Application for a Prevention of Significant Deterioration (PSD) Air Permit

MISSISSIPPI
SILICON

Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
50 Industrial Drive
Burnsville, MS 38847

Application Date: August 15, 2014

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August 15, 2013

Ms. Bonnie Grey Morgan
Mississippi Department of Environmental Quality
Office of Pollution Control
Environmental Permits Division
P.O. Box 2261
Jackson, Mississippi 39225

RECEIVED
AUG 16 2013
Dept. of Environmental Quality

RE: Request for PSD Construction Air Permit
Proposed Silicon Manufacturing Plant
Burnsville, Tishomingo County, Mississippi
Mississippi Silicon LLC

To: Bonnie Morgan

Mississippi Silicon LLC (MS Silicon) is proposing the construction of a new Greenfield silicon manufacturing plant to be located in Tishomingo County, Mississippi. The silicon manufacturing plant being proposed by MS Silicon will be capable of producing a high quality, low cost silicon. The manufacturing plant will utilize four (4) semi-enclosed submerged arc furnaces (SAF) with a capacity of 2.75 tons/hr each (~45 MVA) to produce approximately 84,096 tons/year of 98-99% pure silicon metal. Based on potential emissions of regulated air pollutants from the proposed silicon manufacturing plant, the plant will be considered a New Major Stationary Source under the Prevention of Significant Deterioration (PSD) regulations.

This application is being submitted by MS Silicon. Included in this application are the required elements that must be included as part of a PSD air permit application. MS Silicon would like to initiate construction of the proposed plant as soon as possible to meet future demands on industry and consumers for the silicon products to be produced by this plant.

As requested by the MDEQ enclosed are five (5) copies of this application. An electronic copy of this application in its entirety is also included with this submittal on a CD.

If you should have any questions regarding the content of this application please address all questions or comments to Mr. Steven Frey at (847) 278-7705. Mr. Frey will be the primary point of contact for this application on behalf of MS Silicon.

Sincerely,
Kennedy/Jenks Consultants

Steven A. Frey
Manager Air Quality

Enclosure – Five (5) Copies

Kennedy/Jenks Consultants

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14 August 2013

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Proposed Silicon Manufacturing Plant
50 Industrial Drive
Burnsville, MS 38847

K/J Project No. 1341008*00

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Section 1: Introduction

Mississippi Silicon, LLC. (MS Silicon) is proposing the construction of a silicon manufacturing plant located near the city of Burnsville, in Tishomingo County, Mississippi (Figure 1-1). The silicon manufacturing plant is being constructed to produce revolutionary low-cost, high-quality silicon allowing MS Silicon to meet the ever-increasing demand for its silicon. The new facility will enable MS Silicon to produce silicon metal so it can be sold to the company's existing and new customers in the global market.

Several factors were important influences on this choice of site:

- Burnsville is centrally located to both the raw material suppliers and finished product customers for Mississippi Silicon.
- The site is located on the Tennessee-Tombigbee Waterway, with a barge loading and unloading facility immediately adjacent and available for Mississippi Silicon to use for inbound materials and outbound product, if desired. The Tennessee- Tombigbee Waterway provides direct access to both the Gulf of Mexico and the Ohio River.
- A high-voltage TVA line runs past the western boundary of the site. TVA will be a stable, reliable, low-cost long-term supplier of the most important production input for Mississippi Silicon, electricity. The proximity of this power line will minimize the cost and facilitate the link to this input.
- Mississippi has a large and sustainable supply of wood, an important raw material in Mississippi Silicon's production process.
- The state of Mississippi, Tishomingo County, and the TVA enthusiastically support the project, and are providing significant financial incentives to demonstrate that support.

The plant will provide jobs for nearly 150 people. When operational, MS Silicon's Mississippi facility has the potential to catalyze significant economic development for Tishomingo County and the state. The project will also create an estimated 500 construction jobs during the peak period of its construction.

The silicon manufacturing plant being proposed by MS Silicon will be capable of producing a high quality, low cost silicon. The manufacturing plant will utilize four (4) semi-enclosed submerged arc furnaces (SAF) with a capacity of 2.75 tons/hr each (~45 MVA) to produce approximately 84,096 tons/year of 98-99% pure silicon metal. The plant will incorporate into its design proven and highly efficient control technologies and techniques for the reduction of potential emissions of regulated air pollutants. In order to create the silicon metal, quartz, coal, and wood will be processed in the SAF.

The silicon manufacturing plant will involve specific process areas including raw material receiving, handling and storage operations along with operations associated with the actual silicon manufacturing process. The primary process operations associated with silicon manufacturing will include:

- Raw material handling, storage and conveyance (coal, wood, quartz and limestone);

- Loading of these raw materials into four (4) semi-enclosed submerged arc furnaces (SAF) (electric fired) to produce liquid silicon metal (approximately 98% pure); and
- Using ladles and casting molds to produce solid silicon metal (approximately 98% pure).

The process areas that will have the potential to emit regulated air pollutants include:

- Material handling and transfer to and from coal, wood and quartz storage piles;
- Storage yard for coal, wood and quartz storage piles;
- Raw material day bins to support the semi-enclosed submerged arc furnaces;
- Four (4) semi-enclosed submerged arc furnaces (SAF) with four (4) baghouses; and
- Four (4) natural gas-fired ladle pre-heaters.

The following plantwide operations and activities will have the potential to emit regulated air pollutants:

- Tank farm;
- Fugitive emissions from roadways;
- Slag handling;
- Silica fume silos:
- Facility-wide miscellaneous operations; and
- Emergency generator.

The operations identified above reflect a phased construction. Phase I will involve the installation of two (2) SAFs and supporting operations. At the completion of Phase I, MS Silicon will initiate construction of Phase II which will involve the installation of two (2) additional SAFs and supporting operations.

Collectively, these process areas will have the potential to emit major levels of regulated air pollutants and, therefore, will be subject to the Prevention of Significant Deterioration (PSD) regulations of the United States Environmental Protection Agency (USEPA) along with the requirements of the Mississippi Department of Environmental Quality (MDEQ) Air Pollution Code (APC), which contain air quality requirements that must be satisfied prior to construction of this type of plant. Appropriate air pollutant emission controls/techniques to minimize potential emissions of regulated air pollutants, appropriate measurements, testing and recording of operational parameters will be performed to confirm that the plant's major source levels of regulated air pollutant emissions are being achieved. The regulatory requirements imposed by the PSD and MDEQ air regulations, as well as emissions controls/measurements and compliance testing will ensure that the proposed silicon manufacturing plant will have no adverse impact to human health and welfare.

1.1 Summary of the Proposed Silicon Manufacturing Project

The proposed project will involve the construction and operation of a silicon manufacturing plant to be located in Tishomingo County, near the town of Burnsville. The proposed silicon manufacturing plant will be constructed in two (2) phases. After completion of both phases, the manufacturing plant will utilize four (4) semi-enclosed submerged arc furnaces (SAF) with a capacity of 2.75 tons/hr each (~45 MVA) to produce approximately 84,096 tons/year of 98-99% pure silicon metal. The proposed project will have the potential to emit regulated air pollutants in sufficient quantities (i.e., tons/year) to trigger the PSD regulations. Potential emission of regulated air pollutants at the conclusion of Phase II are summarized below:

Regulated Air Pollutant	Potential to Emit Emission Rate (tons per year)
Sulfur Dioxide (SO_2)	2,170.1
Nitrogen Dioxide (NO_2)	1,906.2
Carbon Monoxide (CO)	1,444.3
Particulate Matter (PM)	104.1
Particulate Matter (<10 microns) (PM_{10})	81.6
Particulate Matter (<2.5 microns) ($PM_{2.5}$)	73.1
Volatile Organic Compounds (VOC)	93.5
Lead (Pb)	< 1.0
Regulated HAPs	9.9 (individual), 13.9 (total)
Greenhouse Gases (CO_2e)	402,396.76

Based on the proposed plant's potential emission rates defined above, the proposed silicon manufacturing plant will have the potential to emit regulated air pollutants in excess of 100/250 tons/year and will be considered a Major Stationary Source. Since Tishomingo County is considered attainment for all regulated criteria air pollutants, PSD review was triggered for emissions of SO_2, NO_2, CO, PM_{10}, $PM_{2.5}$, VOCs, and GHGs from the proposed silicon manufacturing plant. The proposed silicon manufacturing plant will be considered Major under the PSD program, as well as under the Title V Operating Permit Program. The proposed silicon manufacturing plant will be considered a minor stationary source of regulated HAP emissions as defined under EPA's Title III program.

As part of the project, the potential air pollutant emission sources associated with the proposed silicon manufacturing plant will implement Best Available Control Technology (BACT) and as a result will not have an adverse impact on human health and welfare. Sections of this application provide the results of the air quality demonstration showing the plant will have no adverse impact on human health and welfare. The proposed silicon manufacturing plant will be implementing the following BACT control measures:

- A baghouse will be installed to control particulate matter on the plant's Submerged Arc Furnaces (SAF) to reduce the potential quantity of $PM/PM_{10}/PM_{2.5}$ emissions. One baghouse will be installed for each individual SAF;

- A baghouse(s) will be installed to control particulate matter from raw material handling to reduce the potential quantity of $PM/PM_{10}/PM_{2.5}$ emissions;
- A baghouse(s) will be installed to control particulate matter from product handling to reduce the potential quantity of $PM/PM_{10}/PM_{2.5}$ emissions;
- Utilization of natural gas as the primary combustion fuel in the ladle pre-heaters associated with the proposed plant. This is the cleanest burning fossil fuel and inherently reduces emissions of regulated air pollutants when compared to other fossil fuels such as coal and oil;
- Implementation of a Fugitive Dust Control Plan to minimize potential emissions of $PM/PM_{10}/PM_{2.5}$ from becoming airborne from various support operations associated with the plant (i.e., slag handling, raw material handling, paved and unpaved roadways);
- Installation of low NO_x burner technology or design on the plant's natural gas combustion devices to reduce potential emission of oxides of nitrogen (NO_x);
- Inclusion of bin vent filters on silica fume silos to reduce potential $PM/PM_{10}/PM_{2.5}$ emissions;
- Energy efficiency techniques to reduce the plant's overall potential for formation of greenhouse gas emissions (GHG);
- Implementation of testing, monitoring, recordkeeping and reporting requirements to ensure the plant will operate in compliance with applicable regulatory requirements and will not cause or contribute significantly to an exceedance of air quality standards developed by EPA to protect human health and welfare.

1.2 Site Information

The proposed silicon manufacturing plant will be located near the town of Burnsville in Tishomingo County, MS. Figure 1-1 shows a county map of Mississippi including the location of the proposed site in Tishomingo County. Figure 1-2 identifies the location of the proposed plant in relationship to Burnsville, MS while Figure 1-3 depicts an aerial view of the proposed plant location. Refer to Figure 2-1 for a general process area layout.

This site was selected based on a variety of factors including existing infrastructures, as well as new infrastructures being constructed in the vicinity of the site. Some of these critical infrastructures are listed below:

- Existing electrical transmission lines;
- Existing natural gas;
- Close proximity to major roadways to allow supply trucks easy access into and out of the proposed plant site;
- Rural location; and

- Located away from sensitive receptors such as hospitals, schools, nursing homes, and highly populated residential areas.

1.3 Anticipated Construction Schedule

The proposed plant will be constructed in two phases, Phase I and Phase II. Provided below is a tentative schedule related to construction and operation of these phases:

- Initiate construction of Phase I – November 2013;
- Complete construction of Phase I and commence operation – November 2015;
- Initial construction of Phase II – Spring 2015; and
- Complete construction of Phase II and commence operation – Spring 2017.

1.4 Maximum Design Silicon Production Rates

The proposed plant will have the following maximum design short term and long term production rates for silicon:

- Short Term (tons/hour)
    - Maximum Hourly Rate – One (1) SAF – 2.75 tons/hour
    - Maximum Hourly Rate – Four (4) SAFs – 11 tons/hour
    - Typical or Average Rate – One (1) SAF – 2.4 tons/hour
    - Typical or Average Rate – Four (4) SAFs – 9.6 tons/hour
- Long Term (tons/year)
    - Maximum Annual Rate – One (1) SAF – 21,024 tons/year
    - Maximum Annual Rate – Four (4) SAFs – 84,096 tons/year.

1.5 Regulatory Drivers – Permission to Construct the Plant

As discussed above, the proposed silicon manufacturing plant will have the potential to emit PSD major levels of regulated air pollutants. New equipment and operations which emit air pollutants within the MDEQ jurisdiction are subject to pre-construction review and approval by MDEQ pursuant to the APC-S-2 Permit Regulation for the Construction and/or Operation of Air Emissions Equipment.

The proposed plant will also be subject to other requirements contained within MDEQ's air quality regulations as well as EPA's federal air quality regulations (i.e., New Source Performance Standards (NSPS) and Maximum Achievable Control Technology (MACT). These regulations impose specific requirements and standards for stationary sources of air pollutants. Detailed discussions of these regulations as they pertain to the air pollutant sources at the proposed plant are provided in Section 3.

According to MDEQ APC-S-2-1-D, "Permitting Requirements", any new stationary source or modification of a stationary source must have a permit to construct or multi-media permit incorporating such permit before beginning construction.

The construction application (as specified in the MDEQ application instructions and MDEQ regulations) must include the data and information necessary to demonstrate that the proposed project, which includes new sources of air pollution, complies with applicable air quality regulations and standards.

1.6 Application Requirements – Construction Application and Instructions

The construction application should include and identify the following:

- **GENERAL FORM** – Includes name, address and contact for the owner/applicant and the facility. Also includes the SIC code, number of employees, principal processes, principal products and raw materials, and operating schedule. This form also requires the signature of a registered official.

  Refer to Appendix A which includes the completed MDEQ application forms.

- **All operations or equipment having air emissions**. Specify the maximum schedule, maximum operating rate and expected operating rate, if different from the maximum.

  Refer to Section 2 of this application which identifies operations/equipment having the potential to emit regulated air pollutants, including supporting calculations and documentation.

- **Emission Rates** (in units of applicable emission standard as well as pounds per year and tons per year for each pollutant subject to regulations that can be reasonably expected to be emitted from each emission point. Emission rate calculations must be provided. The following emission rates shall be provided in the Emissions Summary Section of the form:

  - Potential uncontrolled emissions; and
  - Proposed emission rate (maximum emission rate).

  Refer to Section 2 of this application which identifies operations/equipment having the potential to emit regulated air pollutants, including supporting calculations and documentation.

- **Exhaust or Stack Parameters** for each emission source (height, velocity, diameter, and temperature) should be provided in the Emissions Summary Section of the form.

Refer to Section 2 of this application which identifies operations/equipment having the potential to emit regulated air pollutants, including supporting calculations and documentation.

The following additional information must be submitted in duplicate:

- **Design Calculations and Specifications** including all data and calculations used in selecting or designing process and control equipment;
- **Site Drawings** must be to scale and show at least the following:
  - Property involved with dimensions, clearly defining restricted entry boundaries, and if different, total property boundaries;
  - Location and identification of all existing and/or proposed buildings, structures, and/or equipment, including points of discharge of air contaminants to the atmosphere, drawn to scale and in proper orientation;
  - Dimensions (length, width) of all buildings, structures, and/or equipment, including emission points;
  - Elevation of all buildings, structures, and/or equipment, including emission points, showing heights, grade baseline, and grade baseline height above mean sea level;
  - Primary compass direction indicator; and
  - Location of streets and all adjacent properties. Show location of all buildings outside the property that are within 150 feet of the equipment involved in the application. Identify all such buildings, specifying number of stories, or approximate height, and indicate the prevailing wind direction.

  Refer to Sections 1 and 2 of this application for site drawings related to the proposed plant.
- **Construction Drawings** should be an assembly drawing, dimensioned and to scale, in as many sections as needed to show clearly the design and operation of the equipment and the means by which air contaminants are controlled. The following must be shown:
  - Size and shape of equipment. Show exterior and interior dimensions and features; and
  - Locations, sizes, and shape details of all features which may affect the production, collection, conveying or control of air contaminants of any kind: location, size and shape details concerning all materials handling equipment.

- **Description of Process and Control Equipment** – Include a written description of each process at the facility and the function of the equipment used in the process. Descriptions must be complete and particular attention must be given to explaining all stages in the process where the discharge of any materials might contribute in any way to air pollution. Control procedures must be described in sufficient detail to show extent of control of air contaminants anticipated in the design, specifying the expected efficiencies of the captures systems and control devices. All obtainable data must be supplied concerning the nature, volume, particle size, weights, chemical composition and concentrations of all types of air contaminants; and

- **Block Flow Diagram** – Include a drawing showing the steps of the process and the flow of materials through the process and any control devices.

- Additional information may be required as necessary to evaluate the design adequacy of the facility or to comply with PSD regulations.

  Refer to Section 2 of this application for process related information and diagrams related to the proposed plant.

The following sections are also required for a PSD application:

- **Applicable Requirements** - Provide compliance evaluations for all applicable state, federal and local air pollution control requirements including applicable requirements in MDEQ Regulations, federal new source performance standards, and national hazardous air pollutant standards. **(Refer to Section 3).**

- **BACT** - Provide a demonstration that proposed air pollution control devices and measures comply with Best Available Control Technology (BACT) requirements. **(Refer to Section 4).**

- **Air Quality Impacts Analysis** - Provide an ambient air quality impacts analysis based on modeling facility emissions using EPA approved air dispersion models. The modeling analysis should conform to current EPA modeling guidelines and recommended methods. **(Refer to Section 5).**

- **PSD Threshold Determination** - Provide a PSD threshold determination. **(Refer to Section 3).**

- **Additional Impact Analysis** – Provide an additional impact analysis.

  Refer to Sections 2 through 6 of this application for the design calculations/specifications and appropriate impact analysis.

MS Silicon, based on discussions held during the pre-application meeting with MDEQ and the application requirements listed above, is not aware of any additional information that is required for this application to be deemed complete.

The information required, as listed above, is provided in this construction permit application. It is MS Silicon's understanding that applications containing the required information should satisfy MDEQ's requirements for a complete application.

MS Silicon is confident that it has designed the proposed silicon manufacturing plant such that emissions from the facility will meet the requirements of MDEQ standards and rules, as well as the requirements defined by USEPA. Sufficient information is included in this application to provide MDEQ with reasonable assurance that the standards and rules will be met.

1.7 Application Review Timeline

It is our understanding that upon submission of this application, the MDEQ will conduct a complete and thorough review of its contents to ensure that the plant and its associated air emissions sources will:

- Meet all applicable state and federal air quality regulations and requirements;
- Not cause an adverse impact to human health and welfare; and
- Will employ best available control technologies (BACT) and implement appropriate testing, monitoring, recordkeeping and reporting that will ensure future minimal impacts to human health and welfare.

Upon completing this review, a construction permit will be proposed by the MDEQ (containing specific emission limitations, testing, monitoring, recordkeeping, and reporting requirements) and will be provided to the public including EPA Region IV for review and comment, prior to final issuance. The permit to be issued will allow for construction and limited operation. An operating permit will have to be obtained upon final construction of the plant.

1.8 Request for Construction Permit Issuance

MS Silicon is hereby requesting that MDEQ issue a construction permit to allow for construction of the regulated air pollutant emitting units associated with a stationary source (i.e., the proposed plant). It is MS Silicon's understanding that as defined in MDEQ APC-S-2-1-C-27 "stationary source" is defined as:

"Any building, structure, facility, or installation which emits or may emit regulated air pollutant(s)."

MS Silicon understands based on the definition of "stationary source" contained in APC-S-2 that it is not allowed to perform any construction, installation, or establishment of any stationary source without an approved construction permit.

Upon the completion of construction or installation of an approved stationary source or modification, MS Silicon will notify the MDEQ that construction or installation was performed in accordance with the approved plans and specifications on file with the MDEQ.

The following individual will be the primary contact for answering any questions MDEQ may have related to the application request for construction:

Contact Name: Mr. Steven Frey

Phone Number: 847-278-7705

Email: stevefrey@kennedyjenks.com

It is anticipated that MS Silicon will initiate construction of the project in the November of 2013 and begin operation within 20 to 24 months of commencing construction. MS Silicon hereby agrees as part of the construction issuance process to meet the design criteria as accepted by MDEQ and to abide by the MDEQ rules regarding the quantities and types of materials to be discharged from the installation of the proposed silicon manufacturing plant

1.9 MDEQ Requirements for Public Involvement

It is MS Silicon's understanding that the public will be given an opportunity to express their interest in the construction permit application prior to approval by MDEQ. A brief summary of the involvement is provided below, reflecting MS Silicon's understanding of the public notice requirements. If this understanding is incorrect, MS Silicon is requesting that MDEQ provide appropriate guidance:

- Availability for public inspection in at least one location in the area affected of the information submitted by the owner or operator and of MDEQ's analysis of the effect on air quality;

- A 30-day period for submittal of public comment; and

- A notice, by prominent advertisement in the area affected, of the location of the source information and analysis.

