

Attachment E
Doe Run Herculaneum Work Practices Manual Amendment
Building Ventilation System and Particle Capture Project Requirements
Revision to WPM version January 1, 2007

The Doe Run Company's January 2007 Work Practices Manual For Control of Lead Emissions (WPM) will be modified with the below provisions. Doe Run's compliance with, and adherence to, the procedures in the WPM are a requirement of 10 CSR 10-6.120, the CJ and the 2007 Revision to the Missouri State Implementation Plan for the Herculaneum Lead Nonattainment Area (SIP).

I. Building Ventilation Study. In accordance with 2.A.20. of the CJ, Doe Run submitted a work plan to the Missouri Department of Natural Resources' Air Pollution Control Program (hereafter MDNR) for the ventilation study on July 1, 2007. As the CJ allows, this work plan outlined which ventilation units are able to have a minimum flow rate established via continuous flow monitoring and which units are to have their electrical current draws correlated to a minimum door inflow velocity for the purposes of maintaining an appropriate level of particle capture. On August 14, 2008, in a letter sent to Doe Run, MDNR approved the work plan. I.a.- b. below are the guidelines that were followed during the ventilation study (the findings of which were subsequently submitted to the MDNR as per I.c.) All other provisions of this item I. shall continue to apply.

a. Flow Testing Campaign.

Doe Run shall conduct a flow testing campaign to measure ventilation flow rates from the Sinter Building, Blast Furnace Building, and Refinery Building. The campaign shall measure typical flows and record corresponding amperage rates for fans servicing number 6, 7, 8, and 9 baghouses, and the sinter machine wheel tunnel. Doe Run shall conduct similar flow measurements associated with the continuous flow meters for flows from the baghouse #3 /Acid Plant combined trail and baghouse #5, and total combined flow from the sinter plant combination trail that includes the mix drum baghouse, the crusher baghouse, the cooler baghouse, the cage paktor, the 76" smooth rolls, the CV 22 baghouse, and number 6 baghouse.

Alternatively (and preferably), Doe Run may install direct flow measurement devices similar to those currently in operation for the Baghouse #3/Acid Plant (AP) combined flow and Baghouse #5 to continuously measure ventilation rates associated with Baghouses #6, 7, 8, and 9, and the sinter machine wheel tunnel. The minimum operating flow rates for Baghouse #3/AP, Baghouse #5 and the Sinter Machine Wheel Tunnel are 225,000; 300,000 and 15,000 actual cubic feet per minute (acfm) as established in paragraphs 2.A.5, 2.A.11. and 2.A.4. of the CJ respectively. 2.A.4. allows the fan amperage of the Sinter Machine wheel tunnel to be a surrogate limit for flow. (This fan amperage limit was established during the 2.A.20. ventilation study and is listed in II.b. below.) If continuous flow meters are installed at each of these points, Doe Run shall

conduct a flow testing campaign to measure and record typical flows at each of these points representative of normal operations.

b. Door Inflow Survey.

The ventilation study shall also measure inflow at all building openings (including man and equipment doors) to demonstrate that, under the flows used for the flow testing campaign, all openings experience inflow of 200 feet per minute or greater. Inflow shall be measured and addressed as described in III and Section 2 of this document below.

c. Ventilation Study Report.

Based on a review of these amperage and/or flow measurements, Doe Run shall prepare and submit to the MDNR, a report summarizing the results of the initial testing campaign. The report shall include a summary of the anemometric door inflow surveys and statistical analyses of the corresponding major ventilation fan flow rates representative of normal operations along with recommendations for enforceable flow rates and/or fan amperages based on the data from this baseline study. The report shall also contain a building diagram showing where each building opening (including equipment and man doors) is located and a system for referencing the individual openings. Doe Run shall make all raw data available to MDNR upon request.

d. Verification of Fan Amperages and Continuous Flow Measurements.

The flow testing campaign outlined in I.a. above shall be conducted once per year. Doe Run shall submit the results to the department by July 30 of each year. This yearly check is to serve as a verification that the ventilation systems are operating correctly and the continuous flow and amperage meters are appropriately calibrated.

f. Test Methods.

