Control Equipment Description

Control Technology Description Located at Southwest Power Station

Unit 1 ESP

Unit 1 is equipped with a high efficiency electrostatic precipitator (ESP) used for controlling emissions of particulate matter. The original manufacturer of the precipitator was Universal Oil Products (UOP). The original purchasing contract specified an overall design collection efficiency rating of 99.6 percent. In 1995, performance test results indicated a capture efficiency of 98.7%1. In late 2001 or early 2002, PECO rebuilt the inlet field by replacing the existing four (4) T/R sets with eight (8) new sets. The outlet field was upgraded by replacing the collector plates and retrofitting with rigid discharge electrodes. As needed, Southwest utilizes a Wilhelm Environmental Technologies' SO_3 injection system for additional opacity and particulate control. In theory, the SO_3 injection system provides further reduction in particulate emissions through enhanced ESP efficiencies and reduction of electrical resistivity of the particles being collected. The SO_3 injection system conditions the particles upstream of the ESP for collection by the particulate control device. During the recent CAM testing, the particulate emission rate with the SO_3 injection system operating was determined to be 0.074 lbs/mBtu at an average opacity of 24.83% (i.e., De-tuned Point 4B). Under relatively similar conditions without the SO_3 injection system, the average particulate emission rate was 0.088 lbs/mBtu at 25.77% opacity (De-tuned Point 4A).

One (1) electrostatic precipitator is in the flue gas ductwork downstream of the Unit 1 coal-fired steam generator. The precipitator consists of a four (4)-chamber unit, with 27 gas passages per chamber in fields 1 & 4 and 36 gas passages per chamber in fields 2 & 3, designed to remove fly ash from the cold-side flue gas originating from the coal-fired steam generator.2 As the gas passes the high voltage rigid discharge electrode (RDEs), it receives a negative charge and is attracted to the positively charged collecting plates. At timed intervals, magnetic impact rappers attached to the collecting plates and RDEs are energized and "rapped" to dislodge the accumulated material, which falls by gravity to the 16 hoppers below. Once the fly ash is removed, the cleaned flue gas is emitted to the atmosphere. Typical ESPs are designed to achieve overall PM control efficiencies in excess of 99.9 percent.3 Table 5, below, details more specifically Unit 1's ESP design parameters.

1 Testing provided by Burns & McDonnell on September 6 and 7, 1995.

2 PECO Operation & Instruction Manual, Project #5832

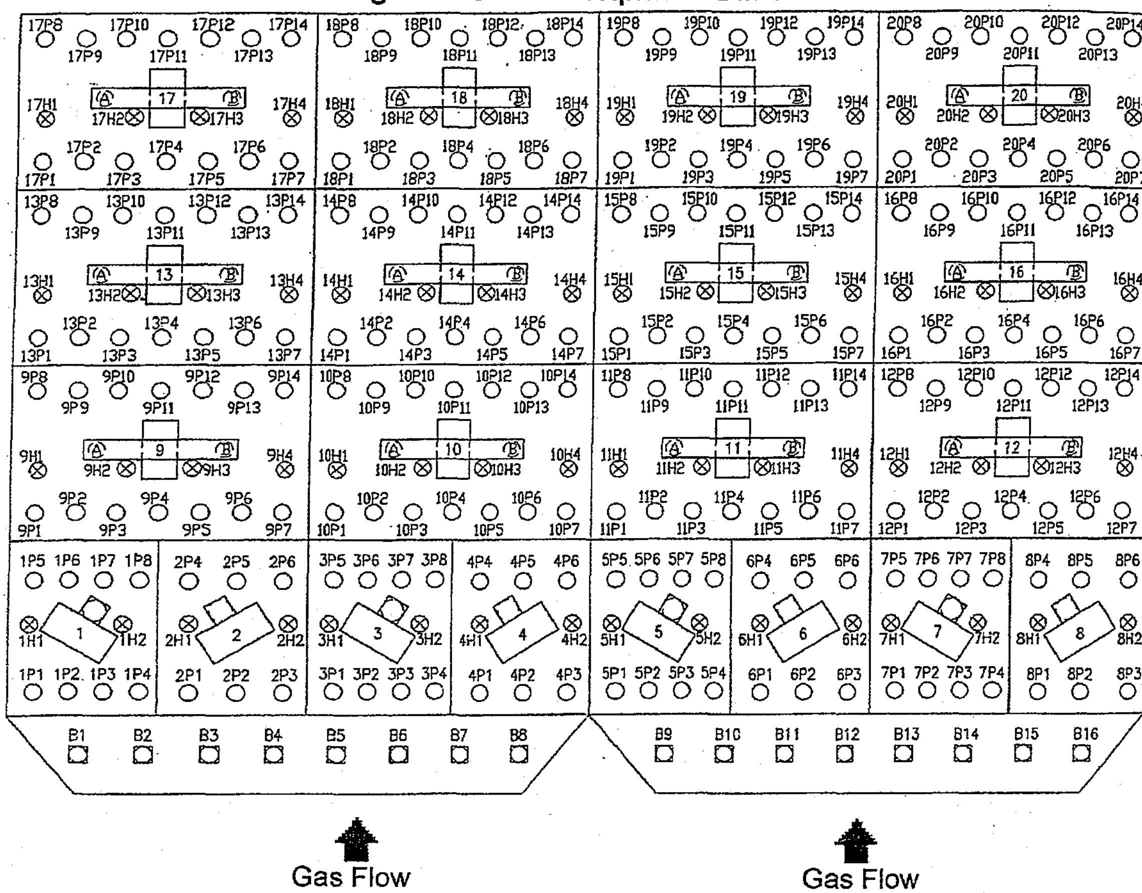
3 70 FR 9705.