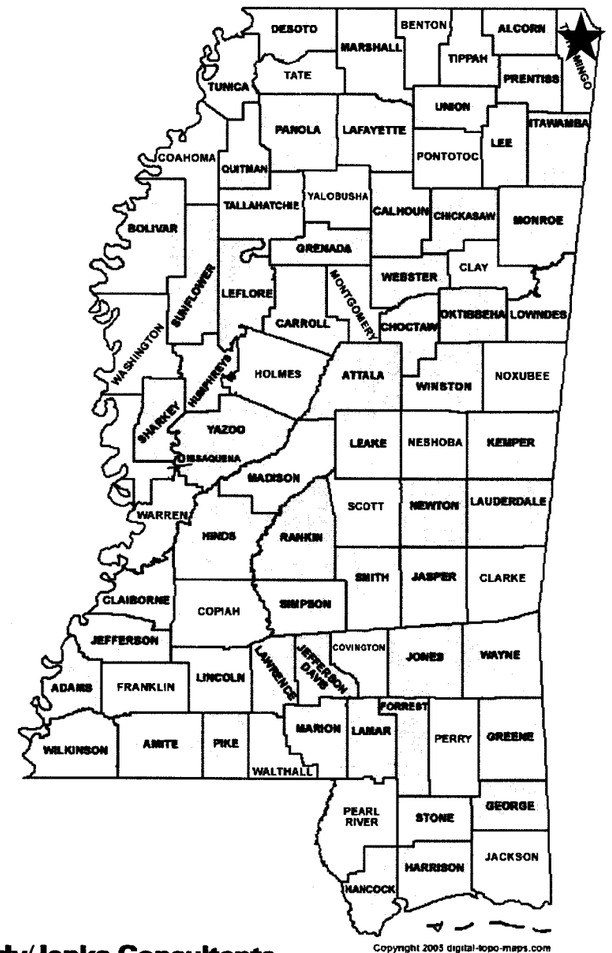
A copy of the notice will be sent to the Administrator of EPA through Region IV, and to all other state and local air pollution control agencies having jurisdiction in the region in which such new or modified installation will be located. A permit to construct issued pursuant to this paragraph is federally enforceable.

1.10 Contents of This Application Request

To assist the MDEQ in approval and issuance of a construction permit, the following information is provided in this application request:

- **Section 2: Description of Proposed Plant** - This section contains a description of the process equipment, a description of control technologies and methods to be used, a description of the methods used to estimate the potential emissions of regulated air pollutants, and tables summarizing the estimated potential to emit (PTE) regulated air pollutant emission rates;
- **Section 3: Regulatory Applicability** - This section discusses the pertinent federal, state, and local air pollution control regulations that may be applicable to the proposed plant. This section also provides a PSD threshold determination;

- **Section 4: BACT Analysis** – This section presents a demonstration that the proposed air pollution control devices and measures comply with Best Available Control Technology (BACT) requirements;
- **Section 5: Air Quality Impact Evaluation** – An air quality impact evaluation was performed to demonstrate that predicted ambient air concentration impacts resulting from emissions of regulated air pollutants from the proposed plant would not adversely impact human health and welfare. These predicted impacts were determined from EPA's approved air dispersion model, referred to as AERMOD;
- **Section 6: Additional Impact Analysis** - This section provides a discussion on the additional impacts that might be caused by the proposed plant including soil and vegetation, endangered species, Class I areas, etc.;
- **Section 7: Suggested Permit Structure** – This section presents suggested permit language;
- **Section 8: Application Forms** – This section provides a list of the application forms required by MDEQ;
- **Appendix A: MDEQ Application Forms** – Appendix A includes the appropriate MDEQ application forms required for a construction permit; and
- **Appendix B: Air Quality Impact Evaluation Modeling Results** – Appendix B contains copies of the output files obtained from the air dispersion model "AERMOD", which was used to perform the air quality impact modeling.

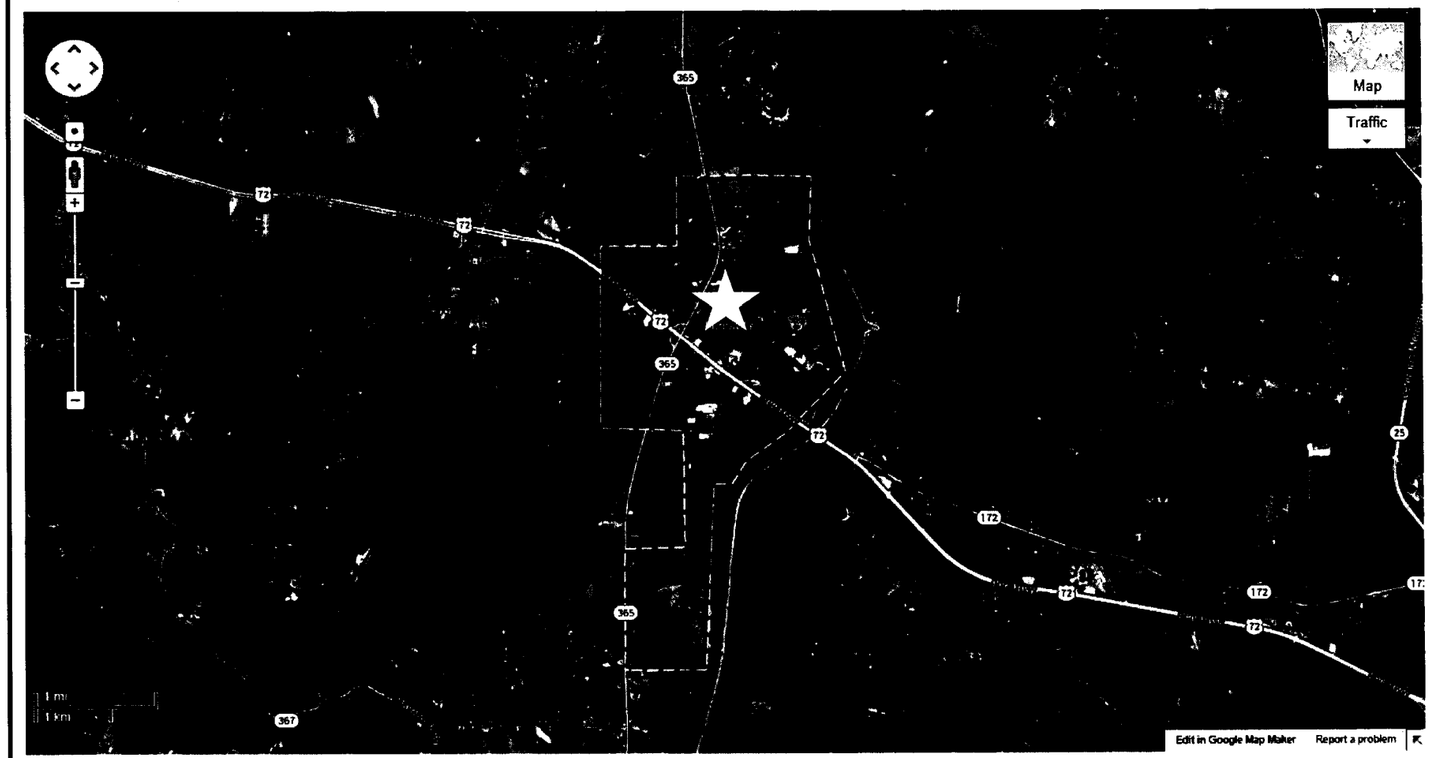


★ Location of Proposed Plant

Kennedy/Jenks Consultants
Engineers & Scientists

Figure 1-1. Map of Mississippi Counties and Location of Proposed Plant

MS Silicon
Proposed Silicon Manufacturing Plant
Burnsville, Mississippi
August 2013



Location of Burnsville, MS

★ Location of Proposed Plant

Figure 1-2. Location of Proposed Silicon Manufacturing Plant in Relation to Burnsville, MS

MS Silicon
Proposed Silicon Manufacturing Plant
Burnsville, Mississippi
August 2013

Kennedy/Jenks Consultants
Engineers & Scientists

Location of Proposed Plant

Kennedy/Jenks Consultants
Engineers & Scientists

Figure 1-3. Location of Proposed Plant

MS Silicon
Proposed Silicon Manufacturing Plant
Burnsville, Mississippi
August 2013

Section 2: Description of Proposed Plant

MS Silicon is proposing the construction of a silicon manufacturing plant in Tishomingo County, Mississippi. The plant will consist of two (2) specific process areas:

- Silicon manufacturing; and
- Support operations.

The silicon manufacturing process will involve the mixing of quartz, coal, and wood in a semi-enclosed submerged arc furnace to produce 98% pure silicon. Further processing is performed to produce the 98% pure silicon in the form of an ingot or flake.

The silicon manufacturing process will include the following operations with the potential to emit regulated air pollutants:

- Material handling and transfer to and from coal, wood and quartz storage piles;
- Storage yard for coal, wood and quartz storage piles;
- Wind erosion from coal, wood and quartz storage piles;
- Wood chipper (electric-fired);
- Casting frames;
- Raw material day bins with supporting baghouse(s);
- Four (4) semi-enclosed submerged arc furnaces (SAF) with four (4) baghouses;
- Four (4) ladle pre-heaters; and
- Product refining operations with supporting baghouse(s).

The following plantwide operations and activities will support the entire plant and will also have the potential to emit regulated air pollutants:

- Tank farm;
- Fugitive emissions from roadways;
- Slag handling;
- Silica fume silos:
- Facility-wide miscellaneous operations; and
- Emergency generator.

To provide a visual representation of the plant, several figures are contained in this application. The figures provided are as follows:

- Figure 1-1 provides a county map of the state of Mississippi and the location on the proposed plant
- Figure 1-2 provides the proposed site location in relation to Burnsville, MS;
- Figure 1-3 provides an aerial view of the proposed plant location.

Collectively, the process areas noted above will have the potential to emit major levels of regulated air pollutants and will be subject to the PSD air regulations along with air regulations established by the Mississippi Department of Environmental Quality (MDEQ). Proven and highly efficient air pollutant emission control technologies and techniques will be utilized to minimize potential air emissions from the air emission units associated with the proposed plant. Continuous emission measuring, stack testing, as well as recording of operational parameters will also be performed, as appropriate; to confirm the plant's levels of regulated air pollutant emissions. These emissions will result in the plant having no adverse impacts to human health and welfare.

To support the conclusion that no adverse impacts will occur to human health and welfare, MS Silicon has conducted an air quality impact evaluation for potential emissions of regulated air pollutants from the plant. The results of that evaluation, including a demonstration of compliance with the state and National Ambient Air Quality Standards is included in Section 5 of this PSD construction permit application.

The general layout of the silicon manufacturing process is provided in Figure 2-1. A general process flow diagram of the silicon manufacturing process is presented in Figure 2-2 and process descriptions and definitions are provided in Figure 2-2a. A generic process flow summary of the silicon manufacturing process is provided in Figure 2-2b and representative pictures depicting the silicon manufacturing process are shown in Figure 2-2c. Process flow diagrams depicting other processes and equipment associated with the silicon manufacturing plant are provided in Figures 2-3 through 2-9.

This section contains a discussion of the process equipment, a description of the air pollution control technologies / management practices to be used, the methods used to estimate the potential emissions of regulated air pollutants, and tables summarizing the estimates of these regulated air pollutant emission rates. Tables 2-1 and 2-1a identify the initial list of equipment with the potential to emit regulated air pollutants, including stack information. Summaries of project related estimated PTE of regulated air pollutants including criteria air pollutants, hazardous air pollutants (HAPs) and greenhouse gases (GHG) are provided in Tables 2-9, 2-10 and 2-11, respectively. As shown in these tables, the proposed plant is classified as a major stationary source of regulated air pollutants as defined under state and federal air regulations.

To support the emission estimation process, methodologies involving engineering estimates, vendor suggested emission rates and prior experience were utilized to conservatively estimate PTE regulated air pollutants from the proposed silicon manufacturing plant. As part of the emission estimation process, MS Silicon utilized the best available information/data to determine air pollutant emission levels for each of the four SAFs. Emission estimates for the raw material receiving, handling and storage operations, and

emergency support equipment were based on either a) USEPA established emission factors and methodologies; b) vendor estimates; or c) state/federal emission standards.

For purposes of this application, any reference to particulate matter (PM) also includes particulate matter with an aerodynamic diameter less than or equal to a nominal ten (10) micrometers (PM_{10}) and particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$).

Provided below is a discussion on each process area to be performed within the silicon manufacturing process. To assist MDEQ in their development of the plant's construction permit, we have also included emission identification numbers following the numbering scheme typically employed by the MDEQ in their construction and operating permits.

2.1 Silicon Manufacturing Process – AA-100, AA-200 and AA-300

The proposed silicon manufacturing process will utilize four semi-enclosed submerged arc furnaces (SAF) that will convert raw materials including coal, woodchips and quartz to 98-99% pure silicon metal. .

The three (3) primary air pollutant emission activities within the silicon manufacturing process are 1) raw material handling and storage, 2) processing of these raw materials into one of four SAFs and supporting activities to produce silicon ingots, and 3) product refinement and handling. These three (3) activities have been assigned emission ID's AA-100, AA-200, and AA-300, respectively.

2.1.1 Raw Material Handling, Storage and Transfer to/from Storage Piles – AA-101, AA-102, AA-103, AA-104, AA-105 and AA-106

Raw material handling, transferring and storage operations will begin with the receipt of raw materials via truck. Coal, woodchips, and quartz are unloaded in a designated unloading area where various mechanisms will be used to transfer these materials to the appropriate storage piles. These mechanisms will include unloading of the trucks by tilting of the truck or bottom unloading from the truck. The raw materials will be emptied onto the pile or transferred by front end loaders to the piles. From the storage piles, materials will be conveyed via front end loaders to enclosed raw material storage/day bins. From the day bins, the raw materials will be weighed and dropped to a skip bucket from which they will be transferred to the top of one (1) of four (4) semi-enclosed submerged arc furnaces for processing. Limestone will be used as flux and will be delivered in bulk. Provision will be made for its storage in the Raw Material Enclosure area. The same hopper and conveying system will be used to convey limestone to the SAF. Limestone will be fed directly via one of the charging conveyors on the upper floor.

The following emission units have been identified in the raw materials handling, storage and transfer operations process (AA-100):

- AA-101 – Material handling and transfer to and from coal storage pile with a material throughput rate of 105,120 tons/year;

- AA-102 - Material handling and transfer to and from wood storage pile with a material throughput rate of 212,763 tons/year;
- AA-102b – Wood chipper (electric-fired);
- AA-103 - Material handling and transfer to and from quartz storage pile with a material throughput rate of 212,763 tons/year;
- AA-104 – Limestone handling operations with a material throughput rate of approximately 183 tons/year;
- AA-101a, AA-102a, AA-103a, - Material Handling (Coal, Wood, and Quartz Transfer to Day Bins) Baghouse;
- AA-105 – Storage Pile Processing (Bulldozers); and
- AA-106 – Wind erosion on coal, wood and quartz storage piles.

Refer to Figure 2-3 for a process flow diagram of the raw material handling and transfer operations.

2.1.1.1 Potential Air Pollutant Emission Sources

Since the material handling operations will involve solid type materials, potential particulate matter (PM) emissions may occur from a) unloading of raw materials from the trucks; b) moving the materials by front end loaders to the pile areas/day bins; c) conveying the material to the day bins/SAFs; d) fugitive dust from vehicle traffic on the plant roads; and e) wind erosion from the raw material storage areas. It is important to note that the conveyors and conveyor transfer drop points associated with this process area will be covered to the extent physically possible. Potential PM emissions from the covered storage area will be minimal based on the moisture content of the materials, as well as any walls and/or roof that may be used to cover the primary pile, thus minimizing the exposure of the stored materials to wind. PM emissions from the storage areas and equipment to be utilized to place and remove these materials from this storage area will also be negligible due to the use of larger sized pieces of materials, high moisture content of the raw materials and low speed of the vehicles moving the materials.

Potential fugitive dust emission rates were estimated using the recommended methods developed by USEPA (i.e., AP-42). Emission source types for this process includes material handling (i.e., material drop points), paved and unpaved road (truck traffic on the paved and unpaved roads), equipment (i.e., front end loaders) utilized to maintain the storage areas, and wind erosion from the proposed outside storage area. Details of the calculations and the resulting emission estimates can be found in Tables 2-4 through 2-7d. Appropriate control efficiencies have been incorporated to reflect equipment installed to minimize exposure to wind during the actual transfer of material from one conveyor to another or dropping of the material to a storage pile.

2.1.1.2 Air Pollution Control Devices/Technologies

The raw material receiving, handling, storage, and processing system will be designed to minimize fugitive dust emissions through use of best management practices, which include covers on conveyors and, to the extent physically possible, covered chutes for dropping materials to and from conveyors (referred to as conveyor transfer points). It is important to note that specific sections of the conveyor system will be uncovered to allow for visual inspection of the materials. Dropping raw materials onto the outdoor storage areas will also be designed to minimize excessive dust. Raw material day bins, identified as emission group AA-101a, AA-102a and AA-103a, will be used to support the semi-enclosed submerged arc furnaces. The raw materials from the storage piles will be transferred to the raw material day bins using front end loaders before being loaded into the semi-enclosed submerged arc furnaces. The transfer of raw materials to the day bins will be controlled by a common baghouse or a series of smaller baghouses. All of the above techniques represent the best available control technology for minimizing PM emissions from the raw material receiving, handling, and storage operations. The raw materials to be utilized will generally be moist, larger in size than finer materials such as sand, and not prone to dusting. The composition of the materials themselves inherently reduces the potential for PM emissions.

2.1.1.3 Type of Release (Point or Fugitive)

With the exception of the transfer to coal, wood, and quartz to the day bins, all of the PM emissions associated with the raw material receiving, handling and storage operations will be fugitive in nature.

2.1.1.4 Calculation of Air Pollutant Emission Basis and Supporting Documentation

Potential fugitive PM emission rates were estimated using the recommended methods developed by EPA (i.e., AP-42). Emission source types for this process included material handling (i.e., conveyor transfer points or material drop points), paved road (truck traffic on these paved roads), equipment (i.e., front end loaders) utilized to maintain the storage areas, and wind erosion from the proposed outside storage areas. Details of the calculations and the resulting emission estimates can be found in Tables 2-4 through 2-7d.

2.1.2 Silicon Manufacturing Process (i.e., Meltshop Operations)

The silicon manufacturing process (i.e., the meltshop operations) will include melting, transferring and cooling operations. Refer to Figures 2-4 and 2-5 for process flow diagrams related to the furnaces and metal processing, respectively.

The raw material day bins, identified as emission group AA-101a, AA-102a and AA-103a, will be used to support the semi-enclosed submerged arc furnaces. The raw materials from the storage piles will be transferred to the raw material day bins before being loaded into the semi-enclosed submerged arc furnaces. Material will be mechanically (i.e., front end loaders or other types of equipment) moved to reclaim areas where the materials will be conveyed either underground or aboveground to the raw material day bins.

The raw material day bins will then feed into one or more of the four (4) SAFs. The SAFs will then convert the coal, woodchips, and quartz into 98% pure silicon metal in molten form. Each SAF will be rated at approximately 25 megawatts per hour of input and will produce a design maximum of 2.75 tons of silicon per hour. The processes associated with producing the silicon will include raw material handling and silicon metal melting and tapping. Each SAF will be equipped with a baghouse for controlling PM emissions. Appropriate equipment will be installed on each SAF that will be used to duct furnace exhaust gases to the baghouse.

These four (4) SAFs are identified as emission unit AA-201 and will produce 98-99% pure silicon metal. The submerged arc process is a reduction smelting operation. In the production of silicon metal, quartz is the raw material from which silicon is derived. Carbon is necessary as a reducing agent and is supplied by coal and woodchips and limestone is used as flux. Smelting in the SAF is accomplished by conversion of electric energy to heat. An alternating current applied to the electrodes causes a current to flow through the charge from the electrode tips to the furnace hearth. This provides a reaction zone of temperature up to 3600 degrees F. To maintain a uniform electric load, electrode depth is continuously varied automatically, as required. At high temperatures in the reaction zone, the carbon sources react chemically with silicon dioxide gas to form carbon monoxide and silicon metal.

Molten product from the SAFs will then be tapped from the SAF through a taphole located at the bottom of the SAF at hearth level. The molten metal and dross will flow from the taphole into a ladle. The ladle will be moved by a hoist to the casting process. The metal will be poured into low, flat pans that will provide rapid cooling of the molten metal. Fume and dust generated and captured throughout the production process including tapping will be controlled by the baghouses and then collected and reused or sold.

The process will also include four (4) natural gas-fired ladle pre-heaters rated at 10.0 MMBtu/hr each, which will be used to provide additional heat for further processing of the molten silicon to silicon flakes. The natural gas-fired ladle pre-heaters are identified as emission unit AA-202.