All of the flow measurements associated with the initial flow testing campaign and all subsequent campaigns shall be conducted using standard EPA test methods. All instruments associated with the flow measurements shall be maintained and calibrated according to manufacturer specifications. Fans and/or flow meters shall be maintained and operated according to manufacturer specifications. Manufacturer specifications shall be available to the MDNR upon request.

II. Fan Amperage / Flow Meter Data Collection. Ventilation System Operation.

The following measurements shall be captured and recorded by an automatic data logging system at least once a minute: i.) Fan amperages or flow rates (whichever is appropriate) from the sinter machine wheel tunnel, number 6, 7, 8, and 9 baghouses, ii.) flows from the combined number 3 baghouse / Acid Plant trail and number 5 baghouse, and total combined flow from the sinter plant combination trail that includes the mix drum baghouse, the crusher baghouse, the cooler baghouse, the cage paktor, the 76" smooth

rolls, the CV 22 baghouse, and number 6 baghouse. The amperage to the sinter machine and sinter feed belt motors shall be monitored continuously by the datalogger which shall log the reading and time when either of these motor amperages are zero (0). All ventilation units shall be properly maintained and operated continuously at the required minimum flow rates or fan amperages as required by the CJ and II.b. below, except:

- i. if such flows would interfere with maintenance work being performed on the ventilation or related process equipment in accordance with VI.c. below or elsewhere in the WPM;
- ii. as allowed by VI.d. below.

a. Raw Data.

The raw data from the fan amperage and continuous flow meters shall be collected and saved for a minimum of 5 years and made available to the MDNR upon request.

b. Building Ventilation Limits. The minimum limits as established per 2.A.20. of the CJ. are listed in the table below. The datalog software shall be set up for a conditional format so that when both the sinter machine and feed belt motors measure zero (0) amps, the flow rate limit shall switch to the Sinter Plant Combination Trail Non-Production limit. Because 2.A.4. requires the fan amperage for the Sinter Wheel tunnel to be set with respect to a damper setting, Doe Run agreed to weld the damper to a position that will maintain an amperage above the minimum. Doe Run shall maintain the damper in this position.

Minimum Flow Rates and Fan Amperages:

Sinter Plant Combination Trail Production period minimum =	169,000 acfm
Sinter Plant Combination Trail Non-Production minimum =	100,000 acfm
#6 Baghouse Fan =	70 amps
#7 Baghouse Fan =	210 amps
#8 Baghouse Fan =	73 amps
#9 Baghouse Fan =	163 amps
Sinter Wheel Tunnel Ventilation Fan =	58 amps

c. 1 Minute Monitoring

At least one measurement shall be taken and recorded every minute for each of the individual fan amperage and continuous flow meters. The datalogger software shall be set up with a conditional format so that any 3 consecutive minutes of data below the respective required minimum set point sets off a warning alarm. These 3 minute warnings give the operator time to troubleshoot and repair any malfunctions or excursions from normal ventilation system operations (hereafter called a low flow) prior to the triggering of the 15 minute compliance alarm. These datalogs shall be collected and saved for a minimum of 5 years and made available to the MDNR upon request.

c. Flow Rates and Fan Amperage Minimum Limits

Any 15 consecutive minute period below the minimum required flow rate or fan amperage shall trigger an actionable alarm and shall be logged with a detailed description of the event to include the time and date of the low-flow , the time and date of the flow restoration and all corrective or maintenance actions taken to restore flow to the required rate. In addition, corrective action shall be taken as detailed in VI. below. The 15 consecutive minute low-flow alarm log shall be reported to the MDNR as part of the quarterly report as discussed in IV. below.

III. Building Openings & Inflow Testing.

a. Quarterly Inflow Testing.

Doe Run shall measure the inflow of air at all of the exterior man doors and equipment doors and any other openings of the Sinter Plant, Blast Furnace, and Refinery Buildings once per quarter. Measurements shall be conducted in accordance with the attached Building Inflow Testing utilizing Hand-Held Anemometers SOP (Section 2 of this document). The data sheet should include the date, time of day that the study is being conducted, and note the wind speed and direction from the local meteorological station during the time that the measurements were taken.