Table 5: Unit 1 ESP Design Parameters:

Parameter	Design	Range
Total gas flow, ACFM x 10^5	7.95	7.0-9.0
Gas Temperature, °F	310	280-325
Draft Loss, inches wc	0.5	N/A
Collection Efficiency	99.60	N/A

The electrostatic precipitator is structurally designed and constructed as one complete unit. The precipitator is housed in a reinforced steel casing, complete with hoppers. The collecting electrodes for the last three (3) fields are divided into seven (7) spring mounted groups. The collecting surfaces of the inlet field are manufactured from 16 ga. Roll forced component with "Opzel" baffles. The baffles act as stiffeners. They provide rigidity and straightness for the collecting plate assemblies and also enhance the transmission of rapping energy over the entire collecting surface. Figure 2, below, depicts the precipitator gas flow through Unit 1's ESP.

Figure 2: Unit 1 Precipitator Gas Flow



The electrostatic precipitator is classified as a rigid frame, horizontal flow dry type precipitator. The electrostatic precipitator's chamber contains four independently energized fields in series. Table 9 lists Unit 1's ESP physical characteristics data for reference.

Table 6: Unit 1 Precipitator Physical Characteristics

Parameter	Value
Design Gas Volume	795,000 ACFM
Design Gas Temperature, °F	310 °F
Number of Precipitators	1
Number of Mechanical Fields in Series/ESP	4 @ 9'
Number of Electrical Fields in Series/ESP	4 @ 9'
Number of Chambers in Parallel/ESP	4
Number of Bus Sections in Parallel/Chamber	2
Bus Sections/ESP	32
Number of Gas Passages/ESP	108 Fields 1 & 4
	144 Fields 2 & 3
Spacing of Gas Passages	12" Fields 1 & 4
	9" Fields 2 & 3
Collecting Surface Material	A36, 16 Ga. Opzel-Type Plate
Total Effective Plate Area per Precipitator	272,160 ft^2
Specific Collecting surface SCA = A / V	272,160 ft^2 / 795,000 ACFM = 342 ft^2 / 1000 ACFM
Total Number of Discharge Electrodes/ESP	1,296 Fields 1 & 4 Combined
	3,456 Fields 2 & 3 Combined
Electrode Spacing (in direction of gas flow)	17 3/16" Field 1 (only)
Electrode Material for Field 1	A513, 16 ga. Tube w/ 1 ½" Pins
Electrode Diameter for Field 1	1 ½ "
Number/Type of Plate Rappers/ESP	225/Magnetic Impact
Number/Type of Electrode Rappers/ESP	64/Magnetic Impact
Collecting Surface/Rapper, ft^2 for Field 1	1080
Discharge Electrode/Rapper, ft for Field 1	1248/1344
Insulator Compartment Purge System	Positive Pressure Air

Sulfur Skid Description

Southwest Unit 1 installed a Wilhelm Environmental Technologies granular sulfur injection system to help improve Unit 1's ESP performance and reduce the frequency and duration of excess opacity emissions. The SO_3 injection system utilizes a granular elemental sulfur that is oxidized to SO_2 in an electric sulfur furnace. Other components include sulfur storage, a sulfur burner or furnace, a SO_2 to SO_3 converter and associated piping, controls and electrical equipment. Sulfur is loaded into a day tank each operating day when the injection system is used.