2.1.2.1 Potential Air Pollutant Emission Sources

Due to the nature of this operation, potential emissions of criteria air pollutants including carbon monoxide (CO), nitrogen oxide (NO_x), sulfur dioxide (SO_2), volatile organic compounds (VOC), particulate matter (PM) and greenhouse gases (primarily in the form of carbon dioxide (CO_2) may occur from a) smelting in the SAF; b) combustion of natural gas in the ladle pre-heaters; and c) material ladling and casting operations.

Fume and dust generated and captured throughout this manufacturing process including tapping will be controlled by the baghouses which vents to a single exhaust stack associated with each SAF. The collected dust from the meltshop baghouses will then be collected and reused or sold.

2.1.2.2 Air Pollution Control Devices/Technologies

Four (4) baghouses will be used to capture and control PM emissions generated from the four (4) SAF operations. Good work practices will also be employed to minimize the release of regulated air pollutants from the entire meltshop operations.

2.1.2.3 Type of Release (Point or Fugitive)

All of the emissions associated with natural gas combustion in the ladle pre-heater are considered fugitive in natural and will not be routed to a control device or through a stack.

Each of the four (4) SAFs is considered a point source and will be controlled by its own baghouse. Each baghouse will have a stack with the following parameters:

- Stack Height – Approximately 300 feet above grade;
- Stack Diameter - 15 feet in diameter;
- Stack flow rate of 125,000 acfm; and
- Exhaust stack gas temperature of approximately 140 degrees F.

2.1.2.4 Calculation of Air Pollutant Emission Basis and Supporting Documentation

Potential PM emission rates from the SAFs were estimated using the recommended methods developed by EPA (i.e., AP-42). Emissions of other regulated criteria air pollutants were based on engineering design and estimates, recent permits issued or recent BACT determinations. Emissions of regulated criteria air pollutants from natural gas combustion in the ladle pre-heaters were also estimated using the recommended methods developed by EPA (i.e., AP-42). Details of the calculations and the resulting emission estimates for the SAFs can be found in Tables 2-2a, 2-2b and 2-2c. Emissions from natural gas combustion are found in Tables 2-3a, 2-3b and 2-3c. Potential regulated air pollutant emissions from the casting frames are presented in Table 2-2d.

2.1.3 Wood Chipping – AA-102b

A portable electric wood chipper will be used for as needed wood grinding/chipping and will be limited to 2080 hours per year of operation. Fugitive particulate emissions can occur from operation of the wood chipper (AA-102b). The wood chipper will include an enclosure that will minimize fugitive dust emissions. Refer to Figure 2-3 for a process flow diagram of the raw material handling and storage operations.

2.1.3.1 Potential Air Pollutant Emission Sources

Processing wood in the wood chipper has the potential to emit PM. Details of the calculations and the resulting emission estimates can be found in Tables 2-4b.

2.1.3.2 Air Pollution Control Devices/Technologies

The wood chipper will include an enclosure that will minimize fugitive dust emissions.

2.1.3.3 Type of Release (Point or Fugitive)

The PM emissions associated with wood chipping operations with be fugitive sources.

2.1.3.4 Calculation of Air Pollutant Emission Basis and Supporting Documentation

Potential fugitive PM emission rates were estimated using a PM emission factor based on Idaho Department of Environmental Quality factor for similar source (wood debarking) as referenced in Idaho air permit number 4051-00. The emission estimate assumed that PM_{10} emissions are 10% of PM emissions based on North Carolina Department of Environment and Natural Resources study "Estimating Emissions from Generation and Combustion of "Waste" Wood DRAFT" (July 15, 1998), which indicated that PM_{10} generated during milling and sawing is at most 10% of PM. The estimate is also based on the assumption that $PM_{2.5}$ emissions are equal to PM_{10} emissions. Details of the calculations and the resulting emission estimates can be found in Table 2-4b.

2.1.4 Product Refinement and Handling – AA-300

Silicon product refinement and handling occurs after the casting operations. After the metal has been cooled it will be crushed and sized to customer specifications. Any remaining undersized material will be re-melted during the casting process. The following emission units have been identified in the product refinement and handling operation (AA-301):

- AA-301 –Silicon grinding and milling operations.

Refer to Figure 2-6 for a process flow diagram of the silicon product refinement and handling operations.

2.1.4.1 Potential Air Pollutant Emission Sources

Since the silicon product refinement and handling operation will involve solid type materials, potential particulate matter (PM) emissions may occur from grinding, milling and transfer of the product.

The grinding and milling operations will be equipped with either a common baghouse or series of smaller baghouses for controlling PM emissions. Details of the calculations and the resulting emission estimates can be found in Tables 2-4a.

2.1.4.2 Air Pollution Control Devices/Technologies

The grinding and milling operations will be equipped with either a common baghouse or series of smaller baghouses for controlling PM emissions.

2.1.4.3 Type of Release (Point or Fugitive)

All of the PM emissions associated with product refinement and handling operations with be point sources.

2.1.4.4 Calculation of Air Pollutant Emission Basis and Supporting Documentation

Potential PM emission rates were estimated using the manufacturer's specifications for the baghouses and the flow rate of each control device. Details of the calculations and the resulting emission estimates can be found in Tables 2-4a.

2.2 Plantwide Operations and Activities – AA-400

The proposed silicon manufacturing plant will have additional support operations and activities including the following:

- Tank farm identified as emissions unit AA-401 including:
  - One (1) vertical oxygen storage tank with a storage capacity of 6,000 gallons; and
  - One (1) 500-gallon diesel fuel storage tank.
- Plantwide fugitive emissions from roadways identified as emissions unit AA-402 and AA-402a. Emissions represent haul trucks to support plant operations;
- Slag handling and storage identified as emission unit AA-403;
- Silica fume silos identified as emission unit AA-404; and
- Facilitywide Miscellaneous Operations Subject to APC-S-6 identified as AA-405.

2.2.1 Tank Farm – AA-401

The tank farm will include the following tanks:

- One (1) vertical oxygen storage tank with a storage capacity of 6,000 gallons; and
- One (1) 500-gallon diesel fuel storage tank.

2.2.1.1 Potential Air Pollutant Emission Sources

The oxygen storage tank does not have the potential to emit regulated air pollutants. The 500-gallon diesel storage tank has the potential to emit a regulated air pollutant (VOCs).

2.2.1.2 Air Pollution Control Devices/Technologies

All emissions of regulated air pollutants from the storage tanks will be fugitive in nature and will not include any additional control devices, other than those inherent to each tank (i.e., pressure relief valves). Good operating practices will be followed to minimize VOC emissions from the diesel storage tank.

2.2.1.3 Type of Release (Point or Fugitive)

All emissions of regulated air pollutants from the storage tanks will be will be fugitive in nature.

2.2.1.4 Calculation of Air Pollutant Emission Basis and Supporting Documentation

As per Mississippi Title V Air Permit Regulations APC–S-6 Section VII B.7 "Insignificant Activities and Emissions", the 500- gallon diesel storage tank must be listed in the application but emissions do not have to be quantified.

2.2.2 Fugitive Emissions from Roadways – AA-402 and AA-402a

PM emissions may be generated from the use of haul trucks to support plant operations. The empty haul trucks have been assumed to weigh 22 tons and have a cargo capacity of 17 tons. The majority of the trucks to enter and leave the site will be carrying materials to support the plant as well as the silicon product produced by the plant.

2.2.2.1 Potential Air Pollutant Emission Sources

Potential emissions of regulated air pollutants from the roadways will include fugitive PM and dust from trucks on paved or unpaved roads.

2.2.2.2 Air Pollution Control Devices/Technologies

All emissions of regulated air pollutants from the roadways will be fugitive in nature and will not include any additional control devices. However, dust suppression techniques will be used to minimize the amount of dust generated from vehicles on unpaved roads. These techniques include watering the roadways and other fugitive dust control techniques such as limiting the speed of the individual trucks. Good work practices will be followed for the paved road surface which will include implementing procedures to minimize the buildup of materials on the paved roadways.

2.2.2.3 Type of Release (Point or Fugitive)

All emissions of regulated air pollutants from the roadways will be will be fugitive in nature.

2.2.2.4 Calculation of Air Pollutant Emission Basis and Supporting Documentation

Potential emission rates of regulated air pollutants from the roadways were estimated using the recommended methods developed by EPA (i.e., AP-42). Details of the calculations and the resulting emission estimates can be found in Tables 2-6 and 2-6a.

2.2.3 Slag Handling and Storage – AA-403

PM emissions may be generated from the handling and storage of slag. Slag will be processed as needed in the finished product processing area; this process incorporates a fabric filter baghouse.

2.2.3.1 Potential Air Pollutant Emission Sources

Potential emissions of regulated air pollutants from slag handling will include fugitive PM.

2.2.3.2 Air Pollution Control Devices/Technologies

Slag will be processed as needed in the finished product processing area; this process incorporates a fabric filter baghouse.

2.2.3.3 Type of Release (Point or Fugitive)

All emissions of regulated air pollutants from the slag handling will be will be fugitive in nature.

2.2.3.4 Calculation of Air Pollutant Emission Basis and Supporting Documentation

Potential emission rates of regulated air pollutants from the handling of slag were estimated using the recommended methods developed by EPA (i.e., AP-42). Details of the calculations and the resulting emission estimates can be found in Tables 2-4c and 2-7d.

2.2.4 Silica Fume Silos – AA-404

Silica fumes collected in the SAF baghouses will be pneumatically transferred to the silica fume silos. In the silos, the silica fumes will be densified to about 45 lbs/cu.ft., prior to dispatch to cement and refractory manufacturers.

2.2.4.1 Potential Air Pollutant Emission Sources

Potential emissions of regulated air pollutants from the silos will include PM.

2.2.4.2 Air Pollution Control Devices/Technologies

All emissions of regulated air pollutants from the silos will be fugitive in nature and will not include any additional control devices.

2.2.4.3 Type of Release (Point or Fugitive)

All emissions of regulated air pollutants from the roadways will be will be fugitive in nature.

2.2.4.4 Calculation of Air Pollutant Emission Basis and Supporting Documentation

Potential emission rates of regulated air pollutants from the silos were estimated. Details of the calculations and the resulting emission estimates can be found in Table 2-4d.

2.2.5 Facilitywide Miscellaneous Operations Subject to APC-S-6 – AA-405

Several operations will be performed that will result in insignificant air contaminant emission rates and/or may not be regulated under state or federal air permitting requirements. These following

activities/emissions sources are not required to be included in a Title V permit application. These sources may include:

1. New or modified pilot plants, subject to temporary source regulations located in Section III.E.

2. Maintenance and upkeep:

a. maintenance, structural changes, or repairs which do not change the capacity of such process, fuel-burning, refuse-burning, or control equipment, and do not involve any change in quality, nature, or quantity of potential emissions of any regulated air pollutants; and

b. housekeeping activities or building maintenance procedures;

3. Air conditioning or ventilation: comfort air conditioning or comfort ventilating systems which do not transport, remove, or exhaust regulated air pollutants to the atmosphere;

4. Laboratory equipment:

a. laboratory equipment used exclusively for chemical or physical analysis for quality control or environmental monitoring purposes.

5. Hot water heaters which are used for domestic purposes only and are not used to heat process water;

6. Fuel use related to food preparation by a restaurant, cafeteria, residential cooker or barbecue grill where the products are intended for human consumption;

7. Clerical activities such as operating copy machines and document printers, except operation of such units on a commercial basis;

8. Hand held equipment used for buffing, polishing, carving, cutting, drilling, machining, routing, sanding, sawing, surface grinding, or turning of ceramic art work, precision parts, leather, metals, plastics, fiber board, masonry, carbon, glass, or wood;

9. Equipment for washing or drying fabricated glass or metal products, if no VOCs are used in the process and no oil or solid fuel is burned;

10. Water cooling towers (except at nuclear power plants); water treatment systems for process cooling water or boiler feed water; and water tanks, reservoirs, or other water containers not used in direct contact with gaseous or liquid process streams containing carbon compounds, sulfur compounds, halogens or halogen compounds, cyanide compounds, inorganic acids, or acid gases;

11. Domestic sewage treatment facilities (excluding combustion or incineration equipment, land farms, storage silos for dry material, or grease trap waste handling or treatment facilities);

12. Stacks or vents to prevent escape of sewer gases through plumbing traps;

13. Vacuum cleaning systems for housekeeping, except at a source with hazardous air pollutants;

14. Alkaline/phosphate washers and associated cleaners and burners;

15. Mobile sources;

16. *Livestock and poultry feedlots and associated fuel burning equipment other than incinerators;*
17. *Outdoor kerosene heaters;*
18. *Equipment used for hydraulic or hydrostatic testing;*
19. *Safety devices, excluding those with continuous emissions; and*
20. *Brazing, soldering, or welding equipment that is used intermittently or in a noncontinuous mode.*

In addition, the facility may include space heaters utilizing natural or LPG gas and used exclusively for space heating, as listed in APC-S-6, VII, B:

2.3 Emergency Support Equipment – AA-501

Emergency support equipment will also support the proposed assembly plant. This equipment will consist of one (1) 670 HP emergency generator identified as AA-501. This generator will be fueled by low sulfur diesel fuel.

Air emission estimates of regulated air pollutants for the emergency generator were based on USEPA AP-42 emission factors. Hours of operation were limited to 100 per year for the generator. Tables 2-8 and 2-8a provide estimated air emissions associated with the emergency generator.

2.3.1 Potential Air Pollutant Emission Sources

Due to the combustion of diesel fuel in the emergency equipment, potential emissions of criteria air pollutants including CO, NO_x, SO_2, VOC, PM and CO_2 may occur. Minor emissions of regulated HAPs may also occur from the emergency generator.

2.3.1.1 Air Pollution Control Devices/Technologies

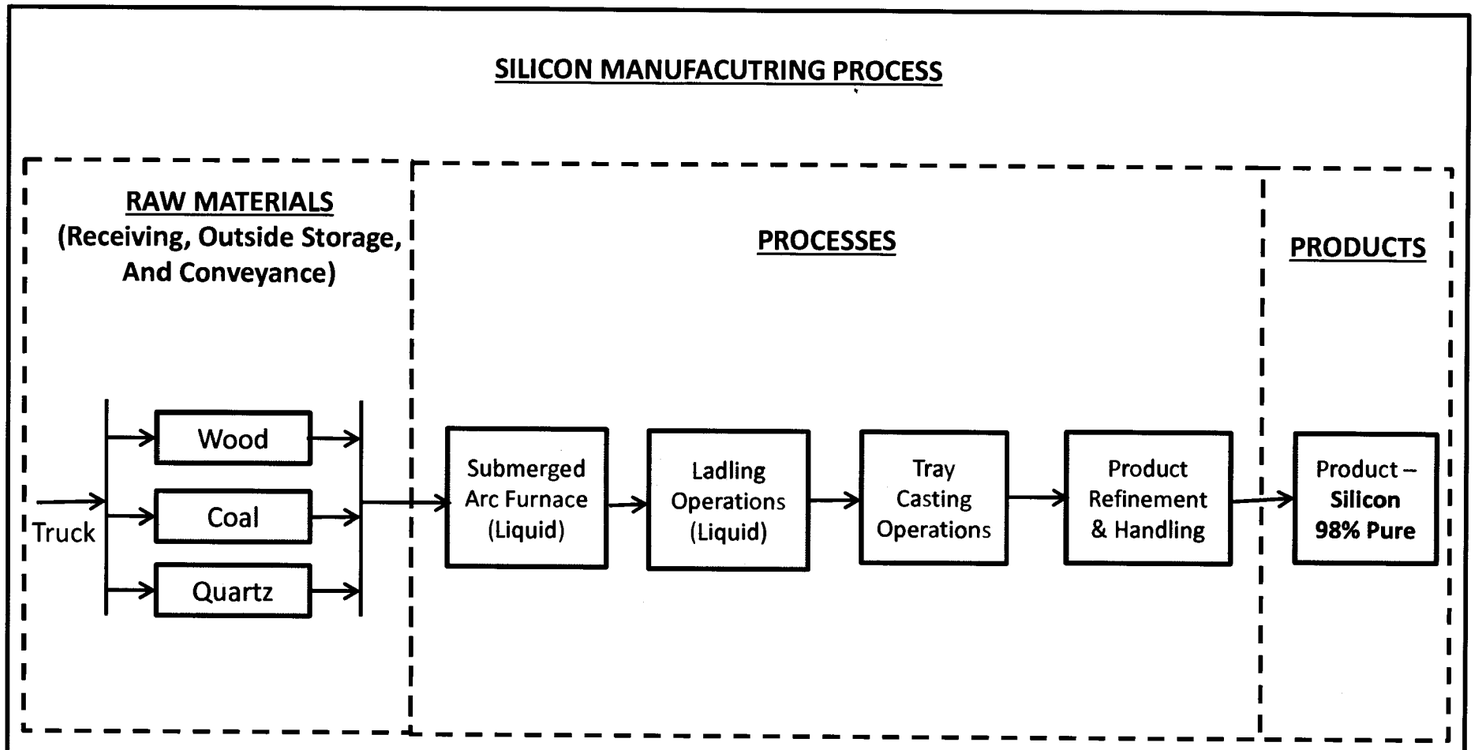
The emergency equipment will not have any add-on control devices or technologies. However, minimal operations and good combustion practices will be followed to minimize emissions of regulated air pollutants.

2.3.1.2 Type of Release (Point or Fugitive)

Emissions of regulated air pollutants from the emergency equipment will be a point source.

2.3.1.3 Calculation of Air Pollutant Emission Basis and Supporting Documentation

Potential emission rates of regulated air pollutants from the emergency equipment were estimated using the recommended methods developed by EPA (i.e., AP-42 program) or EPA limits defined by NSPS Subpart IIII. Details of the calculations and the resulting emission estimates can be found in Tables 2-8 and 2-8a.



Note: Phase I to include two (2) submerged arc furnaces, ladling operations and tray casting operations. Phase II to include two (2) additional submerged arc furnaces, ladling operations and tray casting operations.

Figure 2-2. General Process Flow Diagram – Silicon Manufacturing Process (AA-200)

MS Silicon
Proposed Silicon Manufacturing Plant
Burnsville, Mississippi
August 2013

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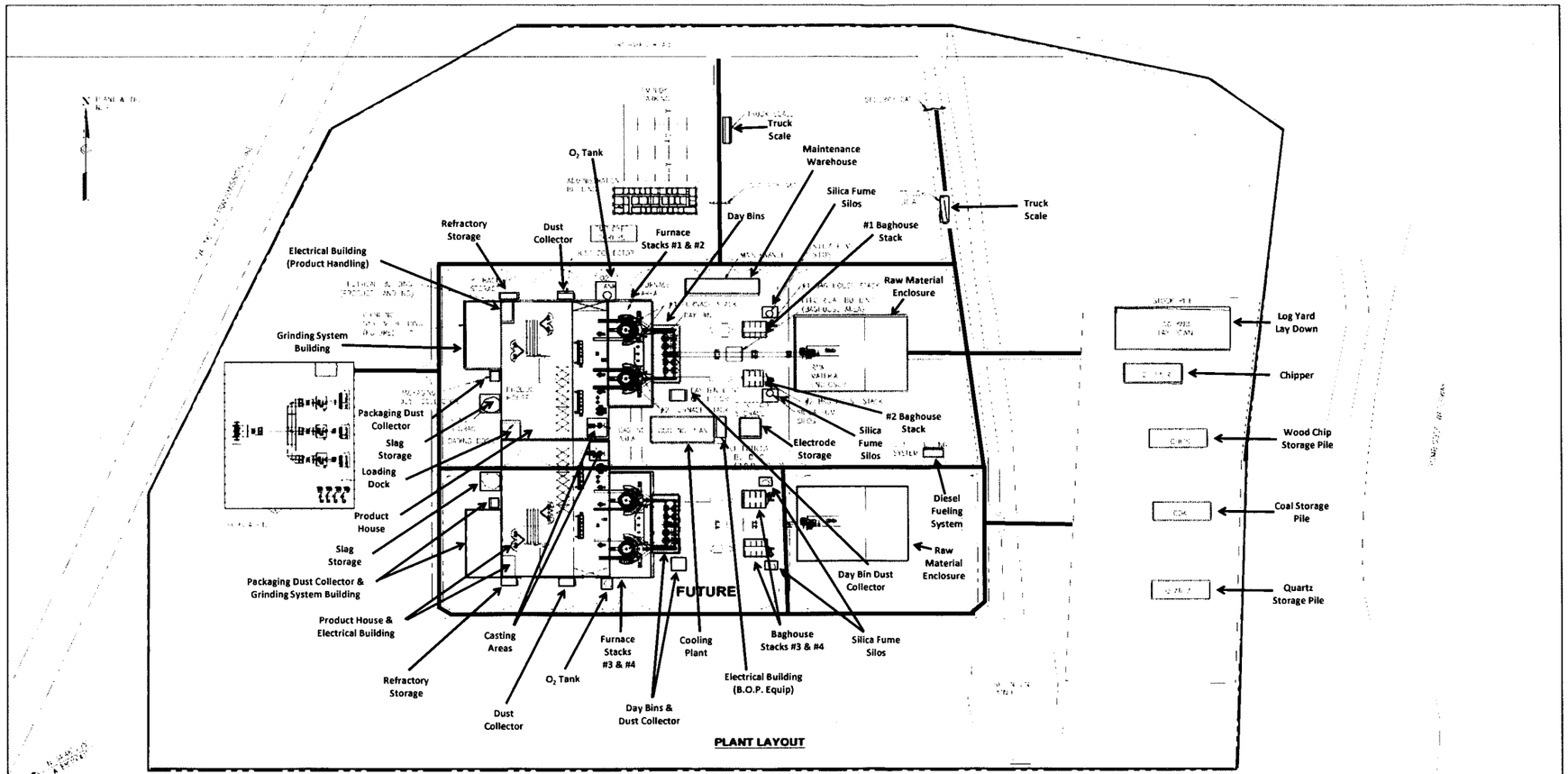

Plant Propery Boundary - Entire property is assumed to be fenced

Plant Roadway - Assumed that 95% of roadways are paved

Phase I Emission Sources, Control Devices and Equipment

Phase II Emission Sources, Control Devices and Equipment

APPROVALS

CLIENT | CV

REV.	DATE	BY	DESCRIPTION

MISSISSIPPI SILICON
Northeast MS Waterfront Industrial Park
BURNSVILLE, MS

CV Engineering
4840 McKnight Road
Pittsburgh, PA 15237
Ph. 412-364-2180 Fax 412-364-8022
Email info@cvengineering.com
Website www.cvengineering.com

12365-GA04

C

Note: Preliminary process layout subject to change pending final engineering.

