consistent with USEPA's Modeling Guidance for SO_2 NAAQS Designations, AERMOD provided a table of fourth-high 1-hour SO_2 impacts concentrations consistent with the form of the 1-hour SO_2 NAAQS.[9]

Please refer to Table 1 for the modeling results.

---

[8] USEPA, Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions, Appendix W to 40 CFR Part 51, November 9, 2005.
[9] USEPA, Area Designations for the 2010 Revised Primary Sulfur Dioxide National Ambient Air Quality Standards, Attachment 3, March 24, 2011, pp. 24-26.

4. Model Inputs

4.1 Geographical Inputs

The "ground floor" of all air dispersion modeling analyses is establishing a coordinate system for identifying the geographical location of emission sources and receptors. These geographical locations are used to determine local characteristics (such as land use and elevation), and also to ascertain source to receptor distances and relationships.

The Universal Transverse Mercator (UTM) NAD83 coordinate system was used for identifying the easting (x) and northing (y) coordinates of the modeled sources and receptors. Stack locations were obtained from facility permits and prior modeling files provided by the state regulatory agency. The stack locations were then verified using aerial photographs.

The facility was evaluated to determine if it should be modeled using the rural or urban dispersion coefficient option in AERMOD. A Geographic Information System (GIS) was used to determine whether rural or urban dispersion coefficients apply to a site. Land use within a three-kilometer radius circle surrounding the facility was considered. USEPA guidance states that urban dispersion coefficients are used if more than 50% of the area within 3 kilometers has urban land uses. Otherwise, rural dispersion coefficients are appropriate.[10]

USEPA's AERSURFACE v. 13016 was used to develop the meteorological data for the modeling analysis. This model was also used to evaluate surrounding land use within 3 kilometers. Based on the output from the AERSURFACE, approximately 1.5% of surrounding land use around the modeled facility was of urban land use types including Type 21 – Low Intensity Residential, Type 22 – High Intensity Residential and Type 23 – Commercial / Industrial / Transportation.

This is less than the 50% value considered appropriate for the use of urban dispersion coefficients. Based on the AERSURFACE analysis, it was concluded that the rural option would be used for the modeling summarized in this report. Please refer to Section 4.5.3 for a discussion of the AERSURFACE analysis.

[10] USEPA, Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions, Appendix W to 40 CFR Part 51, November 9, 2005, Section 7.2.3.

4.2 Emission Rates and Source Parameters

The modeling analysis considered SO_2 emissions from the Sibley, Hawthorne, Nearman Creek and Veolia power plants. Other off-site sources were not considered. Concentrations were predicted for the scenarios shown in Tables 1 and 2:

1) allowable emissions based on the current permit issued by the regulatory agency, and

2) actual hourly emissions for Sibley, Hawthorne and Nearman Creek were measured each hour between January 1, 2012 and December 31, 2014 as taken from USEPA *Air Markets Program Data*.[11] Actual emissions for Veolia were the annual average based on the emissions inventory report for 2014.

Stack parameters and emissions used for the modeling analysis are summarized in Table 4.

Table 4 – Facility Stack Parameters and Emissions [12]

Facility	Sibley		Hawthorn	Nearman	Veolia
Stack	S01	S03	H01	N01	V01
Description	50, 60 and 70	Boiler 70	Unit 5A	Unit 1	6 and 8
X Coord. [m]	397718	397718	372264	353388	363375
Y Coord. [m]	4337279	4337279	4332322	4337135	4330433
Base Elevation [m]	221.13	221.13	226.06	229.41	234.12
Release Height [m]	213.36	213.36	182.88	121.92	85.95
Gas Exit Temperature [°K]	422.039	422.039	338.706	410.928	395.928
Gas Exit Velocity [m/s]	37.087	28.43	27.344	13.373	1.798
Inside Diameter [m]	4.115	4.115	6.462	6.096	5.105
Allowable Emission Rate [g/s]	6,011	4,609	1,360	367.9	886.8
Actual Emission Rate [g/s]	-	-	-	-	223.9

The above stack parameters and emissions were obtained from regulatory agency documents and databases identified in Section 2.2. The analysis was conducted based on 100% operating load using maximum exhaust flow rates and temperatures. Operation at less than full capacity loads was not considered. This assumption under-predicts impacts since stack parameters such as exit flow rate and temperature are lower at less than full load, reducing pollutant dispersion and increasing predicted air quality impacts. Stack location, height and diameter were verified using aerial photographs, and flue gas flow rate and temperature were verified using combustion calculations.

---

[11] http://ampd.epa.gov/ampd/

[12] Sibley, Hawthorne and Nearman Creek stack parameters obtained from U.S. Energy Information Administration, Form EIA-923 Detailed Data, Schedule 6, Stack & Flue Data, http://www.eia.gov/electricity/data/eia923/. Veolia stack parameters obtained from Missouri DNR, Emissions Inventory Questionnaire for 2014.

4.3 Building Dimensions

No building dimensions or prior downwash evaluations were available. Therefore this modeling analysis did not address the effects of downwash and this may under-predict impacts.

4.4 Receptors

For Sibley Generating Station, three receptor grids were employed:

1. A 100-meter Cartesian receptor grid centered on Sibley Generating Station and extending out 5 kilometers.
2. A 500-meter Cartesian receptor grid centered on Sibley Generating Station and extending out 10 kilometers.
3. A 1,000-meter Cartesian receptor grid centered on Sibley Generating Station and extending out 50 kilometers. 50 kilometers is the maximum distance accepted by USEPA for the use of the AERMOD dispersion model.[13]

A flagpole height of 1.5 meters was used for all these receptors.