The sulfur burner or furnace is an insulated steel vessel. Granular sulfur is precisely metered into the furnace based on boiler load, where it is thoroughly combusted to SO_2. Process gas and SO_2 from the furnace are piped to the SO_2 and SO_3 converters. The SO_2/SO_3 converters are single-pass vanadium pentoxide catalytic converters. The vendor-guaranteed conversion efficiency is 95%. The objective is to maintain a SO_3 concentration at optimum levels for enhanced ESP efficiency. The SO_3 enters the Unit 1 ductwork just prior to the electrostatic precipitators. ESP performance is increased by adjusting the concentration of SO_3 in the process gas which alters the resistivity of the ash particles.

The Southwest Power Station has chosen not to use bulk loading of granulated sulfur. On an as needed basis, approximately one (1) ton of granulated sulfur is added to the day tank. At maximum design, the system consumes 75 pounds of granular sulfur per hour when the steam generation is at 100% load. Fugitive emissions from the sulfur loading to the day tank are controlled to the extent practicable.

Section 3 - Monitoring Approach Description

Background

This section provides background information on the pollutant specific emissions unit to which the CAM Plan applies. Existing monitoring requirements and quality assurance/quality control procedures are discussed. Further, a brief description of the CAM monitoring approach has been provided under this section.

Monitoring Approach

General Criteria

Indicator Range (Threshold): An exceedance is defined where emissions of particulate matter exceed 0.10 lb/mmBtu, based upon any average of three (3) – one (1) hour stack test runs. The test runs shall be performed under normal unit operating conditions. Typically, stack testing is performed at or near full load operations, where maximum particulate matter emissions are expected. Alternately, an excursion will be identified by an opacity percentage in excess of 26.3% calculated from three (3) hour block average data. Hourly average opacity data for Unit 1 will be used to create the three (3) hour block average. The justification for the selection of the indicator threshold will be discussed in further detail in Section 4. Boiler startup and shutdown periods will be excluded from any calculated average data. Startup and shutdown periods will be properly and promptly reported pursuant to the provisions of Missouri Regulation 10 CSR 10-6.050 and as required pursuant to the provisions of the Federal NSPS. Additionally, an alarm trigger level will be identified by an opacity level in excess of 26.3% for any hourly average. The alarm trigger level will initiate corrective action measures be taken as part of the power station's normal Operation and Maintenance (O & M) Plan and Procedures.

Performance Criteria

The certified Continuous Opacity Monitoring System (COMS) will be used to continuously monitor opacity as a secondary indicator of PM emissions. A Test and Cap Monitoring Approach was used to determine the correlation of opacity data versus PM mass emissions at several control device conditions. The control device was de-energized at four (4) separate conditions to mimic reduced ESP performance over time. Opacity levels were established at each of the de-energized conditions and a "reasonable" correlation of opacity to PM emissions was established. The COMS on the affected unit meets the requirements set forth under Federal regulations 40 CFR 60, Subpart D (or Missouri regulations 10 CSR 10-6.220) and the initial Performance Specification 1 for installation and certification of the opacity monitoring system.

Current, excess opacity reporting is required for all 6-minute opacity average data in excess of 20% for SWPS Unit 1. Exceptions allow for one (1) 6-minute average opacity percentage in excess of 20% but less than 27% per hour. The provisions established by the proposed CAM Plan do not affect the regulatory obligation of the Southwest Power Station to comply with the applicable opacity limitation or standard for the affected unit. Excess emissions during startup and shutdown periods are clearly identified for each six (6) minute average opacity data and reported quarterly to the MDNR.