Figure 2-1. General Process Area Layout

MS Silicon
Proposed Silicon Manufacturing Plant
Burnsville, Mississippi
July 2013

Basic Silicon Manufacturing Process	Quartz will be blended with a carbon source (i.e., coal and wood) and super heated in a submerged arc furnace. As the mix heats, the carbon will react with the oxygen in quartz and forms CO gas, thereby reducing the quartz to 99% silicon. The CO gas will ventilate through the top of the furnace while the liquid silicon is drained, or tapped, from the bottom of the furnace. Although the heating/reduction process will be continuous while the furnace is in operation, raw materials will be added to the furnace and silicon will be tapped from the furnace in batches.
Submerged Arc Furnace	The furnace will be filled with charge materials (combination of quartz containing silica, coal and woodchips). The power will be delivered by carbon electrodes submerged into the charge materials. The electrodes will deliver a three-phase current which heats the charge material to ~ 2,000 C°. At this temperature the silicon dioxide will be sublimated to produce a silicon gas (SiO) before additional reaction with carbon precipitates the gas to the molten silicon. Simultaneous to the condensation of the molten silicon, a percentage of the SiO will filter back through the unreacted charge and along with the created carbon monoxide will burn in air to produce an amorphous silicon dioxide (silica fume) and carbon dioxide. The silica fume byproduct will be collected in a baghouse and sold to cement companies as a strengthener or to refractory producers.
Tapping Process	The molten metal will be tapped from the furnace through a hole near the bottom and will be refined by gas treatment. During the gas treatment, the oxides and carbides will be removed and the resultant material will typically be 99.3% silicon with the balance mainly consisting of iron, calcium, aluminum and titanium.
Casting Process	The metal will then be casted into either cast iron molds or silicon metal fines. After the metal has been cooled it will be crushed and sized to customer specifications. Any remaining undersized material will be re-melted during the casting process.

Figure 2-2a. Process Descriptions and Definitions

MS Silicon
Proposed Silicon Manufacturing Plant
Burnsville, Mississippi
August 2013

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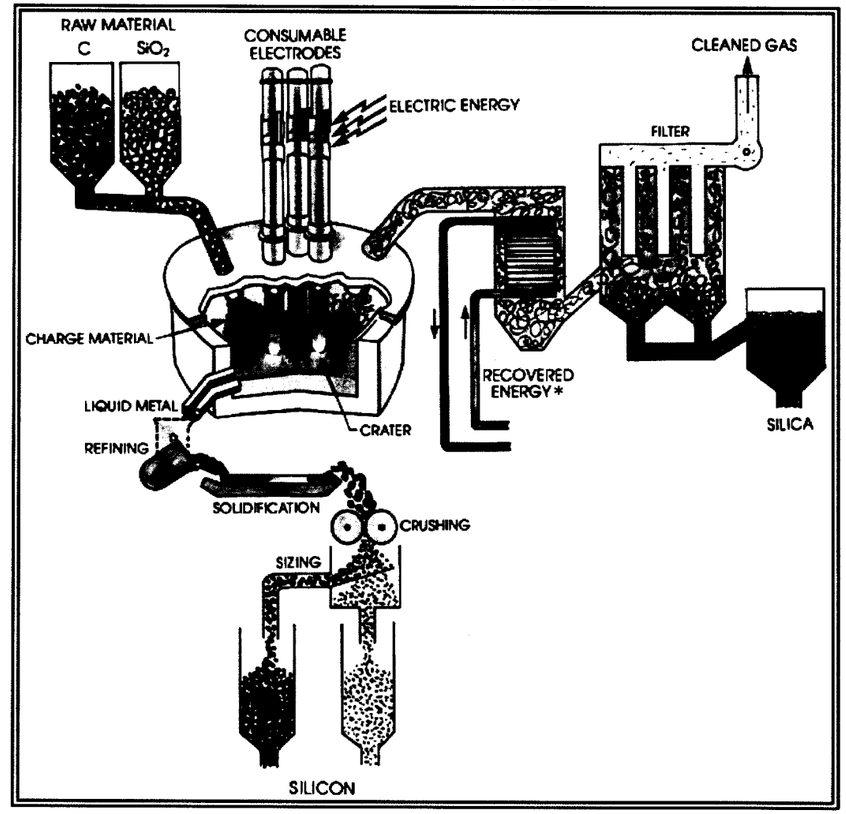
Silicon Metal Production



Note:
*The recovered energy option has not been considered for the proposed MS Silicon facility

Figure 2-2b. General Process Flow Diagram – Typical Silicon Manufacturing Process (AA-200)

MS Silicon
Proposed Silicon Manufacturing Plant
Burnsville, Mississippi
August 2013

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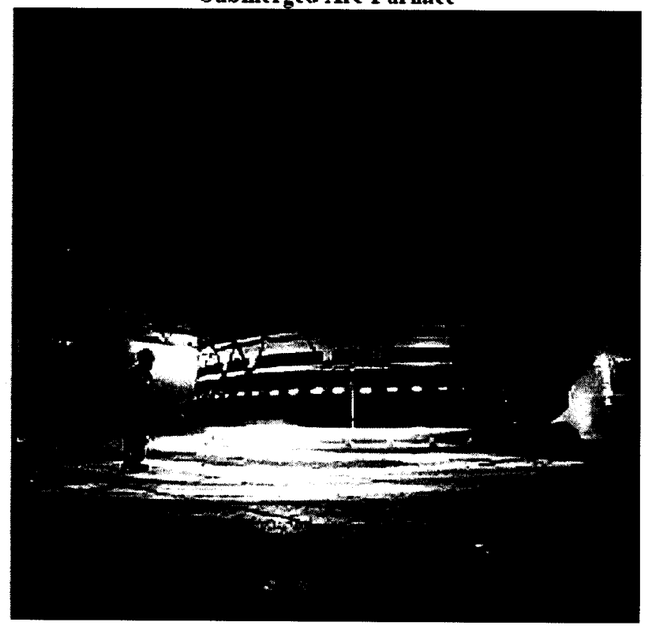
Submerged Arc Furnace



Silicon Metal Tapping

Silicon Metal Casting

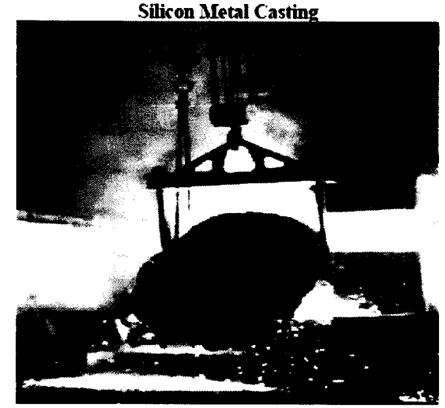


Figure 2-2c. Representative Pictures Depicting the Silicon Manufacturing Process (AA-200)

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Proposed Silicon Manufacturing Plant
Burnsville, Mississippi
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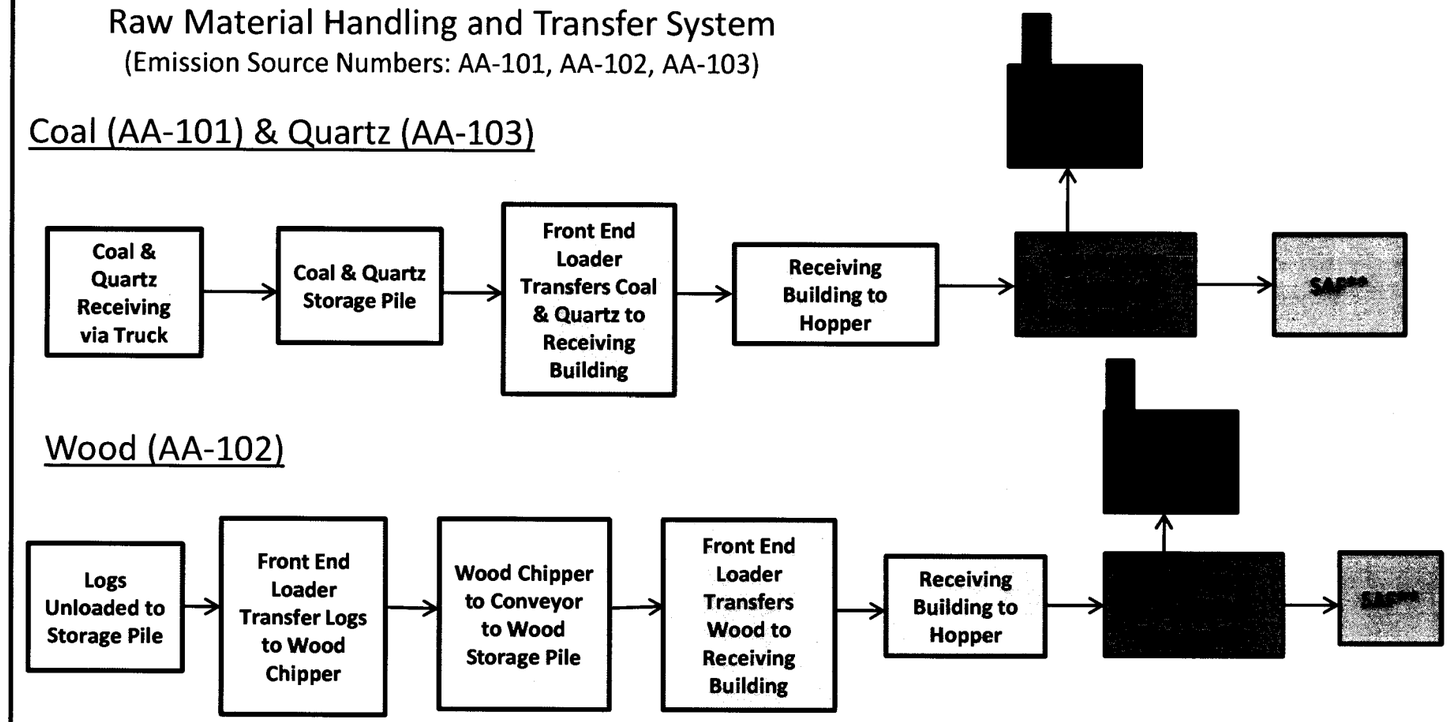
Raw Material Handling and Transfer System

(Emission Source Numbers: AA-101, AA-102, AA-103)



Notes:

*Total baghouse flow rate is 120,000 acfm. The number of baghouses may vary, however the total flow volume should reflect all discharge points to the baghouse(s) for Phase I and II.

**SAF – Submerged Arc Furnace

*BG5 – Baghouse #5

Exhaust stack(s) with potential to emit regulated air pollutants

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Figure 2-3. General Process Flow Diagram – Raw Material Handling and Transfer

MS Silicon
Proposed Silicon Manufacturing Plant
Burnsville, Mississippi
August 2013

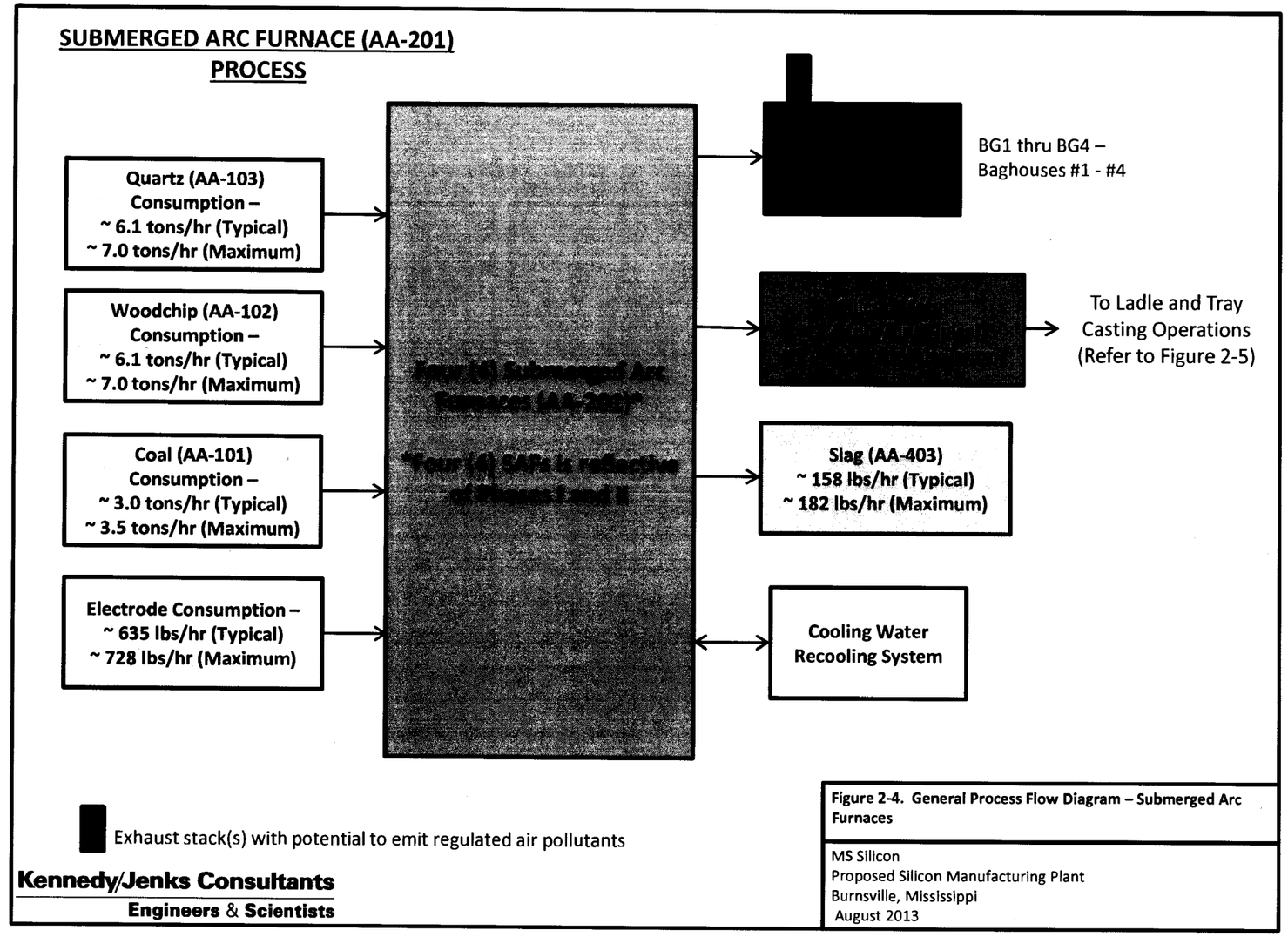
SUBMERGED ARC FURNACE (AA-201)
PROCESS
Quartz (AA-103)
Consumption –
~ 6.1 tons/hr (Typical)
~ 7.0 tons/hr (Maximum)
Woodchip (AA-102)
Consumption –
~ 6.1 tons/hr (Typical)
~ 7.0 tons/hr (Maximum)
Coal (AA-101)
Consumption –
~ 3.0 tons/hr (Typical)
~ 3.5 tons/hr (Maximum)
Electrode Consumption –
~ 635 lbs/hr (Typical)
~ 728 lbs/hr (Maximum)
BG1 thru BG4 –
Baghouses #1 - #4
To Ladle and Tray
Casting Operations
(Refer to Figure 2-5)
Slag (AA-403)
~ 158 lbs/hr (Typical)
~ 182 lbs/hr (Maximum)
Cooling Water
Recooling System
Exhaust stack(s) with potential to emit regulated air pollutants
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Figure 2-4. General Process Flow Diagram – Submerged Arc Furnaces
MS Silicon
Proposed Silicon Manufacturing Plant
Burnsville, Mississippi
August 2013

LADLE AND TRAY CASTING OPERATIONS
(AA-201a AND AA-202)

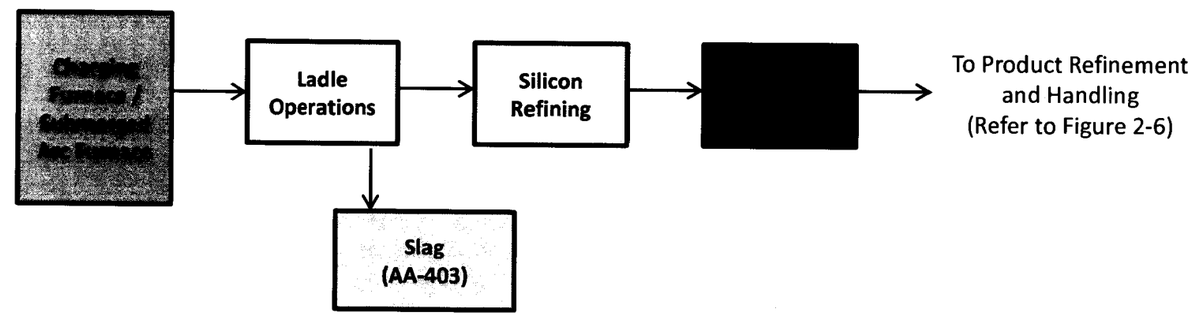

Figure 2-5. General Process Flow Diagram – Ladle and Tray Casting Operations

MS Silicon
Proposed Silicon Manufacturing Plant
Burnsville, Mississippi
August 2013

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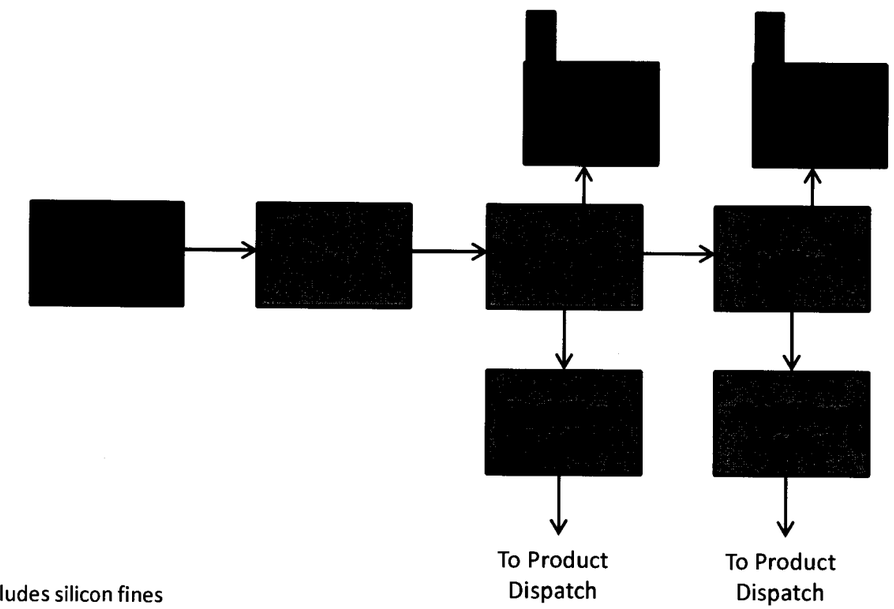
PRODUCT REFINEMENT & HANDLING AREA
(AA-301)