b. Man Door Low-Inflow

If any measurement taken at a man door shows inflow below 200 feet per minute or any amount of outflow, the door must be permanently sealed or replaced with a double door chamber system. Permanently sealed means sealed at least as air tight as a wall siding panel, and to the point that it would take a maintenance crew the same amount of time or difficulty to restore the opening as it would to remove a wall siding panel. The double door chamber system must be engineered so that a person must close one of the doors before opening the next, and engineered to prevent airflow from the building into the chamber. This shall be completed no later than 3 months following the low-flow measurement. Inflow measurements will not be required at permanently sealed, or where double door chamber systems have been installed. Any alternative projects to a non-compliant (low-inflow) man door, such as installing a quality door with weather seals and a lock-out procedure doors may be approved by the MDNR only if the proposal for such a door project is submitted in writing to the MDNR within 30 days of the low-flow measurement. Such a proposal shall outline the benefit of the alternative door project from the standpoint of particle capture and state why a double door chamber system or permanent sealing of the door are not feasible or appropriate.

c. Equipment Door Low-Inflow.

If any measurement taken at an equipment door shows inflow below 200 feet per minute or any amount of outflow, Doe Run shall install and maintain heavy-duty industrial clear vinyl strip curtains over the doorway no later than 2 months following the low-flow measurement. All vinyl strip curtains shall become part of, and subject to, the door and siding maintenance, inspection and recordkeeping provisions for each building found in the corresponding section elsewhere in this work practices manual. Any alternative projects to a non-compliant (low-inflow) equipment door, such as installing a rapid motorized roll-up door or decreasing the area of the equipment door may be approved by the MDNR only if the proposal for such a door project is submitted in writing to the MDNR within 30 days of the low-inflow measurement. Such a proposal shall outline the benefit of the alternative equipment door project from the standpoint of particle capture and state why the vinyl strip curtains are not feasible or appropriate taking into account traffic and door location. Inflow measurements shall be required where vinyl air strip curtains have been installed. If an equipment door has another low-inflow measurement within 1 year of the first, Doe Run shall submit to MDNR within 30 days of the second low-inflow measurement a proposal for a continual improvement project relevant to that door that will significantly reduce the outflow of air-borne lead particles. Examples of such projects might include permanently sealing off another door, reducing the surface area of this equipment door or installing a motorized rapid roll up door in addition to the vinyl strip curtains. Upon approval by the MDNR, Doe Run shall complete the project within 2 months. If an agreement can not be reached as to an appropriate equipment door project, the issue shall be settled as per the dispute resolution paragraph of the 2007 Consent Judgment.

d. Floor Diagram. Door Designations.

On or before July 30, 2009, all doors marked on the floor diagram, which was submitted as part of the ventilation study as required by paragraph 2.A.20. of the 2007 CJ, shall have their number painted on them so as to be clearly identified. Doe Run shall submit a new floor diagram to MDNR within 90 days any changes to the location or designation scheme of doors. Any doors that have been walled over or removed do not have to be painted. Doors that have been permanently sealed but still appear to be a door on the inside or outside shall be painted as per above.

e. Door Projects. The following door projects shall be completed by July 30, 2009:

i. Quality locking doors with effective air seals shall be installed at Sinter Plant #'s 1, 3 and 5. These doors are to be used only for infrequent access to equipment for maintenance purposes. Beginning on or before July 30, 2009, Doe Run shall institute lockout procedures for these man doors. The lockout procedures shall be the same as used for the large equipment doors as outlined in 2.A.18. f the CJ. When properly locked and sealed, these doors will not require inflow measurements. The door and weatherstripping seals shall be maintained in good condition.

ii. Sinter Plant door #'s 3 and 6 shall be replaced with doors with a double door chamber system as outlined in III.b. above.

iii. Sinter Plant door #'s 11, 21 and 28 shall be permanently sealed as outlined in III.b. above.

iv. Sinter Plant Equipment door # 24 shall have an automatic motorized rapid roll-up door installed. This door shall be similar to the one installed at the Railcar Tippler building as per the 2007 CJ.

f. Door Projects. The steel bulkhead style doors at Sinter Plant #7, 22 and 23 shall have locks and effective air seals installed by August 30, 2009. These doors are to be used only for infrequent access to equipment for maintenance purposes. Beginning on or before August 30, 2009, Doe Run shall institute lockout procedures for these man doors. The lockout procedures shall be the same as used for the large equipment doors as outlined in 2.A.18. of the CJ. When properly locked and sealed, these doors will not require inflow measurements. The door and weatherstripping seals shall be maintained in good condition.