Elevations from stacks and receptors were obtained from National Elevation Dataset (NED) GeoTiff data. GeoTiff is a binary file that includes data descriptors and geo-referencing information necessary for extracting terrain elevations. These elevations were extracted from 1 arc-second (30 meter) resolution NED files. The USEPA software program AERMAP v. 11103 is used for these tasks.

4.5 Meteorological Data

To improve the accuracy of the modeling analysis, recent meteorological data for the 2012-2014 period were prepared using the USEPA's program AERMET which creates the model-ready surface and profile data files required by AERMOD. Required data inputs to AERMET included surface meteorological measurements, twice-daily soundings of upper air measurements, and the micrometeorological parameters surface roughness, albedo, and Bowen ratio. One-minute ASOS data were available so USEPA methods were used to reduce calm and missing hours.[14] The USEPA software program AERMINUTE v. 14237 is used for these tasks.

This section discusses how the meteorological data was prepared for use in the 1-hour SO_2 NAAQS

---

[13] USEPA, Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions, Appendix W to 40 CFR Part 51, Section A.1.(1), November 9, 2005.
[14] USEPA, Area Designations for the 2010 Revised Primary Sulfur Dioxide National Ambient Air Quality Standards, Attachment 3, March 24, 2011, p. 19.

modeling analyses. The USEPA software program AERMET v. 14134 is used for these tasks.

4.5.1 Surface Meteorology

Surface meteorology was obtained for Kansas City Downtown Airport located near the Sibley Generating Station. Integrated Surface Hourly (ISH) data for the 2012-2014 period were obtained from the National Climatic Data Center (NCDC). The ISH surface data was processed through AERMET Stage 1, which performs data extraction and quality control checks.

4.5.2 Upper Air Data

Upper-air data are collected by a "weather balloon" that is released twice per day at selected locations. As the balloon is released, it rises through the atmosphere, and radios the data back to the surface. The measuring and transmitting device is known as either a radiosonde, or rawindsonde. Data collected and radioed back include: air pressure, height, temperature, dew point, wind speed, and wind direction. The upper air data were processed through AERMET Stage 1, which performs data extraction and quality control checks.

For Sibley Generating Station, the concurrent 2012-2014 upper air data from twice-daily radiosonde measurements obtained at the most representative location were used. This location was the Topeka, Kansas measurement station. These data are in Forecast Systems Laboratory (FSL) format and were downloaded in ASCII text format from NOAA's FSL website.[15] All reporting levels were downloaded and processed with AERMET.

4.5.3 AERSURFACE

AERSURFACE is a program that extracts surface roughness, albedo, and daytime Bowen ratio for an area surrounding a given location. AERSURFACE uses land use and land cover (LULC) data in the U.S. Geological Survey's 1992 National Land Cover Dataset to extract the necessary micrometeorological data. LULC data was used for processing meteorological data sets used as input to AERMOD.

AERSURFACE v. 13016 was used to develop surface roughness, albedo, and daytime Bowen ratio values in a region surrounding the meteorological data collection site. AERSURFACE was used to develop surface roughness in a one kilometer radius surrounding the data collection site. Bowen ratio and albedo was developed for a 10 kilometer by 10 kilometer area centered on the meteorological data collection site. These micrometeorological data were processed for seasonal periods using 30-degree sectors. Seasonal moisture conditions were considered average with winter

[15] Available at: http://esrl.noaa.gov/raobs/

months having continuous snow cover.

4.5.4 Data Review

Missing meteorological data were not filled as the data file met USEPA's 90% data completeness requirement.[16] The AERMOD output file shows there were 0.31% missing data.

To confirm the representativeness of the airport meteorological data, the surface characteristics of the airport data collection site and the modeled source location were compared. Since the Kansas City Downtown Airport is located close to Sibley Generating Station, this meteorological data set was considered appropriate for this modeling analysis. [17] Additionally, this weather station provided high quality surface measurements for the most recent 3-year time, and had similar land use, surface characteristics, terrain features and climate.

5. Background SO_2 Concentrations

Background concentrations were determined consistent with USEPA's Modeling Guidance for SO_2 NAAQS Designations.[18, 19] To preserve the form of the 1-hour SO_2 standard, based on the 99th percentile of the annual distribution of daily maximum 1-hour concentrations averaged across the number of years modeled, the background fourth-highest daily maximum 1-hour SO_2 concentration was added to the modeled fourth-highest daily maximum 1-hour SO_2 concentration.[20] Background concentrations were based on the 2011-13 design value measured by the ambient monitors located in Missouri.[21]

6. Reporting

All files from the programs used for this modeling analysis are available to regulatory agencies. These include analyses prepared with AERSURFACE, AERMET, AERMAP, and AERMOD.

---

[16] USEPA, Meteorological Monitoring Guidance for Regulatory Modeling Applications, EPA-454/R-99-05, February 2000, Section 5.3.2, pp. 5-4 to 5-5.
[17] USEPA, AERMOD Implementation Guide, March 19, 2009, pp. 3-4.
[18] USEPA, Area Designations for the 2010 Revised Primary Sulfur Dioxide National Ambient Air Quality Standards, Attachment 3, March 24, 2011, pp. 20-23.
[19] USEPA, SO_2 NAAQS Designations Modeling Technical Assistance Document, Dec. 2013, section 8.1, pp 27-28.
[20] USEPA, Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard, August 23, 2010, p. 3.
[21] http://www.epa.gov/airtrends/values.html