Notes: *Baghouse includes silicon fines

Product refinement and handling will also be used to refine SAF slag material

Exhaust stack(s) with potential to emit regulated air pollutants

Figure 2-6. General Process Flow Diagram – Product Refinement & Handling Area

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Burnsville, Mississippi
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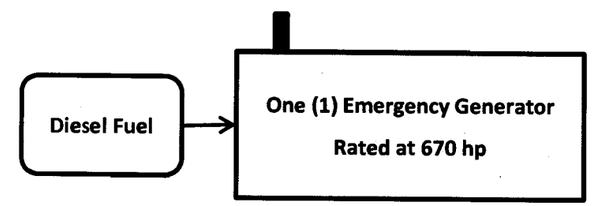
EMERGENCY SUPPORT EQUIPMENT (AA-501)



Emission sources with potential to emit regulated air pollutants

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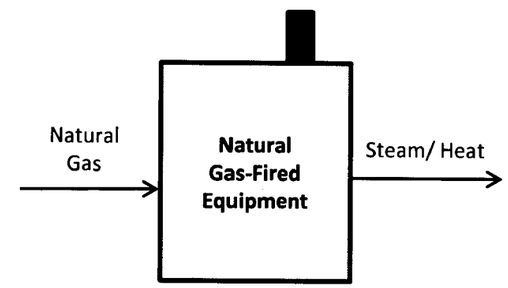
Figure 2-7. General Process Flow Diagram – Emergency Equipment

MS Silicon
Proposed Silicon Manufacturing Plant
Burnsville, Mississippi
August 2013

NATURAL GAS COMBUSTION



Ladle Preheaters #1 - #4	AA-202	10.0 MMBtu/hr each

Note: Four (4) ladle preheaters will be used to support Phases I and II

Emission sources with potential to emit regulated air pollutants

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Figure 2-8. General Process Flow Diagram – Natural Gas Combustion Equipment

MS Silicon
Proposed Silicon Manufacturing Plant
Burnsville, Mississippi
August 2013

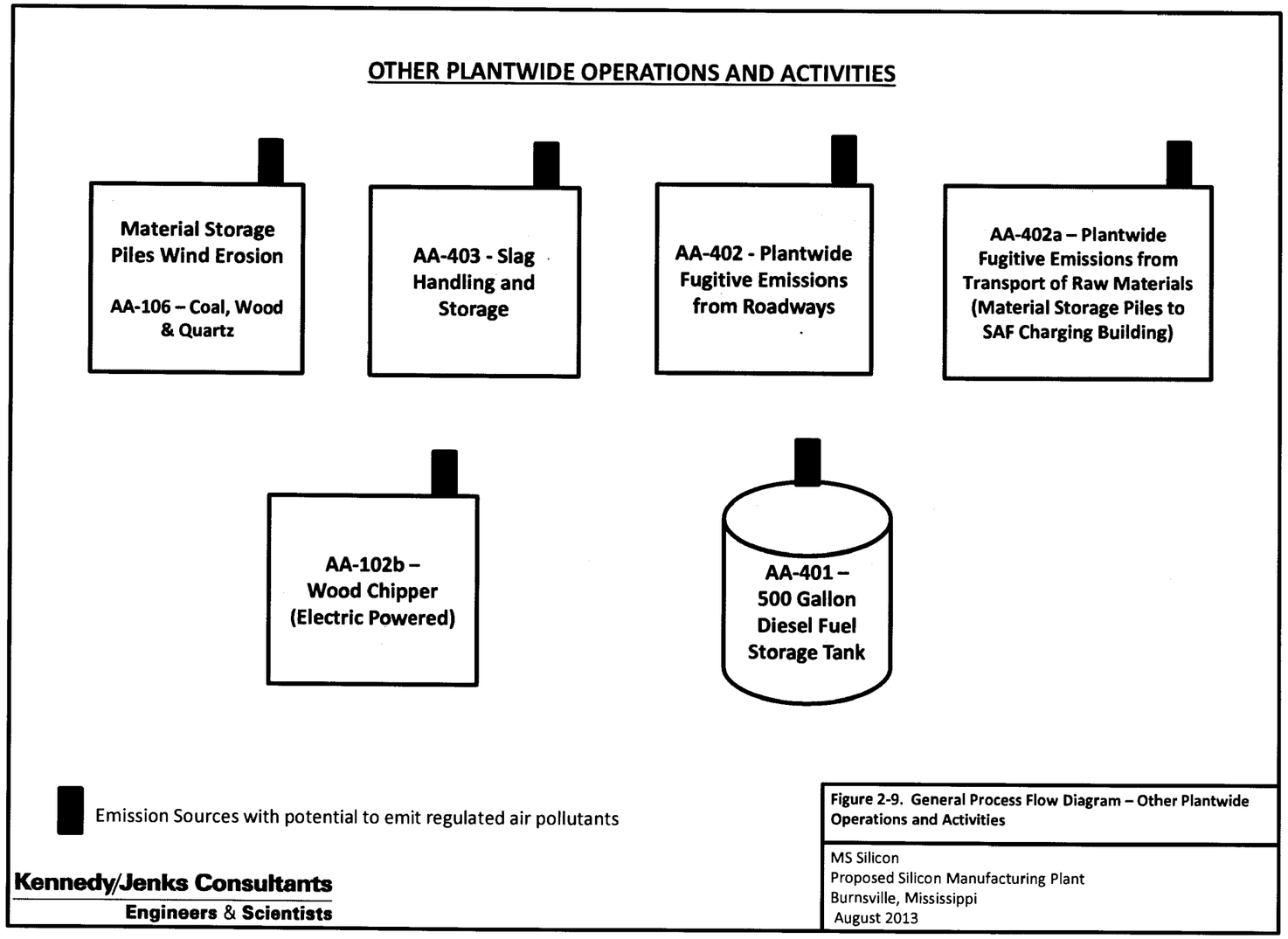

Figure 2-9. General Process Flow Diagram – Other Plantwide Operations and Activities

MS Silicon
Proposed Silicon Manufacturing Plant
Burnsville, Mississippi
August 2013

Table 2-1
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
List of Emission Sources

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
AA-000	**Silicon Manufacturing Plant**						
AA-100	**Raw Material Receiving, Handling and Storage Operations**						
AA-101	Material Handling and Transfer to and from Coal Storage Pile	--	--	$PM/PM_{10}/PM_{2.5}$	--	Material Storage and Conveyance - Fugitive	Table 2-4
AA-101a	Conveyance of Coal to Charging Storage Silo	BG5	Baghouse	$PM/PM_{10}/PM_{2.5}$	--	Material Storage and Conveyance - Fugitive	Table 2-4a
AA-102	Material Handling and Transfer to and from Wood Storage Pile	--	--	$PM/PM_{10}/PM_{2.5}$	--	Material Storage and Conveyance - Fugitive	Table 2-4
AA-102a	Conveyance of Wood to Charging Storage Silo	BG5	Baghouse	$PM/PM_{10}/PM_{2.5}$	--	Material Storage and Conveyance - Fugitive	Table 2-4a
AA-102b	Wood Chipper	--	--	PM/PM10/PM2.5	--	Material Storage and Conveyance - Fugitive	Table 2-4b
AA-103	Material Handling and Transfer to and from Quartz Storage Pile	--	--	$PM/PM_{10}/PM_{2.5}$	--	Material Storage and Conveyance - Fugitive	Table 2-4
AA-103a	Conveyance of Quartz to Charging Storage Silo	BG5	Baghouse	$PM/PM_{10}/PM_{2.5}$	--	Material Storage and Conveyance - Fugitive	Table 2-4a
AA-104	Material Handling and Transfer to and from Limestone Storage Pile	--	--	$PM/PM_{10}/PM_{2.5}$	--	Material Storage and Conveyance - Fugitive	Table 2-4
AA-105	Storage Piles Processing (i.e., Bulldozing)	--	--	$PM/PM_{10}/PM_{2.5}$	--	Material Storage and Conveyance - Fugitive	Table 2-5
AA-106	Wind Erosion on Coal, Wood and Quartz Storage Piles	--	--	$PM/PM_{10}/PM_{2.5}$	--	Material Storage and Conveyance - Fugitive	Tables 2-7a, 2-7b & 2-7c
AA-200	**Silicon Manufacturing Plant**						
AA-201	Four (4) Submerged Arc Furnaces with Baghouse Control Device	BG1, BG2, BG3, BG4	Baghouse	NO_x, CO, SO_2, VOC, $PM/PM_{10}/PM_{2.5}$, HAPs, GHGs	ST-SAFBG1 thru ST-SAFBG4	SAF - Point; Baghouse - Point	Tables 2-2a, 2-2b, 2-2c & 2-2d
AA-201a	Casting Frames	--	--	$PM/PM_{10}/PM_{2.5}$	--	Casting Frames - Point	Table 2-2e
AA-202	Four (4) Natural Gas-Fired Ladle Preheaters (2 ton ladle capacity)	--	--	NO_x, CO, SO_2, VOC, $PM/PM_{10}/PM_{2.5}$, HAPs, GHGs	--	Natural Gas-Fired Ladle Preheaters - Indoor Fugitive	Tables 2-3a, 2-3b & 2-3c
AA-300	**Product Refinement and Handling**						
AA-301	Silicon Grinding & Milling Operations	BG6	Baghouse	PM/PM10/PM2.5	--	Material Storage and Conveyance - Fugitive	Table 2-4a
AA-400	**Other Plantwide Operations and Activities**						
AA-401	One (1) Oxygen Vertical Storage Tanks and One (1) Diesel Storage Tank	--	--		--	Storage Tanks - Point	--
AA-402	Plantwide Fugitive Emissions from Roadways	--	--	$PM/PM_{10}/PM_{2.5}$	--	Gravel Roads - Fugitive	Table 2-6
AA-402a	Plantwide Fugitive Emissions from Transport of Raw Materials (Material Storage Piles to SAF Charging Building)	--	--	$PM/PM_{10}/PM_{2.5}$	--	Paved Roads - Fugitive	Table 2-6a
AA-403	Slag Handling and Storage	--	--	$PM/PM_{10}/PM_{2.6}$	--	Slag Handling and Storage - Fugitive	Table 2-4c and 2-7d
AA-404	Silica Fume Silos	--	--	$PM/PM_{10}/PM_{2.6}$	--	Silica Fume Silos - Fugitive	Table 2-4d
AA-405	Facility-Wide Miscellaneous Operations	--	--	--	--	--	--
AA-500	**Emergency Support Equipment**						
AA-501	One (1) Diesel-Fired Emergency Generator	--	--	NO_x, CO, SO_2, VOC, $PM/PM_{10}/PM_{2.5}$, HAPs, GHGs	ST-EGEN1	Emergency Generator - Point	Tables 2-8 and 2-8a

Notes:
*Operations with no specific add-on control devices listed will utilize best management and operational practices to minimize excessive regulated air pollutant emission rates.

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Table 2-1a
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Emission Source and Stack Information

Point Sources

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
SAF1	AA-201	Four (4) Submerged Arc Furnaces with Baghouse Control Device	91.44	300	1.93	6.3	19.37	63.5	449.82	350.01
SAF2			91.44	300	1.93	6.3	19.37	63.5	449.82	350.01
SAF3			91.44	300	1.93	6.3	19.37	63.5	449.82	350.01
SAF4			91.44	300	1.93	6.3	19.37	63.5	449.82	350.01
RM1	BG5*	Raw Material Baghouse	12.19	40.0	1.37	4.5	18.29	60.0	293.15	68
RM2			24.384	80.0	1.37	4.5	18.29	60.0	293.15	68
PR1	BG6**	Product Refinement & Handling Baghouse	12.19	40.0	1.07	3.5	18.29	60.0	293.15	68
PR2			24.384	80.0	1.07	3.5	18.29	60.0	293.15	68

Notes:

*Emission units AA-101a, AA-102a, AA-103a exhaust to this baghouse

**Emission unit AA-301 exhauast to this baghouse

Volume Sources

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
F1	AA-202	Four (4) Natural Gas-Fired Ladle Preheaters	20.01	65.6	6.97	18.62	22.9	61.1
F2			20.01	65.6	6.97	18.62	22.9	61.1
CF1	AA-201a	Casting Frames	14.00	45.9	5.61	13.02	18.4	42.7
CF2			14.00	45.9	5.61	6.51	18.4	21.4

Aera Sources

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
C1	AA-102b	Wood Chipper	3.05	10.0	6.10	6.10	20.0	20.0
PA	--	Process Area	9.14	30.0	229.66	339.73	753.5	1114.6
SP	--	Pile Storage Area	9.14	30.0	166.03	105.72	544.7	346.9

Table 2-2a
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Emissions of Regulated Air Pollutants from Submerged Arc Furnace (SAF) (Criteria Air Pollutants)

Submerged Arc Furnace

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]															
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Submerged Arc Furnace 1	SAF	AA-201	**2.75**	**21,024**	3.49	15.30	3.49	15.30	3.49	15.30	141.900	542.42	123.75	473.04	6.05	23.13	93.50	357.41	0.00	0.00
Submerged Arc Furnace 2	SAF	AA-201	**2.75**	**21,024**	3.49	15.30	3.49	15.30	3.49	15.30	141.900	542.42	123.75	473.04	6.05	23.13	93.50	357.41	0.00	0.00
Submerged Arc Furnace 3	SAF	AA-201	**2.75**	**21,024**	3.49	15.30	3.49	15.30	3.49	15.30	141.900	542.42	123.75	473.04	6.05	23.13	93.50	357.41	0.00	0.00
Submerged Arc Furnace 4	SAF	AA-201	**2.75**	**21,024**	3.49	15.30	3.49	15.30	3.49	15.30	141.900	542.42	123.75	473.04	6.05	23.13	93.50	357.41	0.00	0.00
Total	**SAF**	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Maximum Hours per Year = 8,760
Baghouse scf/min = 81,481
Baghouse acfm/min= 125,000

Example Calculations

Emissions (lbs/hr) = Emission Factor (lb/ton Si) * Maximum Throughput (tons/hr)
Emissions(tons/year) = PM Emissions (lbs/hr) * Maximum Hours per Year / 2000

$PM/PM_{10}/PM_{2.5}$ Emissions (lbs/hr) = Emission Factor (gr/scf) * Baghouse Flow Rate (dscf/min) * 60 / 7000
$PM/PM_{10}/PM_{2.5}$ Emissions(tons/year) = PM Emissions (lbs/hr) * Maximum Hours per Year / 2000

Notes:

*Potential emissions of non-criteria air pollutants were based on the assumption that the combustion components of coal and wood would also occur during the operation of the arc furnace
**Conversion of SO_2 to H_2SO_4 assumed to be negligible

Emission Factors Based on Engineering Estimate or Vendor Guarantee

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.005	0.005	0.005	52	45	2.2	34

Emission Factor Notes:
Emission factors based on engineering estimates or vendor guarantee.
1) $PM/PM_{10}/PM_{2.5}$ based on vendor emissions data for proposed baghouse control device
2) NO_x, SO_2, VOC, CO and SO_2 based on engineering estimate

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Table 2-2b
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Emissions of Regulated Air Pollutants from Submerged Arc Furnace (SAF) (Greenhouse Gases)

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Inputs to Submerged Arc Furnace					
Carbonaceous Materials - Coal Charged to the Furnace	3.4	26,280	23,840.81	60%	15,768.00
Carbonaceous Materials - Wood Charged to the Furnace	7.0	53,191	48,253.81	20%	10,638.14
Carbonaceous Materials - Quartz Charged to the Furnace	7.0	53,191	48,253.81	1%	531.91
Flux Materials Charged to the Furnace	0.1	876	794.69	5%	43.80
Total Input to Submerged Arc Furnace	**17.45**	**133,537.44**	**121,143.13**	--	**26,981.85**
Outputs from Submerged Arc Furnace					
Slag Produced by the Furnace	0.1	695	630.72	10%	69.52
Air Pollution Control Residue Collected	1	8,760	7,946.94	10%	876.00
Total Output from Submerged Arc Furnace	**1.09**	**9,455.25**	**8,577.66**	--	**945.52**

Example Calculation
CO_2 Emissions (tons/yr) = Annual Mass (tons/yr) * Carbon Content (Weight %) * (44/12)

Annual GHG Calculation (By GHG Rule Eq. Q-5)

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
26,981.85	945.52	26,036.33	95,466.53	1.00	95,466.53	86,605.88	381,866.12	346,423.53

Calculation Method (GHG Rule Equation Q-5):

$CO_2 = 44/12 * [(Coal) * (C_{Coal}) + (Charcoal) * (C_{Charcoal}) + (Wood) * (CWood) + (Quartz) * (CQuartz) + (Flux) * (C_{Flux}) + Electrode * (C_{Electrode}) - (Slag) * (C_{Slag}) - (R) * (C_R)]$

Where:

CO_2 = Annual CO_2 mass emissions from the EAF (metric tons).
44/12 = Ratio of molecular weights, CO_2 to carbon.
(Coal) = Annual mass of coal (if any) charged to the furnace (metric tons).
(C_{Coal}) = Carbon content of the direct reduced iron, from the carbon analysis results (percent by weight, expressed as a decimal fraction).
(Charcoal) = Annual mass of charcoal charged to the furnace (metric tons).
($C_{Charcoal}$) = Carbon content of the charcoal, from the carbon analysis results (percent by weight, expressed as a decimal fraction).
(Wood) = Annual mass of wood charged to the furnace (metric tons).
(C_{Wood}) = Carbon content of the wood, from the carbon analysis results (percent by weight, expressed as a decimal fraction).
(Quartz) = Annual mass of quartz charged to the furnace (metric tons).
(C_{Quartz}) = Carbon content of the quartz, from the carbon analysis results (percent by weight, expressed as a decimal fraction).
(Flux) = Annual mass of flux materials (e.g., limestone, dolomite) charged to the furnace (metric tons).
(C_{Flux}) = Carbon content of the flux materials, from the carbon analysis results (percent by weight, expressed as a decimal fraction).
(Electrode) = Annual mass of carbon electrode consumed (metric tons).
($C_{Electrode}$) = Carbon content of the carbon electrode, from the carbon analysis results (percent by weight, expressed as a decimal fraction).
(Slag) = Annual mass of slag produced by the furnace (metric tons).
(C_{Slag}) = Carbon content of the slag, from the carbon analysis results (percent by weight, expressed as a decimal fraction).
(R) = Annual mass of air pollution control residue collected (metric tons).
(C_R) = Carbon content of the air pollution control residue, from the carbon analysis results (percent by weight, expressed as a decimal fraction).