IV. Quarterly Report.

Doe Run shall prepare a quarterly ventilation report of the data collected related to items II. and III. The report shall note the date and time any ventilation 15 consecutive minute low-flow alarms were triggered, and Doe Run shall indicate what actions were taken to address these alarms. The report shall also include the results of the quarterly inflow study, and specifically note all measurements that indicate inflows of less than 200 feet per minute as well as any doorways in which flow was exiting the building and the schedule for modifying these doorways per the requirements of III.b. and III.C above. The report shall also provide updates on any changes to doorways as a result of previous inflow studies.

V. Continual Improvement.

As part of the continual improvement strategy, if an ambient air lead monitor in Herculaneum monitors a quarterly value above 1.4 micrograms per cubic meter, Doe Run shall conduct a fluid modeling study of the flow patterns inside the Sinter, Blast Furnace, and Refinery Buildings. The purpose of this modeling is to determine if additional ventilation would better ensure adequate inflow and to identify where such additional ventilation should be located. Doe Run shall complete and submit this evaluation and associated findings to the department no more than 3 months following the receipt of the monitor reading.

VI. Ventilation System Fan Failure Action / Compliance.

a. Corrective Action Necessary.

In the event that the ventilation system in any process building is compromised to the point that it can no longer sustain a fan amperage or flow meter level at the required minimum rate or a 15 consecutive minute low-flow alarm has been triggered, all appropriate corrective action must be taken as quickly as reasonably possible up to and including the shut down of all processes within the affected building(s) without compromising the equipment. Operations within the building(s) shall not recommence until the problem has been addressed, the ventilation system is fully operational, and the affected fan amperage or flow rate is back up to the required level. Within 24 hours of the restoration of operations, a flow test shall be conducted at the point(s) where the ventilation system failed verifying that the flow or fan amperages are meeting required levels. The flow test shall be conducted in accordance with EPA methods and results shall be submitted to the MDNR as part of the quarterly report. All such alarm triggers or ventilation system compromises shall be logged with a detailed explanation of the problem and the action taken, and the time and date of the – i. failure, ii. response to the failure, and iii. restoration of required flow. All such ventilation alarm trigger logs and maintenance records shall be collected and saved for five years and submitted to the MDNR in the quarterly report. An example of a ventilation system failure that might not require a complete building shut down would be the breakage of a fan belt where the repair can be affected quickly and is part of a unit providing ventilation to process equipment that does not contribute significantly to lead-bearing particle emissions from within the building. In this case, shutting down only the related process unit until the repair is affected would be appropriate.

b. Corrective Action Review & Improvement.

Also as part of the continual improvement strategy, Doe Run shall report to MDNR at least quarterly, in a fashion similar to the requirements of 2.B.7.b. of the CJ, on any actions taken or recommendations to prevent ventilation system shutdowns or to improve corrective action response. In reviewing the alarm trigger and ventilation system compromise reports, if MDNR determines that a more timely or effective corrective procedure could have been taken, Doe Run must submit a written update to the WPM for MDNR's approval. The update must include improved procedures for any similar future failure scenarios, and be applicable to all appropriate ventilation systems and related process units. This WPM amendment proposal shall be submitted to the MDNR for approval no later than 60 days after Doe Run is notified of the determination of necessity for such a proposal by the MDNR. If the parties are unable to agree on a corrective action improvement proposal, the matter shall be submitted for dispute resolution pursuant to paragraph 2.E. of the CJ.

c. Ventilation System Maintenance.

The ventilation equipment may be shut down without corrective action taken, if such ventilation flows would interfere with maintenance work being performed on the ventilation or related process units and as long as such maintenance shutdowns are properly logged and recorded with a detailed explanation of the nature of the necessary work as outlined in VI.a. above.

d. Extended Periods of Non- Production (Shut Downs)

Except where otherwise required by the Consent Judgment, Doe Run may cease operation of any of the ventilation system units described herein within the Sinter Plant, Blast Furnace or Refinery Buildings if all of the lead manufacturing process units within a given building have been turned off and all corresponding production has ceased for a minimum of twenty-four consecutive hours.

e. Compliance

Any failure to take appropriate corrective action as determined by the MDNR or any failure to properly log and record low flow conditions or any lack of compliance with the applicable provisions of this document shall constitute a violation of the CJ. All provisions of the CJ in regards to violations shall apply.