City Utilities believes the data being collected from the COMS provides a representative sampling of the control device's current and on-going performance. Though opacity is not a direct measurement of compliance, it can be an excellent surrogate to ascertain a "reasonable assurance" of compliance and is a good indicator of possible excursions of the applicable emission limitation or standard. Plant operation and maintenance personnel use several indicators of proper control device and related control equipment operations. However, the primary indicator for most plant personnel is the COMS data. This seems like the best indicator to use for assessing on-going compliance and proper operation and maintenance of the control equipment. Maintenance is routinely performed by plant personnel on the control equipment. Appropriate checks and periodic maintenance is performed in accordance with the plant's Operation and Maintenance Plan and procedures and good engineering control practices. Specific quality assurance and quality control procedures are performed to assure proper operation and certification of the continuous opacity monitoring system (COMS). Opacity data will be monitored on a continuous basis using the COMS. One (1) minute opacity values are obtained and used to calculate an hourly average opacity percentage. A block of three (3) one-hour opacity averages will be used to calculate a three (3) hour block average that is compared to the CAM indicator threshold or range. Hourly average opacity data will be configured for monitoring the Alarm Trigger Level (ATL). The ATL will be used to initiate corrective action measures of the plant's O & M Plan and procedures. The quality of COMS data will continue to be scrutinized through daily calibration error checks and other periodic checks defined in the quality assurance/quality control manual. These periodic checks have been listed in Table 7, below.

Special criteria for Use of COMS

The Continuous Opacity Monitoring System (COMS) will require additional configuration of the software to record and store opacity data for use in complying with the CAM provisions. The ESC software is configured to monitor and record one (1) minute opacity data. Hourly averages will be determined from all one (1) minute values obtained during a "valid" hour. Since the PM standard is based on three (3) hour average. The ESC software can be configured to calculate and record a three (3) hour block average from the hourly averages recorded by the COMS and stored in the ESC database.

<u>Data Collection Frequency</u>

The Continuous Opacity Monitoring System (COMS) records data on a continuously when the boiler is operating. One (1) minute data, six (6) minute and hourly averages are recorded. One (1) minute data is not stored for more than a week. Three (3) hour block averages will be calculated from hourly averages recorded by the COMS. Except for periods of quality assurance (QA), the COMS should record and collect opacity data while the boiler is operating.

Description of Current Opacity Monitors

The KVB/Enertec MIP model LM3086EPA3 Opacity Monitor, located on Unit 1 stack, utilizes a laser-based technology, consisting of a straight single-pass, dual-path design. The laser is a monochromatic light source which radiates one, well-defined wavelength and provides a collimated beam for more accurate and precise results. [4]The monochromatic light source and the other design features of the opacity monitor are thoroughly discussed in the KVB/Enertec MIP Operations and Service Manual. Initial installation and certification testing were conducted in October of 2000.

QA/QC Requirements

The quality of the opacity data collected for the CAM Plan will require continued quality assurance/quality control activities be performed. The Southwest Power Station will continue to utilize guidelines established under 60.13 and the general provisions of the performance specification to Appendix B of Part 60 (PS-1) to validate quality data capture. Daily calibration error checks and periodic quality assurance activities will be followed as outlined in the plant's quality assurance/quality control manual.

Table 7, indicates the type of continued periodic checks performed by plant personnel each year. The QA/QC procedures are detailed as part of the plant's Quality Assurance Plan and in some cases reference the KVB/MIP opacity monitor operations and service manual. A calibration error check is required following any maintenance or corrective action or repair to the opacity monitor.

4 KVB/MIP Laser Based Opacity Monitor Operations and Service Manual, release date 11/98.

Table 7: Periodic Checks for Opacity Monitor

	Unit 1
DAILY	Check data logger and opacity monitor controller for faults
	Check dirty window indicator. Clean reflector per User's Tech. Manual
	Daily Auto-Calibration Test
WEEKLY	Open enclosure and conduct visual inspection
	Check optical alignment by noting position of light beam image
	Inspect purge air system for leaks or damage
MONTHLY	Check/clean flange tube for dirt or build-up of particulate on both transceiver and retroreflector
	Inspect purge air system on both transceiver and retroreflector
	Inspect retroreflector lens condition and clean the glass surface, as needed
	Inspect transceiver lens condition and clean the glass surface, as needed
QUARTERLY	On Stack Checks as Written in Opacity Manufacturer's Manual
SEMI-ANNUAL	Same as Quarterly
ANNUAL	Same as Quarterly/Semi-Annual List
	Annual On-Stack Opacity Filter Calibration

Averaging Period

Continuous opacity measurements – three (3) hour block average opacity data. One (1)-minute averages will be used to create one (1)-hour opacity averages. Three (3) - one (1)-hour averages are used to calculate a three (3)-hour block average from which the indicator threshold level or range can be determined.