Table 2-2c
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS

Potential Emissions of Regulated Air Pollutants from Coal Combustion in Submerged Arc Furnaces
(Hazardous Air Pollutants)***

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Formaldehyde	Yes	2.40E-04	AP-42 Coal Combustion (9/98) Table 1.1-14	3.30E-03	1.26E-02
Acenaphthene	Yes	5.10E-07	AP-42 Coal Combustion (9/98) Table 1.1-13	7.01E-06	2.68E-05
Acenaphthylene	Yes	2.50E-07	AP-42 Coal Combustion (9/98) Table 1.1-13	3.44E-06	1.31E-05
Acetaldehyde	Yes	5.70E-04	AP-42 Coal Combustion (9/98) Table 1.1-14	7.84E-03	3.00E-02
Acetophenone	Yes	1.50E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	2.06E-04	7.88E-04
Acrolein	Yes	2.90E-04	AP-42 Coal Combustion (9/98) Table 1.1-14	3.99E-03	1.52E-02
Antimony	Yes	1.80E-05	AP-42 Coal Combustion (9/98) Table 1.1-18	2.48E-04	9.46E-04
Anthracene	Yes	2.10E-07	AP-42 Coal Combustion (9/98) Table 1.1-13	2.89E-06	1.10E-05
Arsenic	Yes	4.10E-04	AP-42 Coal Combustion (9/98) Table 1.1-18	5.64E-03	2.15E-02
Benz(a)anthracene	Yes	8.00E-08	AP-42 Coal Combustion (9/98) Table 1.1-13	1.10E-06	4.20E-06
Benz(a)pyrene	Yes	3.80E-08	AP-42 Coal Combustion (9/98) Table 1.1-13	5.23E-07	2.00E-06
Benzene	Yes	1.30E-03	AP-42 Coal Combustion (9/98) Table 1.1-14	1.79E-02	6.83E-02
Benzo(b,j,k)fluoranthene	Yes	1.10E-07	AP-42 Coal Combustion (9/98) Table 1.1-13	1.51E-06	5.78E-06
Benzo(g,h,i)perylene	Yes	2.70E-08	AP-42 Coal Combustion (9/98) Table 1.1-13	3.71E-07	1.42E-06
Benzyl chloride	Yes	7.00E-04	AP-42 Coal Combustion (9/98) Table 1.1-18	9.63E-03	3.68E-02
Beryllium	Yes	2.10E-05	AP-42 Coal Combustion (9/98) Table 1.1-18	2.89E-04	1.10E-03
Biphenyl	Yes	1.70E-06	AP-42 Coal Combustion (9/98) Table 1.1-13	2.34E-05	8.94E-05
Bis(2-ethylhexyl)phthalate (DEHP)	Yes	7.30E-04	AP-42 Coal Combustion (9/98) Table 1.1-14	1.00E-02	3.84E-02
Bromoform	Yes	3.90E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	5.36E-04	2.05E-03
Cadmium	Yes	5.10E-05	AP-42 Coal Combustion (9/98) Table 1.1-18	7.01E-04	2.68E-03
Carbon disulfide	Yes	1.30E-04	AP-42 Coal Combustion (9/98) Table 1.1-14	1.79E-03	6.83E-03
2-Chloroacetophenone	Yes	7.00E-06	AP-42 Coal Combustion (9/98) Table 1.1-14	9.63E-05	3.68E-04
Chlorobenzene	Yes	2.20E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	3.03E-04	1.16E-03
Chloroform	Yes	5.90E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	8.11E-04	3.10E-03
Chromium	Yes	2.60E-04	AP-42 Coal Combustion (9/98) Table 1.1-18	3.58E-03	1.37E-02
Chrysene	Yes	1.00E-07	AP-42 Coal Combustion (9/98) Table 1.1-13	1.38E-06	5.26E-06
Cobalt	Yes	1.00E-04	AP-42 Coal Combustion (9/98) Table 1.1-18	1.38E-03	5.26E-03
Cumene	Yes	5.30E-06	AP-42 Coal Combustion (9/98) Table 1.1-14	7.29E-05	2.79E-04
Cyanide	Yes	2.50E-03	AP-42 Coal Combustion (9/98) Table 1.1-14	3.44E-02	1.31E-01
Dimethyl sulfate	Yes	4.80E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	6.60E-04	2.52E-03
2,4-Dinitrotoluene	Yes	2.80E-07	AP-42 Coal Combustion (9/98) Table 1.1-14	3.85E-06	1.47E-05
Ethyl Benzene	Yes	9.40E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	1.29E-03	4.94E-03
Ethyl chloride	Yes	4.20E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	5.78E-04	2.21E-03
Ethylene dichloride	Yes	4.00E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	5.50E-04	2.10E-03
Ethylene Dibromide	Yes	1.20E-06	AP-42 Coal Combustion (9/98) Table 1.1-14	1.65E-05	6.31E-05
Fluoranthene	Yes	7.10E-07	AP-42 Coal Combustion (9/98) Table 1.1-13	9.76E-06	3.73E-05
Fluorene	Yes	9.10E-07	AP-42 Coal Combustion (9/98) Table 1.1-13	1.25E-05	4.78E-05
Hexane	Yes	6.70E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	9.21E-04	3.52E-03
Indeno(1,2,3-cd)pyrene	Yes	6.10E-08	AP-42 Coal Combustion (9/98) Table 1.1-13	8.39E-07	3.21E-06
Isophorone	yes	5.80E-04	AP-42 Coal Combustion (9/98) Table 1.1-14	7.98E-03	3.05E-02
Lead	Yes	4.20E-04	AP-42 Coal Combustion (9/98) Table 1.1-18	5.78E-03	2.21E-02
Manganese	Yes	4.90E-04	AP-42 Coal Combustion (9/98) Table 1.1-18	6.74E-03	2.58E-02
Mercury	Yes	8.30E-05	AP-42 Coal Combustion (9/98) Table 1.1-18	1.14E-03	4.36E-03
Methyl Bromide	Yes	1.60E-04	AP-42 Coal Combustion (9/98) Table 1.1-14	2.20E-03	8.41E-03
Methyl Chloride	Yes	5.30E-04	AP-42 Coal Combustion (9/98) Table 1.1-14	7.29E-03	2.79E-02
Methyl Ethyl Ketone	Yes	3.90E-04	AP-42 Coal Combustion (9/98) Table 1.1-14	5.36E-03	2.05E-02
Methyl Hydrazine	Yes	1.70E-04	AP-42 Coal Combustion (9/98) Table 1.1-14	2.34E-03	8.94E-03
Methyl methacrylate	Yes	2.00E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	2.75E-04	1.05E-03
Methyl tert-butyl Ether	Yes	3.50E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	4.81E-04	1.84E-03
Methylene Chloride	Yes	2.90E-04	AP-42 Coal Combustion (9/98) Table 1.1-14	3.99E-03	1.52E-02
Naphthalene	Yes	1.30E-05	AP-42 Coal Combustion (9/98) Table 1.1-13	1.79E-04	6.83E-04
Nickel	Yes	2.80E-04	AP-42 Coal Combustion (9/98) Table 1.1-18	3.85E-03	1.47E-02
Phenanathrene	Yes	2.70E-06	AP-42 Coal Combustion (9/98) Table 1.1-13	3.71E-05	1.42E-04
Phenol	Yes	1.60E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	2.20E-04	8.41E-04
Propionaldehyde	Yes	3.80E-04	AP-42 Coal Combustion (9/98) Table 1.1-14	5.23E-03	2.00E-02
Pyrene	Yes	3.30E-07	AP-42 Coal Combustion (9/98) Table 1.1-13	4.54E-06	1.73E-05
Selenium	Yes	1.30E-03	AP-42 Coal Combustion (9/98) Table 1.1-18	1.79E-02	6.83E-02
Tetrachloroethylene	Yes	4.30E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	5.91E-04	2.26E-03
Toluene	Yes	2.40E-04	AP-42 Coal Combustion (9/98) Table 1.1-14	3.30E-03	1.26E-02
1,1,1-Trichloroethane	Yes	2.00E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	2.75E-04	1.05E-03
Styrene	Yes	2.50E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	3.44E-04	1.31E-03
Xylenes	Yes	3.70E-05	AP-42 Coal Combustion (9/98) Table 1.1-14	5.09E-04	1.94E-03
Vinyl acetate	Yes	7.60E-06	AP-42 Coal Combustion (9/98) Table 1.1-14	1.05E-04	3.99E-04
				Total (TPY)=	**0.70**

[redacted]	[redacted]	[redacted]
Four (4) Submerged Arc Furnaces	13.75	105,120

Notes:

*Regulated under Section 112(b) for Clean Air Act

**Emission factors taken from AP-42, Chapter 1 - Coal Combustion (9/98) Table 1.1-13 "Emission Factors for Polynuclear Aromatic Hydrocarbons (PAH) from Controlled Coal Combustion", Table 1.1-14 "Emission Factors for Various Organic Compounds from Controlled Coal Combustion" and Table 1.1-18 "Emission Factors for Trace Metals from Controlled Coal Combustion"

***No data exists on potential HAP emissions involving submerged arc furnaces associated with the ferroalloy industrial sector. Since coal is being utilized, these factors were used to define the potential level of regulated HAPs from a submerged arc furnace.

[redacted] = Individual HAP with the highest emission rate

Example Calculations

Estimated Uncontrolled Emissions (lbs/hr) = Emission Factor (lbs/ton) * Total Coal Throughput (tons/hr)
Estimated Uncontrolled Emissions (tons/yr) = Emission Factor (lbs/ton) * Total Coal Throughput (tons/yr) / 2000

Table 2-2d
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS

Potential Emissions of Regulated Air Pollutants from Wood Combustion in Submerged Arc Furnaces
(Hazardous Air Pollutants)***

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Acenaphthene	Yes	9.10E-07	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	2.63E-04	1.01E-03
Acenaphthylene	Yes	5.00E-06	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	1.45E-03	5.53E-03
Acetaldehyde	Yes	8.30E-04	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	2.40E-01	9.18E-01
Acetophenone	Yes	3.20E-09	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	9.26E-07	3.54E-06
Acrolein	Yes	9.78E-06	Vacated Boiler MACT backup database tests on wood-burning fluidized bed boilers	2.83E-03	1.08E-02
Antimony	Yes	7.90E-06	AP-42 Wood Residue Combustion (9/03) Table 1.6-4	2.29E-03	8.74E-03
Anthracene	Yes	3.00E-06	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	8.68E-04	3.32E-03
Arsenic	Yes	2.20E-05	AP-42 Wood Residue Combustion (9/03) Table 1.6-4	6.37E-03	2.43E-02
Benzene	Yes	1.11E-05	Vacated Boiler MACT backup database tests on wood-burning fluidized bed boilers	3.21E-03	1.23E-02
Benzo(a)anthracene	Yes	6.50E-08	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	1.88E-05	7.19E-05
Benzo(a)pyrene	Yes	2.60E-06	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	7.53E-04	2.88E-03
Benzo(b)fluoranthene	Yes	1.00E-07	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	2.89E-05	1.11E-04
Benzo(e)pyrene	Yes	2.60E-09	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	7.53E-07	2.88E-06
Benzo(g,h,i)perylene	Yes	9.30E-08	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	2.69E-05	1.03E-04
Benzo(j,k)fluoranthene	Yes	1.60E-07	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	4.63E-05	1.77E-04
Benzo(k)fluoranthene	Yes	3.60E-08	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	1.04E-05	3.98E-05
Beryllium	Yes	1.10E-06	AP-42 Wood Residue Combustion (9/03) Table 1.6-4	3.18E-04	1.22E-03
bis(2-Ethylhexyl)phthalate	Yes	4.70E-08	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	1.36E-05	5.20E-05
Bromomethane	Yes	1.50E-05	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	4.34E-03	1.66E-02
2-Butanone (MEK)	Yes	5.40E-06	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	1.56E-03	5.97E-03
Cadmium	Yes	4.10E-06	AP-42 Wood Residue Combustion (9/03) Table 1.6-4	1.19E-03	4.54E-03
Carbon tetrachloride	Yes	4.50E-05	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	1.30E-02	4.98E-02
Chlorine	Yes	7.90E-04	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	2.29E-01	8.74E-01
Chlorobenzene	Yes	3.30E-05	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	9.55E-03	3.65E-02
Chloroform	Yes	2.80E-05	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	8.10E-03	3.10E-02
Chloromethane	Yes	2.30E-05	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	6.66E-03	2.54E-02
Chromium	Yes	2.10E-05	AP-42 Wood Residue Combustion (9/03) Table 1.6-4	6.08E-03	2.32E-02
Chrysene	Yes	3.80E-08	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	1.10E-05	4.20E-05
Cobalt	Yes	6.50E-06	AP-42 Wood Residue Combustion (9/03) Table 1.6-4	1.88E-03	7.19E-03
Decachlorobiphenyl	Yes	2.70E-10	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	7.81E-08	2.99E-07
Dibenzo(a,h)anthracene	Yes	9.10E-09	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	2.63E-06	1.01E-05
Dichloromethane	Yes	2.90E-04	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	8.39E-02	3.21E-01
2,4-Dinitrophenol	Yes	1.80E-07	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	5.21E-05	1.99E-04
Ethylbenzene	Yes	3.10E-05	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	8.97E-03	3.43E-02
Fluoranthene	yes	1.60E-06	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	4.63E-04	1.77E-03
Fluorene	Yes	3.40E-06	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	9.84E-04	3.76E-03
Formaldehyde	Yes	1.77E-04	Vacated Boiler MACT backup database tests on wood-burning fluidized bed boilers	5.12E-02	1.96E-01
Hydrogen chloride	**Yes**	**8.70E-03**	**Engineering Estimates**	**2.52E+00**	**9.63E+00**
Indeno(1,2,3,c,d)pyrene	Yes	8.70E-08	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	2.52E-05	9.63E-05
Lead	Yes	4.80E-05	AP-42 Wood Residue Combustion (9/03) Table 1.6-4	1.39E-02	5.31E-02
Manganese	Yes	2.48E-04	Vacated Boiler MACT backup database tests on wood-burning fluidized bed boilers	7.18E-02	2.74E-01
Mercury	Yes	3.50E-06	AP-42 Wood Residue Combustion (9/03) Table 1.6-4	1.01E-03	3.87E-03
Naphthalene	Yes	9.70E-05	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	2.81E-02	1.07E-01
Nickel	Yes	3.30E-05	AP-42 Wood Residue Combustion (9/03) Table 1.6-4	9.55E-03	3.65E-02
4-Nitrophenol	Yes	1.10E-07	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	3.18E-05	1.22E-04
Phenanthrene	Yes	7.00E-06	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	2.03E-03	7.74E-03
Phenol	Yes	5.10E-05	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	1.48E-02	5.64E-02
Propionaldehyde	Yes	6.10E-05	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	1.77E-02	6.75E-02
Selelum	Yes	2.80E-06	AP-42 Wood Residue Combustion (9/03) Table 1.6-4	8.10E-04	3.10E-03
Styrene	Yes	5.60E-07	Vacated Boiler MACT backup database tests on wood-burning fluidized bed boilers	1.62E-04	6.20E-04
Toluene	Yes	4.60E-06	Vacated Boiler MACT backup database tests on wood-burning fluidized bed boilers	1.33E-03	5.09E-03
2,4,6-Trichlorophenol	Yes	2.20E-08	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	6.37E-06	2.43E-05
Vinyl Chloride	Yes	1.80E-05	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	5.21E-03	1.99E-02
Xylene	Yes	2.50E-05	AP-42 Wood Residue Combustion (9/03) Table 1.6-3	7.24E-03	2.77E-02

Total (TPY)= 12.91

[redacted]	[redacted]	[redacted]		
Four (4) Submerged Arc Furnaces	27.83	212,763		
Heating Value of Wood - 5200 BTU/lb	55,660 lb/hr	425,525,760 lb/hr	289	MMBtu/hr
			2,212,734	MMBtu/yr

Notes:

*Regulated under Section 112(b) for Clean Air Act

**Emission factors taken from AP-42, Chapter 1 - Wood Residue Combustion (9/03) Table 1.6-3 "Emission Factors for Speciated Organic Compounds, TOC, VOC, Nitrous Oxide, and Carbon Dioxide from Wood Residue Combustion"

***No data exists on potential HAP emissions involving submerged arc furnaces associated with the ferroalloy industrial sector. Since coal is being utilized, these factors were used to define the potential level of regulated HAPs from a submerged arc furnace.

[ ] = Individual HAP with the highest emission rate

Example Calculations
Estimated Uncontrolled Emissions (lbs/hr) = Emission Factor (lbs/MMBtu) * Heat Input Rate (MMBtu/hr)
Estimated Uncontrolled Emissions (tons/yr) = Emission Factor (lbs/MMBtu) * Heat Input Rate (MMBtu/yr) /2000

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Table 2-2e
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Regulated Air Pollutant Emissions from the Casting Frames (Criteria Air Pollutants)

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Casting Frame #1	AA-201a	8760	2.75	21,024	0.003	0.013
Casting Frame #2	AA-201a		2.75	21,024	0.003	0.013
Casting Frame #3	AA-201a		2.75	21,024	0.003	0.013
Casting Frame #4	AA-201a		2.75	21,024	0.003	0.013
				[redacted]	[redacted]	[redacted]

Example Calculations
Estimated Emissions (lbs/hr) = Maximum Throughput (tons/hr) * Emission Factor (lb/ton) * (1 - Adjustment Factor)
Estimated Emissions (tons/yr) = Maximum Throughput (tons/yr) * Emission Factor (lb/ton) / 2000 * (1 - Adjustment Factor)

[redacted]	[redacted]	[redacted]
Casting - Hot Metal Transfer Uncontrolled	[redacted]	[redacted]

[redacted]
[redacted]

Note:
(a) Reflects maximum amount of liquid silicon to pass through this operation and assumes four casting frames. Primary source of PM is estimated at the initial point of liquid silicon loading from the ladles to the casting frames.
(b) Emission factor based on National Pollutant Inventory - Emission Estimation Technique Manual for Iron and Steel Production. First published in September 1999. (Environment Australia). Table 10 - Emission Factors for Steel Teeming and Casting Operations.
(c) Adjustment factor to account for this being an indoor emission source. Potential emissions of PM/PM10/PM2.5 are anticipated to be minimal, however this estimation method was utilized to account for these potential emissions

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Table 2-3a
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Emissions of Regulated Air Pollutants from Natural Gas Combustion (Manufacturing - Ladle Pre-Heaters)
(Criteria Air Pollutants)

Combustion Equipment - Natural Gas

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
AA-202	Ladle Pre-Heaters - 2 Ton Ladle Capacity 4 Units - 10 MMBtu/hr (Each)	40	350,400	0.020	0.089	0.0235	0.1031	3.20	14.02	0.2157	0.945	3.29	14.43	1.00E-08	4.38E-08
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Maximum Hours per Year - Natural Gas = 8,760 hours/year

Natural Gas Combustion Emission Factors

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Natural Gas < 100 MMBtu	0.52	0.6	82	5.5	84.0	0.0005	0.0005	0.0005882	0.08	0.0054	0.0824	4.90E-07

Note:

*Emission factors from AP-42, Chapter 1 - External Combustion Sources.

*Factors for NO_x and CO taken from Table 1.4-1 - Emission Factors for Nitrogen Oxides (NOx) and Carbon Monoxide (CO) from Natural Gas Combustion. Small Boilers (< 100) - Uncontrolled.

*Factors for VOC, SO_2 and Pb taken from Table 1.4-2 - Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion. Emission factor of 0.52 lb/MMscf (0.0005 lbs/MMBtu) for $PM/PM_{10}/PM_{2.5}$ is based on EPA's $PM_{2.5}$ natural gas combustion study (2010). All PM (total, condensable, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors may be used to estimate PM_{10} and $PM_{2.5}$.

**To convert lbs/MMcf to lbs/MMBtu, the lbs/MMcf emission factors were divided by 1,020.

<u>Example Calculations</u>

Estimated Uncontrolled Emissions (lbs/hr) = Heat Input Rate (lbs/MMBtu) * Emission Factor (lbs/MMBtu)

Estimated Uncontrolled Emissions (tons/yr) = Estimated Uncontrolled Emissions (lbs/hr) * Hours of Operation (hrs/yr) / 2000

Table 2-3b
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Emissions of Regulated Air Pollutants from Natural Gas Combustion (Manufacturing - Ladle Pre-Heaters)
(Hazardous Air Pollutants)

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Formaldehyde	Yes	7.35E-05	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	2.94E-03	1.29E-02
2-Methylnaphthalene	Yes	2.35E-08	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	9.41E-07	4.12E-06
3-Methylchloranthrene	Yes	1.76E-09	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	7.06E-08	3.09E-07
7,12-Dimethylbenz(a)anthracene	Yes	1.57E-08	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	6.27E-07	2.75E-06
Acenaphthene	Yes	1.76E-09	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	7.06E-08	3.09E-07
Acenaphthylene	Yes	1.76E-09	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	7.06E-08	3.09E-07
Anthracene	Yes	2.35E-09	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	9.41E-08	4.12E-07
Arsenic	Yes	1.96E-07	AP-42 Nat. Gas Comb. (7/98), Table 1.4-4	7.84E-06	3.44E-05
Benz(a)anthracene	Yes	1.76E-09	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	7.06E-08	3.09E-07
Benz(a)pyrene	Yes	1.18E-09	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	4.71E-08	2.06E-07
Benzene	Yes	2.06E-06	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	8.24E-05	3.61E-04
Benzo(b)fluoranthene	Yes	1.76E-09	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	7.06E-08	3.09E-07
Benzo(g,h,i)perylene	Yes	1.18E-09	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	4.71E-08	2.06E-07
Benzo(k)fluoranthene	Yes	1.76E-09	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	7.06E-08	3.09E-07
Beryllium	Yes	1.18E-08	AP-42 Nat. Gas Comb. (7/98), Table 1.4-4	4.71E-07	2.06E-06
Cadmium	Yes	1.08E-06	AP-42 Nat. Gas Comb. (7/98), Table 1.4-4	4.31E-05	1.89E-04
Chromium	Yes	1.37E-06	AP-42 Nat. Gas Comb. (7/98), Table 1.4-4	5.49E-05	2.40E-04
Chrysene	Yes	1.76E-09	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	7.06E-08	3.09E-07
Cobalt	Yes	8.24E-08	AP-42 Nat. Gas Comb. (7/98), Table 1.4-4	3.29E-06	1.44E-05
Dibenzo(a,h)anthracene	Yes	1.18E-09	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	4.71E-08	2.06E-07
Dichlorobenzene	Yes	1.18E-06	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	4.71E-05	2.06E-04
Fluoranthene	Yes	2.94E-09	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	1.18E-07	5.15E-07
Fluorene	Yes	2.75E-09	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	1.10E-07	4.81E-07
Hexane	Yes	1.76E-03	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	7.06E-02	3.09E-01
Indeno(1,2,3-cd)pyrene	Yes	1.76E-09	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	7.06E-08	3.09E-07
Manganese	Yes	3.73E-07	AP-42 Nat. Gas Comb. (7/98), Table 1.4-4	1.49E-05	6.53E-05
Mercury	Yes	2.55E-07	AP-42 Nat. Gas Comb. (7/98), Table 1.4-4	1.02E-05	4.47E-05
Naphthalene	Yes	5.98E-07	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	2.39E-05	1.05E-04
Nickel	Yes	2.06E-06	AP-42 Nat. Gas Comb. (7/98), Table 1.4-4	8.24E-05	3.61E-04
Phenanathrene	Yes	1.67E-08	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	6.67E-07	2.92E-06
Pyrene	Yes	4.90E-09	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	1.96E-07	8.59E-07
Selenium	Yes	2.35E-08	AP-42 Nat. Gas Comb. (7/98), Table 1.4-4	9.41E-07	4.12E-06
Toluene	Yes	3.33E-06	AP-42 Nat. Gas Comb. (7/98), Table 1.4-3	1.33E-04	5.84E-04

Total (TPY)= 0.32

[redacted]	[redacted]	[redacted]
Natural Gas-Fired Combustion Sources - Silicon Manufacturing Plant - Ladle Pre-Heaters (AA-202)	40.00	8760

Notes:
*Regulated under Section 112(b) for Clean Air Act

**Emission factors taken from AP-42, Chapter 1 - External Combustion Sources, Table 1.4-3 - Emission Factors for Speciated Organic Compounds from Natural Gas Combustion and Table 1.4-4 - Emission Factors for Metals from Natural Gas Combustion

[redacted] = Individual HAP with the highest emission rate

Example Calculations
Estimated Uncontrolled Emissions (lbs/hr) = Emission Factor (lbs/MMBtu) * Heat Input Rate (MMBtu/hr)
Estimated Uncontrolled Emissions (tons/yr) = Estimated Uncontrolled Emissions (lbs/hr) * Hours of Operation / 2000

Table 2-3c
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Emissions of Regulated Air Pollutants from Natural Gas Combustion - Silicon Purification Process (Greenhouse Gases)

Emission Factor Table

Fuel	Fuel Classification	Higher Heating Value (HHV)				CO_2 Emission Factor (EF)				CH_4 Emission Factor (EF)				N_2O Emission Factor			
		Value - HHV	Custom - HHV	Default - HHV	Units	Value - EF	Custom - EF	Default - EF	Units	Value - EF	Custom - EF	Default - EF	Units	Value - EF	Custom - EF	Default - EF	Units
Natural Gas	Fossil-gaseous	0.001028		1.028E-03	MMBtu/scf	53.02		53.02	kg/MMBtu	0.001		1.0E-03	kg/MMBtu	0.0001		1.0E-04	kg/MMBtu

Notes:

a) Default values for natural gas were obtained from the EPA Greenhouse Gas Reporting Rule (10/30/2009) Tables C-1 and C-2. Table C-1 - Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel. Table C-2 - Default CH_4 and N_2O Emission Factors for Various Types of Fuel.

b) Please convert any custom values to the specified default units.