VII. Deadline. Effective Date.

Unless specifically stated otherwise, all projects required by this document, shall be completed by, and all provisions contained herein, shall take effect on August 30, 2009.

VIII. Historical Data Requirements.

All data collected in association with the above requirements shall be maintained for a minimum of 5 years and made available to the MDNR upon request.

IX. Improvements to the Ventilation Systems.

The building ventilation systems discussed in this document can only be altered to improve capture and control of lead bearing particles that are emitted from within the buildings. A plan for the improvement of the lead particle capture systems (building ventilation components, doorway improvement projects) shall be submitted to and approved by the MDNR prior to the commencement of any such improvement project. Alarm set points where fan amperages and flow rates must be measured and data collected shall be revised as appropriate with the approval of the MDNR. Any unauthorized modification of the building ventilation systems that affects flow rates, fan amperages, or the capture and control of lead bearing particles as described herein shall be a violation of the Consent Judgment.

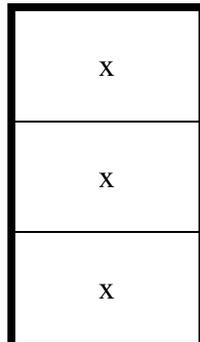
Attachment E Section2

Standard Operating Procedure (SOP)
For Building Inflow Testing utilizing Hand-Held Anemometers

1. Anemometers shall be maintained, calibrated, and operated according to manufacturer's specifications.

2. Measurement of flow rates shall be obtained at and in the openings and doorways. Disturbances to the airflow shall be minimized as much as is practical. When taking official readings, the operators should follow the manufactures recommendations and directions for the specific anemometer. Measurements shall not be closer than a foot to the edge of the opening or doorway, wherever practical, except for openings smaller than two feet. Anemometers shall be operated with a minimum of airflow barriers (e.g., the operator or other persons shall not stand where they could obstruct the flow the operator is measuring). To minimize upwind disturbances, the operator shall stand downwind of the anemometer while holding and orienting the instrument in the plane of the opening or doorway. The operator should hold the anemometer with the pitch and yaw as close as practical to zero, relative to the plane of the opening. The operator shall hold the anemometer with an extended arm to maximize the distance between the instrument and the operator.

3. Man doors or openings of smaller than 35 square feet shall be measured at a minimum of three points. The opening shall be divided visually into three equal horizontal rows, creating three sections with equivalent areas. Measurements shall be taken as close as possible to the centroid of each equivalent area of the opening or doorway. For example, readings would be taken at each "x" below:



The readings shall be recorded. The doorway or opening shall be numbered and identified in such a fashion that an inspector would be able to read the report and find the opening without further description. The measurement point at each doorway or opening shall be uniquely labeled (i.e. top (t), middle (m), bottom (b)).

4. Equipment doors or openings larger than or equal to 35 square feet shall be measured at a minimum of nine points. The opening shall be divided visually into three equal vertical columns and three equal horizontal rows, creating nine sections. Each of these measurement sections

shall have an equivalent area. Measurements shall be conducted at the centroid of each equivalent area. For example, readings would be taken at each “x” below:

x	x	x
x	x	x
x	x	x

Each measurement shall be recorded. The doorway or opening shall be indicated in such a fashion that an inspector would be able to read the report and find the opening without further description. The readings for each doorway or opening shall reference the vertical and horizontal position of the reading: vertically- top (t), middle (m), bottom (b); horizontally, as you face the building- left (l), middle (m), right (r).

5. The record shall also show the date, time, wind speed and wind direction, weather conditions (i.e. gusty, raining, snowing, etc.) and ambient temperatures from the local meteorological station at the time the readings were taken.

6. All testing shall be conducted consistent with the indraft testing methods of the MACT standards for Primary Lead Smelters (40CFR 63.1546) (Subpart TTT) if at all possible and whenever the MACT test methods are not in conflict with any of the testing provisions of this section, especially in regards to the maximum wind speed of approximately 5 miles per hour.