Record keeping

Records of the COMS data and quality assurance and quality control activities pursuant the facility's quality assurance/quality control procedures will be maintained on-site at the Southwest Power Station. Records shall be maintained for a minimum period of five (5) years.

Reporting

Current opacity reports (See applicable record keeping forms, Attachment F of the Operating Permit renewal application) will continue to be submitted quarterly as defined by the applicable opacity standard or requirement of the plant's operating permit. On a semi-annual basis, excursions and/or deviations from the CAM Plan will be reported to the MDNR. Exceedances of the PM limitation or standard based on a required stack tes or subsequent testing will be reported within ten (10) days following the receipt of the final test report indicating an exceedance.

Operational QA/QC

The ESP located at the Southwest Power Station will be operated and maintained in accordance with manufacturer's recommendation. The Southwest Power Station will follow its O & M procedures for its applicable control device equipment to assure continuous compliance with the established emission limitation. It is not in the best interest of the utility to improperly maintain control equipment to the point of a deteriorated condition. Continued poor maintenance practices will eventually cause operational limitations and control device replacement that will cost City Utilities' ratepayers.

Unit Specific COMS Data

Table 8: Unit Specific Indicator Range (Threshold)

Southwest affected unit	CAM Indicator Range (Percent)	Opacity Limit (Percent)
Unit 1 (1)	26.3%	20%

The appropriate indicator (Opacity %) range (threshold) and alarm trigger level was determine through stack testing results and the average opacity reading over the duration of the test run (See Table 8, above). Average test data was graphed and a correlation of opacity to PM mass emission was "reasonably" determined. Unit 1 was significantly below its applicable PM standard at the unit's opacity limit. Exceedance of the PM standard was determined to correspond at an equivalent opacity above 29%. The highest tested opacity average (percent) of 35% corresponded to an average PM emission rate of 0.172 lb/mmBtu.

Current Baseline Opacity Indicator Ranges

Table 9: Unit Specific Baseline Opacity Values

Southwest Unit(s)	CAM Indicator Threshold	Average Baseline Opacity
	(Percent)	(Percent)
Unit 1 (1)	26.3%	11.2%

Unit 1: Normal operating range between 10 - 18% opacity. Table 9 shows the average opacity percent during the baseline CAM testing in comparison to the established CAM indicator range (threshold).

Typical opacity emissions during startup or shutdown periods can have a wide range of results depending on condition of the unit or operational problems experienced that would prolong unit startup. Startup opacity levels for Unit 1 range between 45 - 99% opacity. Unit startups on natural gas significantly limit the duration and magnitude of the excess emission. Shutdown periods are not as long and usually the magnitude of opacity percentage is much less.

Rationale and Documentation

Southwest is using the indicator threshold and monitoring approach because of the recent test data showing compliance with the applicable standard. A good correlation of the average test data can be made. This correlation was used in determining the appropriateness of the selection. The correlation between the PM mass emission and the percent opacity established a level (threshold) the plant could operate at before the CAM plan is triggered. Test data supporting this rationale and selection of the monitoring approach is provided in Section 7. A "reasonable" compliance margin has been incorporated as part of the indicator range (threshold) that establishes a safe operating condition lower than the PM limit based on percent opacity. Table 10 shows the percent of operating time at different loads based on an historical load analysis of the CEMS data. The results for 2004 show 85% or more of the total unit operating time is spent in the high (normal) operating range. 2003 performance results are consistent with 2004's analysis shown in Table 10.

Table 10: 2004[1] Historical Load Analysis

Unit Load	Unit 1 Range of Operation
	110 -195 MW
Low (0-30)	4.5
Mid (30-60%)	8.9
High (60-100%)	86.6

[1]Based on CEMS Flow RATA dates

Graphs and Tables of CAM/PM Testing

Southwest is using opacity as an indicator of conformance to the applicable emission limitation or standard. EPA has established opacity as a "presumptively acceptable" monitoring indicator in several of its guidance documents. EPA has allowed the use of "presumptively acceptable" monitoring without additional justification if the plant agrees to the conditions established by any recent technical guidance document(s). This guidance and other documents were used in the reliance on developing an appropriate plan for the Southwest Power Station. This plan has many elements of the EPA designed proposal and general guideline. However, a more appropriate site-specific plan was used and created for Southwest Unit 1. The overall monitoring approach was the same, but the trigger level varied based on the specific unit. These differences are discussed as part of the CAM Plan and support documentation. Graphs and tables supporting Southwest's selection of the appropriate CAM indicator and range (threshold are provided under the Table and Figures section of this CAM Plan.