Color Key:

Optional Data (Provide if Available). Default emission factors are used unless operational data/factors are provided.

Annual GHG Calculation (By GHG Rule Eq. C-2a and C-2b)

[illegible]	[illegible]	[illegible]	[illegible]
40.00	350,400	340,856,000	Tier 1

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EF[b] (kg/MMBtu)	53.02	0.001	0.0001	--
Estimated GHG Emissions (metric tons)	18,578	0.350	0.0350	--
Estimated GHG Emissions (tons)	20,479	0.386	0.0386	--
Global Warming Potential (GWP)[c] (kg CO_2e/kg)	1	21	310	--
Estimated GHG Emissions (metric tons CO_2e)	18,578	7.36	10.86	18,596
Estimated GHG Emissions (tons CO_2e)	20,479	8.11	11.97	20,499

Notes:

a) The default HHV value from Table C-1 of the EPA Greenhouse Gas Reporting Rule is substituted when no actual HHV data from fuel sampling is available. Use of the default HHV value constitutes the Tier 1 calculation method while use of HHV values obtained from fuel sampling constitutes Tier 2.

b) Emission factors (EF) for natural gas were obtained from Tables C-1 and C-2 of the EPA Greenhouse Gas Reporting Rule (40 CFR 98). Table C-1 - Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel. Table C-2 - Default CH_4 and N_2O Emission Factors for Various Types of Fuel.

c) Global warming potentials (GWP) were obtained from Table A-1 of the EPA Greenhouse Gas Reporting Rule (40 CFR 98).

Example Calculations

Estimated GHG Emissions (metric tons) = Fuel Use (MMBtu/yr) * Emission Factor (kg/MMBtu) * High Heat Value (MMBtu/scf) * 0.001
Estimated GHG Emissions (metric tons CO_2e) = Estimated GHG Emissions (metric tons) * Global Warming Potential (kg CO_2e/kg)
Estimated GHG Emissions (tons CO_2e) = Estimated GHG Emissions (metric tons CO_2e) * 1.10231

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Table 2-4
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Emissions of Regulated Air Pollutants from Raw Material Receiving, Handling, and Storage (Criteria Air Pollutants)

Raw Material Emission Source Operation	Material Throughput, T								Uncontrolled Annual Air Pollutant Emissions, Q_u (tons/year)							Maximum Air Pollutant Emissions (lbs/hour)		
	(tons/year)								PM	PM_{10}	$PM_{2.5}$					PM	PM_{10}	$PM_{2.5}$
[illegible]																		
[illegible]																		
Truck Receiving to Storage Pile (Drop Point)	105,120	6.8	(a)	4.5	(b)	1.0E-03	4.9E-04	7.4E-05	0.05	0.03	0.004	90.0%	0.01	0.003	0.0004	0.0012	0.0006	0.0001
Front End Loader from Storage Pile to Receiving Building (Transfer Point)	105,120	6.8	(a)	4.5	(b)	1.0E-03	4.9E-04	7.4E-05	0.05	0.03	0.004	90.0%	0.01	0.003	0.0004	1.24E-03	5.88E-04	8.91E-05
Receiving Building Hopper to Conveyor (Transfer Point)	105,120	6.8	(a)	4.5	(b)	1.0E-05	4.9E-04	7.4E-05	0.05	0.03	0.004	90.0%	0.01	0.003	0.0004	1.24E-03	5.88E-04	8.91E-05
Conveyor to Charging Storage Silo (Transfer Point)* (AA-101a)	105,120	6.8	(a)	4.5	(b)	1.0E-03	4.9E-04	7.4E-05	0.05	0.03	0.004	90.0%	*Emissions will be controlled by a baghouse. Refer to Table 2-4a for estimated emissions					
Charging Storage Silo to EAF (Transfer Point)	105,120	6.8	(a)	4.5	(b)	1.0E-03	4.9E-04	7.4E-05	0.05	0.03	0.004	90.0%	0.01	0.003	0.0004	1.24E-03	5.88E-04	8.91E-05
Total Material Transfer to and from Coal Storage Pile (AA-101)	–	–	–	–	–	–	–	–	**0.27**	**0.13**	**0.020**	–	**0.05**	**0.01**	**0.002**	–	–	–
[illegible]																		
Truck Unloaded to Log Storage Pile (Drop Point)	212,763	6.8	(a)	15.0	(d)	6.4E-05	3.0E-05	4.6E-06	0.007	0.003	0.0005	90.0%	0.001	0.0003	0.00005	1.56E-04	7.38E-05	1.12E-05
Front End Loader from Log Storage Pile to Wood Chipper (Transfer Point)	212,763	6.8	(a)	15.0	(d)	6.4E-05	3.0E-05	4.6E-06	0.007	0.003	0.0005	90.0%	0.001	0.0003	0.00005	1.56E-04	7.38E-05	1.12E-05
Wood Chipper to Conveyor (Transfer Point)	212,763	6.8	(a)	15.0	(d)	6.4E-05	3.0E-05	4.6E-06	0.007	0.003	0.0005	90.0%	0.001	0.0003	0.00005	1.56E-04	7.38E-05	1.12E-05
Conveyor to Wood Chip Storage Pile (Drop Point)	212,763	6.8	(a)	15.0	(d)	6.4E-05	3.0E-05	4.6E-06	0.007	0.003	0.0005	90.0%	0.001	0.0003	0.00005	1.56E-04	7.38E-05	1.12E-05
Front End Loader from Storage Pile to Receiving Building (Transfer Point)	212,763	6.8	(a)	15.0	(d)	6.4E-05	3.0E-05	4.6E-06	0.007	0.003	0.0005	90.0%	0.001	0.0003	0.00005	1.56E-04	7.38E-05	1.12E-05
Receiving Building Hopper to Conveyor (Transfer Point)	212,763	6.8	(a)	15.0	(d)	6.4E-05	3.0E-05	4.6E-06	0.007	0.003	0.0005	90.0%	0.001	0.0003	0.00005	1.56E-04	7.38E-05	1.12E-05
Conveyor to Charging Storage Silo (Transfer Point)* (AA-102a)	212,763	6.8	(a)	15.0	(d)	6.4E-05	3.0E-05	4.6E-06	0.007	0.003	0.0005	90.0%	*Emissions will be controlled by a baghouse. Refer to Table 2-4a for estimated emissions					
Charging Storage Silo to EAF (Transfer Point)	212,763	6.8	(a)	15.0	(d)	6.4E-05	3.0E-05	4.6E-06	0.007	0.003	0.0005	90.0%	0.001	0.0003	0.00005	1.56E-04	7.38E-05	1.12E-05
Total Material Transfer to and from Wood Storage Pile (AA-102)	–	–	–	–	–	–	–	–	**0.10**	**0.050**	**0.008**	–	**0.003**	**0.002**	**0.0003**	–	–	–
[illegible]																		
Truck Receiving to Storage Pile (Drop Point)	212,763	6.8	(a)	0.2	(d)	8.9E-02	4.2E-02	6.4E-03	9.44	4.46	0.68	90.0%	0.94	0.45	0.07	0.22	0.10	0.02
Front End Loader from Storage Pile to Receiving Building (Transfer Point)	212,763	6.8	(a)	0.2	(d)	8.9E-02	4.2E-02	6.4E-03	9.44	4.46	0.68	90.0%	0.94	0.45	0.07	0.22	0.10	0.02
Receiving Building Hopper to Conveyor (Transfer Point)	212,763	6.8	(a)	0.2	(d)	8.9E-02	4.2E-02	6.4E-03	9.44	4.46	0.68	90.0%	0.94	0.45	0.07	0.22	0.10	0.02
Conveyor to Charging Storage Silo (Transfer Point)* (AA-103a)	212,763	6.8	(a)	0.2	(d)	8.9E-02	4.2E-02	6.4E-03	9.44	4.46	0.68	90.0%	*Emissions will be controlled by a baghouse. Refer to Table 2-4a for estimated emissions					
Charging Storage Silo to EAF (Transfer Point)	212,763	6.8	(a)	0.2	(d)	8.9E-02	4.2E-02	6.4E-03	9.44	4.46	0.68	90.0%	0.94	0.45	0.07	0.22	0.10	0.02
Total Material Transfer to and fromQuartz Storage Pile (AA-103)	–	–	–	–	–	–	–	–	**47.2**	**22.3**	**3.4**	–	**3.0**	**1.8**	**0.27**	–	–	–
[illegible]																		
Truck To Receiving Building (Drop Point)	183	6.8	(a)	0.2	(d)	8.9E-02	4.2E-02	6.4E-03	0.01	0.004	0.001	90.0%	0.0008	0.0004	0.0001	0.0002	0.0001	0.00001
Receiving Building to EAF (Transfer Point)	183	6.8	(a)	0.2	(d)	8.9E-02	4.2E-02	6.4E-03	0.01	0.004	0.001	90.0%	0.0008	0.0004	0.0001	0.0002	0.0001	0.00001
Total Limestone Material Handling (AA-104)	–	–	–	–	–	–	–	–	**0.02**	**0.008**	**0.002**	–	**0.0016**	**0.0008**	**0.0001**	–	–	–
[illegible]																		

Average Daily Wind Speed (mph): 6.8

[illegible]		
0.74	0.35	0.053

Calculation Method:

Emission Factor, EF (lb/ton) = k * (0.0032) * $(u/5)^{1.3}$ / $(M/2)^{1.4}$
where:
k = Particle Size Multiplier
U = Mean Wind Speed (mph (miles per hour))
M = Moisture Content of Material (%)
Calculation Method Obtained From AP-42 Chapter 13.2.4 Equation 1
Particle Size Multipliers Obtained From AP-42 Chapter 13.2.4

Uncontrolled Air Emissions, Q_u (tons/year) = T (tons/year) * EF (lb/ton) / (2000 lb/ton)

where:

Q_u = Uncontrolled Air Pollutant Emission Rate

T = Coal Throughput

Controlled Air Emissions, Qc (ton/year) = Qu (ton/year) * [1 - C]
where:
Q_c = Controlled Air Pollutant Emission Rate

Sample Calculations:

EF = 0.001 lb-emitted/ton-throughput = 0.74 * 0.0032 * (6.8/5)^1.3 / (4.3/2)^1.4
Q_u = 0.01 tons/year = 0.05 tons/year x (1 - 90%) (Rail Car Bottom Unloaded to Hopper)

Notes:
a) Wind speed data obtained from National Climatic Data Center (NCDC) average wind speed for Tupelo, Mississippi.
b) Moisture content of coal typically ranges from 2.8-20% (AP-42 Table 13.2.4-1).

c) Control efficiency of 90% used to conservatively estimate potential emissions due to covers and enclosures on conveyors.

d) Calculation method based on AP-42 Section 13.2.4 "Aggregate Handling and Storage Piles." The calculation method was utilized since it covers the following ranges of source conditions: silt content percent (0.44-19), moisture content percent (0.25-4.8) and wind speed (1.3-15 mph). Typical silt and moisture contents have been identified for the following: crushed limestone (1.3-1.9% silt, 0.3-1.1% moisture), coal (3.4-16% silt, 2.8-20% moisture), wood (15% moisture), charcoal (3.0-10.0% moisture). Charcoal moisture content taken from the Food and Agriculture Organization of the United Nations - "Simple Technologies for Charcoal Making".

e) PM/PM10/PM2.5 emission estimates increased by a factor of three (3) to account for future variations in the material handling operations.
f) Material feed silo represents the material day bins.

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Table 2-4a
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Emissions of Regulated Air Pollutants from Raw Material Receiving, Handling, and Storage (Criteria Air Pollutants) - Baghouses

Controlled Type Releases

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
AA-101a, AA-102a, AA-103a, AA-403	Material Handling (Coal, Wood, Quartz and Slag) Baghouse (BG5)	120,000	0.0015	8,760	1.54	6.76
AA-301	Product Handling Area Baghouse (BG6)	60,000	0.0015	8,760	0.77	3.38
[illegible]					[illegible]	[illegible]

Calculation Method:
Controlled Emissions (lbs/hr) = Flow (acfm) * Emission Factor (gr/scf) * 60 min/hr * 1 lb/7000 gr
Controlled Emissions (tons/year) = Controlled Emissions (lbs/hr) * Operating Time (hr/yr) / 2000 lb/ton

Notes:
*Majority of potential $PM/PM_{10}/PM_{2.5}$ emissions will be captured and controlled by a baghouse. Uncontrolled emissions have been identified as a fugitive source.
**Number of baghouses may vary, however the total flow volume should reflect all discharge points to the baghouse(s) for Phase I and II.
***Emission factors for baghouse based on manufacturer's specifications.

Table 2-4b
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Emissions of Regulated Air Pollutants from Wood Chipper

1200 HP Electric Wood Chipper

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
AA-102b	Wood Chipper	200	0.02	0.002	0.002	0.40	0.04	0.04	0.416	0.042	0.042

Hours of Operation

Maximum Hours of Operation/Year = 2080

Control Efficiency =** 90%

Maximum Wood Throughput

Equipment Capacity (yd^3/hr) = 600

Density of Wood Chips (lb/yd^3) = 648

Maximum Wood Throughput (lb/hr) = 388,800

Maximum Wood Throughput (tons/hr) = 194.4

Example Calculations

Controlled Emissions (lbs/hr) = Maximum Wood Throughput (tons/hr) * Emission Factor (lb/ton chipped) * (1- control efficiency)
Controlled Emissions (tons/year) = Controlled Emissions (lbs/hr) * Operating Time (hr/yr) / 2000 lb/ton

Notes:

*PM emission factor based on Idaho Department of Environmental Quality factor for similar source (wood deparking) as referenced in Idaho air permit number 4051-00. Assumed that PM_{10} emissions are 10% of PM emissions based on North Carolina Department of Environment and Natural Resources study "Estimating Emissions from Generation and Combustion of "Waste" Wood DRAFT" (July 15, 1998), which indicated that PM_{10} generated during milling and sawing is at most 10% of PM. Assumed that $PM_{2.5}$ emissions are equal to PM_{10} emissions.

** Control efficiency of 90% based on enclosure of chipping area.

Table 2-4c
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Emissions of Regulated Air Pollutants from Slag Handling

Slag Screening and Transfer - AA-403

Material	Air Pollutant Emission Factor, EF (lb/T)* (lb-emitted/ton-throughput)			Uncontrolled Annual Air Pollutant Emissions, Q_u (tons/year)			Control Efficiency, C (%)***	Controlled Annual Air Pollutant Emissions, Q_c (tons/year)		
	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$		PM	PM_{10}	$PM_{2.5}$
Slag Crushing	5.4E-03	2.4E-03	2.4E-03	3.00E-02	1.33E-02	1.33E-02	99.0%	Emissions will be controlled by a baghouse. Refer to Table 2-4a for estimated emissions		
Slag Screening	2.5E-02	8.7E-03	8.7E-03	1.39E-01	4.84E-02	4.84E-02	99.0%			
Conveyor Transfer Point	3.0E-03	1.1E-03	1.1E-03	1.67E-02	6.12E-03	6.12E-03	99.0%			
Total	--	--	--	1.58E-01	5.45E-02	5.45E-02	--	--	--	--

Notes:

*AP-42 11.19.2-2 Emission Factors for Crushed Stone Processing Operations (Tertiary Crushing, Screening and Conveyor Transfer Point). Assumed $PM_{2.5}$ factor equal to PM_{10}
**Slag Handled is based on four (4) Submerged Arc Furnaces and approximately 60 kg/hr (132 lbs/hr) of slag
***Slag will be processed as needed in the finished product processing area, this process incorporates a fabric filter baghouse.