Use of Indicators and Rationale

Opacity percent is a very useful surrogate to PM emissions from the unit boiler. It is an excellent indicator of control device performance problems. It is typically the main parameter that most unit operators or plant personnel review when trouble shooting or experiencing problems with the control device (ESPs). Other sources of performance indicators (i.e., total power to the box, etc.) are at best an arbitrary measurement that can be used to diagnosis problems, but are not good indicators for determining "reasonable assurance" of compliance with the applicable PM standard. Table 11 summarizes the monitoring approach to be used at the Southwest Power Station.

Comments or Applicable Reference Information

Quality Improvement Plan (QIP) thresholds are not currently being considered at the time of the CAM Plan submission. Currently, the CAM Plan does not indicate any deficiencies in the monitoring approach selected. Further, the COMS monitoring requirements provide the specific QA/QC procedures for data collection, record keeping, and reporting appropriate for determining a "reasonable assurance" of compliance with the applicable emission limitation or standard. The COMS can provide a surrogate continuous measurement of opacity/PM corresponding to the standard's averaging period.

Table 11: Monitoring Approach Summary Table

I. Indicator	Opacity of ESP exhaust	
A. Measurement Approach	COMS located in ESP exhaust	When the 3-hour average opacity of three (3) consecutive 1-hour average opacity data is outside the indicator range during normal unit operation, unit operators have three (3) hours to get average opacity data below the indicator range.
II. Indicator Range	The opacity indicator range is a collection of all 1-minute values and average over a 1-hour period. The 1-hour averages will be collected to calculate a 3-hour block average opacity for Unit 1. The 3-hour average opacity trigger for Southwest Unit 1 is greater than or equal to 26.3 percent.	The indicator range is a real-time measurement value of all 1-minute opacity readings collected over the averaging period. The 3-hour block average data is measured using an opacity monitor and stored in a polling computer used for reporting. 1-hour averages used to calculate 3-hour block average opacity data is collected and stored for long-term retrieval. 1-minute opacity readings are stored for a period not exceeding 1 week.
III. Performance Criteria A. Data Representativeness	The COMS was installed at a representative location in the exhaust stack per 40 CFR Part 60, Appendix B, PS-1 requirements	Testing for PM emissions was performed using EPA Method 17 over a range of ESP conditions. Average opacity data was collected during the same time as the performance testing for comparison.
B. Verification of Operational Status	Results of initial and subsequent performance PM testing have been evaluated and summarized in Tables 15-17 over the history of the plant.	Results of PM versus opacity measurements were evaluated and summarized in Figures 3 anc 4.
C. QA/QC Practices and Criteria	COMS installed via PS-1. Daily Zero and Span drift checks are performed. Annual filter audits are performed.	Filters are calibrated and certified annually.
D. Monitoring Frequency	The opacity of the ESP is monitored continuously (instantaneously) will calculate 1-minute averages. All 1-minute averages are used to calculate and store 1-hour opacity data, except for periods of quality assurance. 1-hour opacity averages will be used to calculate the 3-hour block average used as the monitoring indicator.	The CAM Plan is triggered when the three (3) hour block average of opacity data is outside the indicator range. Following the trigger level the unit operator has three (3) hours to get the three hour block average below the indicator range. If after the three (3) hours the opacity average is outside the indicator range the plant's O&M plan will be implement. The plant will follow the reporting requirements for deviation reporting within semi-annual report. Excursions will be reported within the semi-annual report.
E. Data Collection Procedures	The DAHS retains all 6-minute, hourly, and 3-hour average opacity data.	All records of data collected are retained for a maximum period of five (5) years.
F. Averaging period	The 10-second opacity data is used to calculate 1-minute averages. The 1-minute data is used to calculate the 1-hour average opacity, which is used to create a 3-hour block average of opacity.	None

Section 4 - Monitoring Approach Justification

Historical Background

Historical Compliance Testing

Unit 1

Previous testing for Unit 1 was conducted on September 6 and 7, 1995. Test results indicated compliance with the applicable 0.10 lb/mmBtu emission limit. The results indicated an average emission rate of 0.053 lb/mmBtu particulate matter emitted at based load. Testing at 152 MW indicated an average particulate emission rate of 0.037 lb/mmBtu. Testing was conducted by Burns & McDonnell out of Kansas City, Missouri. The average opacity percentage during the base load testing was 18.74%.

Historical Opacity Trends

Review of the historical opacity trends (see Table 12, below) proves that Southwest Unit 1 is normally operated within an opacity range well below the indicator range (threshold) established by this CAM Plan and confirmed by recent test data. Southwest's current operating and maintenance procedures maintain a substantial compliance safety margin for the affected unit. The maximum yearly opacity data indicated in Table 12 is typically representative of unit startup conditions. The fact that the annual 6-minute opacity average for any given year is significantly below the indicator range, shows that prolonged periods in access of the opacity average, yet alone the indicator range (threshold), are not standard operational modes for the Southwest Power Station.

The table represents average data of all 6-minute averages for a given year (i.e., 2002-2005). Possible exceptions are noted where full year data wasn't used or available. The table depicts an excellent operational history and could be used as a "reasonable assurance" of compliance over the operating history. The maximum yearly opacity represents the highest single 1-hr and 6-minute opacity average the occurred during the year. Whereas the maximum yearly opacity data point is a single average value, the average opacity data is the average of all valid six (6) minute opacity values during the year.

Table 12: Historical Unit 1 Annual Opacity Summary

Year of Data	Average Opacity Data[1] (Percent)		Maximum Yearly Opacity[1] (Percent)	
	1-hr	6-min	1-hr	6-min
2002	5.4	5.4	36.2	97.4
2003	7.9	7.9	54.9	99.6
2004	6.1	6.1	27.3	98.3
2005[2]	7.7	7.7	99.6	99.8

[1] Based on CEMS General Average Report for all included 1-hour and 6-minute averages.
[2] Opacity data obtained through 5/31/05.

Rationale for Selection of Performance Indicators

Monitoring Approach and Indicator

The selection of a Test and Cap monitoring approach and the use of the COMS (opacity) as the indicator will provide an indirect but continuous method for assessment of compliance with the PM emission limitation established for the affected unit. City Utilities believes this to be the most practical means of continuous monitoring to assure compliance with the applicable PM limitation. The source has provided initial (most recent) PM emission test information to provide a direct means for compliance evaluation. The condition is being support by an operation and maintenance plan that assures the equipment is being properly operated and maintained in a manner that would support the continued compliance of the affected unit.

The indicator range(threshold) selected for Unit 1 was determined by a PM mass emission and opacity percent correlation of test data. Testing was conducted over a period of three (3) days at several ESP conditions. These conditions were designed to mimic ESP degradation over a period of time. As fields or T-R sets were removed and/or power to the ESP was reduced, opacity percent increased indicating an increase in PM emissions. Results are tabulated and graphed in Section 6: Test Results Summary. A detailed description of the CAM Test Plan is outlined in Section 5.

The average test data for each ESP condition for Unit 1 shows substantial compliance with the standard at opacity percent levels of ~30% or less. The indicator range (threshold) selected for Southwest Unit 1 was 26.3%, which corresponds to a limitation within 90% of the PM standard. A "reasonable assurance" of compliance can be maintained at the threshold level selected. Unit 1 test results showed exceedance of the standard at a 35% opacity.

Indicator Range(s) for COMS Used to Assure Compliance with a PM Standard

The indicator range (threshold) for the Test and Cap approach was established based on extensive testing approved by the MDNR Enforcement Section. The testing correlated opacity percentages (%) at varying ESP performance conditions and corresponds to a reasonable assurance of compliance with the required PM emission limits for the affected unit. An excellent correlation of the test data points can be seen through the graphs shown in Figures 3 and 4, provided as part of this CAM Plan. A very high correlation of data can be determined. Unit 1's average data confidence coefficient for an exponential equation indicates a 0.9664 data confidence. Unit 1's test points and average data for the different test conditions were consistent and reproducible when compared with one another and other baseline historical testing conducted by the plant.

The indicator range (threshold) using opacity is based on the concurrent PM and COMS opacity measurements obtained during the CAM Testing. Southwest reserves the right to supplement test data as needed with other available PM or opacity data that would aid in support of City Utilities' selection of more current indicators and monitoring approach. City Utilities reserves the right to further investigate the use of the particulate mode for the MIP laser opacity monitor and use other approved data to demonstrate compliance with or indicate a trigger level using different units of measure.