Slag Handled (tons/year) =** **11,124** **Pounds per Ton = 2000**

Example Calculations
Estimated Uncontrolled Emissions (tons/yr) = Emission Factor (lb-emitted/ton-throughput) * Slag (tons/year) / 2000
Estimated Controlled Emissions (tons/yr) = Uncontrolled Emissions (tons/year) * (1 - Control Efficiency)

Table 2-4d
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Emissions of Regulated Air Pollutants from Silica Fume Silos

Silica Fume Silo - AA-404

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Silica Fume Silo #1 (12,000 ft^3)	100	0.01	0.009	0.038
Silica Fume Silo #2 (12,000 ft^3)	100	0.01	0.009	0.038
Silica Fume Silo #3 (12,000 ft^3)	100	0.01	0.009	0.038
Silica Fume Silo #4 (12,000 ft^3)	100	0.01	0.009	0.038
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Grains per Pound = 7,000
Hours per Year = 8,760
Minutes per Hour = 60

Example Calculations
Estimated Uncontrolled Emissions (lbs/hr) = Maximum Flow Rate (dscfm) * Emission Factor (gr/dscf) * 60 / 7000
Estimated Uncontrolled Emissions (tons/yr) = Estimated Uncontrolled Emissions (lbs/hr) x Hours of

PM/PM10/PM2.5 Emissions (lbs/hr) = 100 dscfm * 0.01 gr/dscfm * 60 / 7000 = 0.01 lbs/hr
PM/PM10/PM2.5 Emissions (tons/year) = 0.01 lbs/hr * 8,760 hours / 2000 lbs = 0.04 tons/year

Table 2-5
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Emissions of Regulated Air Pollutants - Management of Outdoor Storage Areas (Criteria Air Pollutants)

Source	Material silt content[a] (%)	Material moisture content[b] (%)	Number of dozers, n	Annual operating hours, t (hr)	Emission Factor, EF (lb/hr/dozer)			Control efficiency[d] (%)	Controlled Emissions (lb/hr)			Controlled Emissions (tpy)		
					PM	PM_{10}	$PM_{2.5}$		PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Bulldozing on Coal Storage Areas (AA-105)	4.6	4.8	2	8760	63.68	15.31	1.40	99.0%	1.3	0.3	0.03	5.6	1.3	0.1
Bulldozing on Wood Storage Areas (AA-105)	2.0	35	2	8760	1.77	0.27	0.04	99.0%	0.04	0.01	0.001	0.2	0.02	0.003
Bulldozing on Quartz Storage Areas (AA-105)	0.1	0.2	2	8760	40.08	4.20	0.88	99.0%	0.8	0.1	0.02	3.5	0.4	0.1
											Total	**9.2**	**1.7**	**0.2**

Notes:
a) Material silt content for coal taken from Western Regional Air Partnership's (WRAP) Fugitive Dust Handbook. Silt content for quartz was not readily availble and was assumed to be 0.1%. Silt content for wood based on previous experience with emission calculations for wood storage piles
b) Moisture content of coal and quartz (assumed to be the same as limestone) taken from Western Regional Air Partnership's (WRAP) Fugitive Dust Handbook. Moisture content for wood was based on previous experience with emission calculations for wood storage piles.
c) Potential emissions of hazardous air pollutants assumed to be negligible
d) Control efficiency of 99% assumed based on use of best management practices (i.e., dust minimization techniques including as needed water spray application and partial enclosures)

Calculation Method:
EF_{PM} (lb/hr/dozer) = (78.4 * $(s)^{1.2}$) / ($(M)^{1.3}$) -- AP-42 Table 11.9-1 (Bulldozing - Coal and Overburden)
EF_{PM10} (lb/hr/dozer) = (0.75 * 18.6 * $(s)^{1.5}$) / ($(M)^{1.4}$) -- AP-42 Table 11.9-1 (Bulldozing - Coal and Overburden)
$EF_{PM2.5}$ (lb/hr/dozer) = (0.022 * 78.4 * $(s)^{1.2}$) / ($(M)^{1.3}$) -- AP-42 Table 11.9-1 (Bulldozing - Coal and Overburden)
Short-term PTE = EF * n
Long-term PTE = EF * n * t

Example Calculations:
PM10: EF = (0.75 * 18.6 * 4.6^1.5) / (4.8^1.4) = 15.31 lb-PM10/hr/dozer
PM10: Controlled Emissions (lbs/hr) = 15.31 lb-PM10/hr/dozer * 2 dozers = 0.31 lb/hr
PM10: Controlled Emissions (tons/yr) = 0.3 lb/hr * 8760 hours / (2000 lb/ton) = 1.34 tons/yr

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Table 2-6
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Emissions of Regulated Air Pollutants Due to Vehicle Traffic on Gravel Roads - In Plant Only (Criteria Air Pollutants)

Technical Support Information

Process Supported by Traffic on In-Plant Gravel Roads (AA-402)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Emission Factor, E (lb/VMT)			[illegible]		
						PM	PM_{10}	$PM_{2.5}$	[illegible]	[illegible]	[illegible]
Trucks Loaded per Day (Wood) - Inbound	39	20	7,200	1.70	12,240	7.52	2.14	0.21	2.3	0.7	0.07
Trucks Loaded per Day (Wood) - Outbound	22	20	7,200	1.70	12,240	7.52	2.14	0.21	2.3	0.7	0.07
Trucks Loaded per Day (Coal) - Inbound	39	10	3,600	1.70	6,120	4.24	1.21	0.12	0.6	0.2	0.02
Trucks Loaded per Day (Coal) - Outbound	22	10	3,600	1.70	6,120	4.24	1.21	0.12	0.6	0.2	0.02
Trucks Loaded per Day (Quartz) - Inbound	39	20	7,200	1.70	12,240	7.52	2.14	0.21	2.3	0.7	0.07
Trucks Loaded per Day (Quartz) - Outbound	22	20	7,200	1.70	12,240	7.52	2.14	0.21	2.3	0.7	0.07
Trucks Loaded per Day (Limestone) - Inbound	39	1	24	1.70	41	7.52	2.14	0.21	0.0	0.002	0.0002
Trucks Loaded per Day (Limestone) - Outbound	22	1	24	1.70	41	7.52	2.14	0.21	0.0	0.002	0.0002
Trucks Loaded per Day (Finished Product) - Inbound	39	10	2,600	2.50	6,500	7.52	2.14	0.21	1.2	0.3	0.03
Trucks Loaded per Day (Finished Product) - Outbound	22	10	2,600	2.50	6,500	7.52	2.14	0.21	1.2	0.3	0.03
[illegible]	-	[illegible]	[illegible]	-	[illegible]	-	-	-	[illegible]	[illegible]	[illegible]

Notes:

(a) Emission estimate accounts for best management practices which are to be utilized to minimize the potential for fugitive dust emissions.

(b) Road dust emissions from the material handling equipment in the storage yard are expected to be inconsequential due to the low operating speed of the equipment.

(c) Potential emissions of hazardous air pollutants assumed to be negligible.

(d) Number of trips per day and number of trips per year based on Information Request dated May 29, 2013 (Rev. 1). Number of trips includes both Phase I and Phase I

Calculation Method:

Estimate vehicle miles traveled (VMT) annually
Annual VMT (miles) = Number of Trips per Day x 365 days/year x Miles/trip

Determine Emission Factor; AP-42, Section 13.2.2 - Unpaved Roads

$E = k*(s/12)^a * (W/3)^b * (N - P)/N$

Where:

E= Particulate Matter Emission Factor	varies	lb/VMT
s - Road Surface Silt Loading	8.4	% (Mean silt content from AP-42 Table 13.2.2-1 for "Haul road to/from pit")
W = Average Vehicle Weight (tons)	30	
P = Number of "wet" days during an averaging period	110	(AP-42 Figure 13.2.2-1)
N = number of days in averaging period	365	
VMT = vehicle miles traveled	varies by operation	

	PM	PM_{10}	$PM_{2.5}$
k = Particle Size Factor	4.9	1.5	0.15
a = constant	0.7	0.9	0.9
b = constant	0.45	0.45	0.45

Estimate Emissions,
PTE = Annual VMT * E * (100 - C)/100

C = Control efficiency **95** %

Table 2-6a
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Emissions of Regulated Air Pollutants Due to Vehicles Transporting Raw Materials (Criteria Air Pollutants)

Technical Support Information

Process Supported by Traffic on In-Plant Gravel Roads (AA-402a)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vehicles Transferring Raw Materials from Material Storage Piles to SAF Charging Building	0.12	0.43	1.14	4993	1	12	4380	0.24	0.06	0.06	0.53	0.13	0.13
Vehicles Returning from SAF Charging Building to Material Storage Piles	0.12	0.43	1.14	4993	1	12	4380	0.24	0.06	0.06	0.53	0.13	0.13
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

C = Control efficiency 50.00 %

Particle size multplier: PM10/PM = 25%[a]

Notes:

(a) Emission factor based on National Pollutant Inventory - Emission Estimation Technique Manual for Iron and Steel Production. First published in September 1999. (Environment Australia). Table 11 - Emission Factors for Dust Generation Associated with Vehicle Movements (Paved Roads - Light/Heavy Vehicle Mix)

(b) Assume one (1) trip takes one (1) hour and assume trips occur 365 days/year

(c) Controlled emission estimate based on futgitive dust control plant to minimize PM emissions including sweeping and watering as needed.

Example Calculation

Emissions (lbs/hr) = Emission Factor (lb/vehicle mile travelled) * Miles/Trip * Number of Trips (trips/hour)

Emissions (tons/year) = Emission Factor (lb/vehicle mile travelled) * Miles/Year / 2000

Table 2-7a
Mississippi Silicon, LLC.
Proposed Silicon Manufacturing Plant
Potential Emissions of Regulated Air Pollutants Due to Wind Erosion on Outdoor Coal Storage Areas - AA-106 (Criteria Air Pollutants)

[illegible]	365
[illegible]	9,135
[illegible]	0.55
[illegible]	50%

[illegible]		
[illegible]	[illegible]	[illegible]
1	0.5	0.075

Erosion Potential During Each Disturbance

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Uncontrolled Fugitive Emission Rate, R_i (tons/disturbance)		
						PM	PM_{10}	$PM_{2.5}$
162	10.7	10	10.73	0.57	0.49	0.005	0.002	0.0004

Total Annual Erosion Potential

[illegible]	Fugitive Emission Rate (tons/year)			Fugitive Emission Rate (lb/event)		
	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Total Uncontrolled, R	9.87E+00	4.94E+00	7.40E-01	3.00E-02	1.50E-02	2.25E-03
Total Controlled, R_c	**4.94E+00**	**2.47E+00**	**3.70E-01**	**1.50E-02**	**7.50E-03**	**1.13E-03**

Notes:

a) Threshold friction velocity based on AP-42 Table 13.2.5-2 value for an "uncrusted coal pile".

b) Assumed control efficiency of 50% based on fugitive dust control plant including best management practices.

(c) Disturbances with Erosion Potential of zero (threshold friction velocity was not exceeded) are not shown in table.

d) Fastest mile wind speed data obtained from hourly National Climatic Data Center (NCDC) Quality Controlled Local Climatological Data (QCLCD) for Columbus, Mississippi for the year 2010. Hourly average wind speed was multiplied by a factor of 1.5 to estimate 5-second wind speed, according to the Durst curve for converting wind speeds.

Calculation Method & Sample Calculations (Based on AP-42 Chapter 13.2.5 - Industrial Wind Erosion):

$u^+_{10,i} = u^+_{z,i}$ (ln(10/0.005) / ln(z/0.005))

$u^*_i = 0.0053\ u^+_{10,i}$

$P_i = 58\ (u^*_i - u_t^*)^2 + 25\ (u^*_i - u_t^*)$, for $u^*_i > u_t^*$

$P_i = 0$, for $u^*_i \le u_t^*$

$R_i = k\ P_i\ A$

$R = S^i\ R_i$

$R_c = R\ (1 - C)$

R_i = 0 tons = 1 * 0 g/m2 * 9135 m2 / (453.59 g/lb) / (2000 lb/ton)

R = sum of all R_i

R_c = 4.94 tons/year = 9.87 tons/year x (1 - 50%)

where:

$u^+_{10,i}$ = fastest mile wind speed for the i'th disturbance normalized to 10-m anemometer height

$u^+_{z,i}$ = fastest mile wind speed for the i'th disturbance measured at anemometer with height of z meters

u^*_i = friction velocity for the i'th disturbance

u_t^* = threshold friction velocity

P_i = erosion potential for the i'th disturbance

R_i = emission rate for the i'th disturbance

k = particle size multiplier

R = total uncontrolled annual emission rate

C = control efficiency (%)

R_c = controlled emission rate

Storage Pile Surface Area Calculation:

Assumed conical pile shape

Diameter, D (ft) = 250
Diameter, D (m) = 76.20
Height, H (ft) = 7
Height, H (m) = 2.13
Surface area, A (m^2) = 4,568
Number of Piles = 2
Total surface area, A (m^2) = 9,135

Table 2-7b
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Potential Emissions of Regulated Air Pollutants Due to Wind Erosion on Outdoor Wood Storage Areas - AA-106 (Criteria Air Pollutants)

[illegible]	365
[illegible]	9,135
[illegible]	1.12
[illegible]	50%

[illegible]		
[illegible]	[illegible]	[illegible]
1	0.5	0.075

Erosion Potential During Each Disturbance

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Uncontrolled Fugitive Emission Rate, R_i (tons/disturbance)		
						PM	PM_{10}	$PM_{2.5}$
550	18.8	10	18.78	1.00	0.000	0.00	0.00	0.00

Total Annual Erosion Potential

[illegible]	Fugitive Emission Rate (tons/year)			Fugitive Emission Rate (lb/event)		
	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Total Uncontrolled, R	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total Controlled, R_c	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**

Notes:

a) Threshold friction velocity based on AP-42 Table 13.2.5-2 value for an "uncrusted coal pile".

b) Assumed control efficiency of 50% based on fugitive dust control plant including best management practices.

c) No disturbances exceeded an Erosion Potential of zero (threshold friction velocity was not exceeded). The disturbance with maximum wind speed is shown in table.

d) Fastest mile wind speed data obtained from hourly National Climatic Data Center (NCDC) Quality Controlled Local Climatological Data (QCLCD) for Columbus, Mississippi for the year 2010. Hourly average wind speed was multiplied by a factor of 1.5 to estimate 5-second wind speed, according to the Durst curve for converting wind speeds.

Calculation Method & Sample Calculations (Based on AP-42 Chapter 13.2.5 - Industrial Wind Erosion):

$u^+_{10,i} = u^+_{z,i}\ (\ln(10/0.005) / \ln(z/0.005))$

$u^*_i = 0.0053\ u^+_{10,i}$

$P_i = 58\ (u^*_i - u_t^*)^2 + 25\ (u^*_i - u_t^*)$, for $u^*_i > u_t^*$

$P_i = 0$, for $u^*_i \le u_t^*$

$R_i = k\ P_i\ A$

$R = S^i\ R_i$

$R_c = R\ (1 - C)$

R_i = 0 tons = 1 * 0 g/m2 * 9135 m2 / (453.59 g/lb) / (2000 lb/ton)

R = sum of all R_i

R_c = 0 tons/year = 0 tons/year x (1 - 50%)

where:

$u^+_{10,i}$ = fastest mile wind speed for the i'th disturbance normalized to 10-m anemometer height

$u^+_{z,i}$ = fastest mile wind speed for the i'th disturbance measured at anemometer with height of z meters

u^*_i = friction velocity for the i'th disturbance

u_t^* = threshold friction velocity

P_i = erosion potential for the i'th disturbance

R_i = emission rate for the i'th disturbance

k = particle size multiplier

R = total uncontrolled annual emission rate

C = control efficiency (%)

R_c = controlled emission rate

Storage Pile Surface Area Calculation:

Assumed conical pile shape

Diameter, D (ft) = 250
Diameter, D (m) = 76.20
Height, H (ft) = 7
Height, H (m) = 2.13
Surface area, A (m^2) = 4,568
Number of Piles = 2
Total surface area, A (m^2) = 9,135

Table 2-7c
Mississippi Silicon, LLC.
Proposed Silicon Manufacturing Plant
Potential Emissions of Regulated Air Pollutants Due to Wind Erosion on Outdoor Quartz Storage Areas - AA-106 (Criteria Air Pollutants)

[illegible]	365
[illegible]	9,135
[illegible]	1.30
[illegible]	50%

[illegible]		
[illegible]	[illegible]	[illegible]
1	0.5	0.075

Erosion Potential During Each Disturbance

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Uncontrolled Fugitive Emission Rate, R_i (tons/disturbance)		
						PM	PM_{10}	$PM_{2.5}$
550	18.8	10	18.78	1.00	0.00	0.00	0.00	0.00

Total Annual Erosion Potential

[illegible]	Fugitive Emission Rate (tons/year)			Fugitive Emission Rate (lb/event)		
	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Total Uncontrolled, R	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total Controlled, R_c	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**

Notes:

a) Threshold friction velocity based on AP-42 Table 13.2.5-2 value for Scoria (volcanic rock).

b) Assumed control efficiency of 50% based on fugitive dust control plant including best management practices.

c) No disturbances exceeded an Erosion Potential of zero (threshold friction velocity was not exceeded). The disturbance with maximum wind speed is shown in table.

d) Fastest mile wind speed data obtained from hourly National Climatic Data Center (NCDC) Quality Controlled Local Climatological Data (QCLCD) for Columbus, Mississippi for the year 2010. Hourly average wind speed was multiplied by a factor of 1.5 to estimate 5-second wind speed, according to the Durst curve for converting wind speeds.

Calculation Method & Sample Calculations (Based on AP-42 Chapter 13.2.5 - Industrial Wind Erosion):

$u^+_{10,i} = u^+_{z,i}$ (ln(10/0.005) / ln(z/0.005))

$u^*_i = 0.0053\ u^+_{10,i}$

$P_i = 58\ (u^*_i - u_t^*)^2 + 25\ (u^*_i - u_t^*)$, for $u^*_i > u_t^*$

$P_i = 0$, for $u^*_i \leq u_t^*$

$R_i = k\ P_i\ A$

$R = S^i\ R_i$

$R_c = R\ (1 - C)$

R_i = 0 tons = 1 * 0 g/m2 * 9135 m2 / (453.59 g/lb) / (2000 lb/ton)

R = sum of all R_i

R_c = 0 tons/year = 0 tons/year x (1 - 50%)

where:

$u^+_{10,i}$ = fastest mile wind speed for the i'th disturbance normalized to 10-m anemometer height

$u^+_{z,i}$ = fastest mile wind speed for the i'th disturbance measured at anemometer with height of z meters

u^*_i = friction velocity for the i'th disturbance

u_t^* = threshold friction velocity

P_i = erosion potential for the i'th disturbance

R_i = emission rate for the i'th disturbance

k = particle size multiplier

R = total uncontrolled annual emission rate

C = control efficiency (%)

R_c = controlled emission rate

Storage Pile Surface Area Calculation:

Assumed conical pile shape

Diameter, D (ft) = 250
Diameter, D (m) = 76.20
Height, H (ft) = 7
Height, H (m) = 2.13
Surface area, A (m^2) = 4,568
Number of Piles = 2
Total surface area, A (m^2) = 9,135

Table 2-7d
Mississippi Silicon, LLC.
Proposed Silicon Manufacturing Plant
Potential Emissions of Regulated Air Pollutants Due to Wind Erosion on Outdoor Slag Storage Areas - AA-403 (Criteria Air Pollutants)

[illegible]	
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

[illegible]		
[illegible]	[illegible]	[illegible]
1	0.5	0.075

Erosion Potential During Each Disturbance

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Uncontrolled Fugitive Emission Rate, R_i (tons/disturbance)		
						PM	PM_{10}	$PM_{2.5}$
162	10.7	10	10.73	0.57	0.49	4.89E-05	2.45E-05	3.67E-06

Total Annual Erosion Potential

[illegible]	Fugitive Emission Rate (tons/year)			Fugitive Emission Rate (lb/event)		
	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Total Uncontrolled, R	9.87E-02	4.94E-02	7.40E-03	3.00E-04	1.50E-04	2.25E-05
Total Controlled, R_c	**4.94E-02**	**2.47E-02**	**3.70E-03**	**1.50E-04**	**7.50E-05**	**1.13E-05**

Notes:

a) Threshold friction velocity based on AP-42 Table 13.2.5-2 value for an "uncrusted coal pile".

b) Assumed control efficiency of 50% based on fugitive dust control plant including best management practices.

(c) Disturbances with Erosion Potential of zero (threshold friction velocity was not exceeded) are not shown in table.

d) Fastest mile wind speed data obtained from hourly National Climatic Data Center (NCDC) Quality Controlled Local Climatological Data (QCLCD) for Columbus, Mississippi for the year 2010. Hourly average wind speed was multiplied by a factor of 1.5 to estimate 5-second wind speed, according to the Durst curve for converting wind speeds.

Calculation Method & Sample Calculations (Based on AP-42 Chapter 13.2.5 - Industrial Wind Erosion):

$u^+_{10,i} = u^+_{z,i} (\ln(10/0.005) / \ln(z/0.005))$

$u^*_i = 0.0053\, u^+_{10,i}$

$P_i = 58 (u^*_i - u_t^*)^2 + 25 (u^*_i - u_t^*)$, for $u^*_i > u_t^*$

$P_i = 0$, for $u^*_i \le u_t^*$

$R_i = k P_i A$

$R = S^i R_i$

$R_c = R (1 - C)$

R_i = 0 tons = 1 * 0 g/m2 * 91 m2 / (453.59 g/lb) / (2000 lb/ton)

R = sum of all R_i

R_c = 0.05 tons/year = 0.1 tons/year x (1 - 50%)

where:

$u^+_{10,i}$ = fastest mile wind speed for the i'th disturbance normalized to 10-m anemometer height

$u^+_{z,i}$ = fastest mile wind speed for the i'th disturbance measured at anemometer with height of z meters

u^*_i = friction velocity for the i'th disturbance

u_t^* = threshold friction velocity

P_i = erosion potential for the i'th disturbance

R_i = emission rate for the i'th disturbance

k = particle size multiplier

R = total uncontrolled annual emission rate

C = control efficiency (%)

R_c = controlled emission rate

Storage Pile Surface Area Calculation:

Assumed conical pile shape

Diameter, D (ft) = 25
Diameter, D (m) = 7.62
Height, H (ft) = 0.7
Height, H (m) = 0.21
Surface area, A (m^2) = 46
Number of Piles = 2
Total surface area, A (m^2) = 91

Table 2-8
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Emissions of Regulated Air Pollutants from Diesel Fired Emergency Generators (Criteria Air Pollutants and HAPs)

AA-501 - Diesel-Fired Emergency Generators - 1 Generator Rated at 670 HP

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	
SO_2	0.00809	3.67	5.4	0.27	AP-42, Table 3.4-1
H_2SO_4[a]	0.00062	0.281	0.41	0.021	AP-42, Table 3.4-1
NO_x	0.0007	0.30	0.4	0.02	EPA Final Tier 4
$PM/PM_{10}/PM_{2.5}$	0.00003	0.0149	0.02	0.001	EPA Final Tier 4
CO	0.0057	2.6	3.8	0.2	EPA Final Tier 4
VOC	0.00247	0.14	1.7	0.08	EPA Final Tier 4
[illegible]					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	
Benzene	9.33E-04	7.91E-06	5.30E-03	2.65E-04	AP-42, Table 3.3-2
Toluene	4.09E-04	3.47E-06	2.32E-03	1.16E-04	AP-42, Table 3.3-2
Xylene	2.85E-04	2.42E-06	1.62E-03	8.10E-05	AP-42, Table 3.3-2
1,3-Butadiene	3.91E-05	3.32E-07	2.22E-04	1.11E-05	AP-42, Table 3.3-2
Formaldehyde	**1.18E-03**	**1.00E-05**	**6.70E-03**	**3.35E-04**	**AP-42, Table 3.3-2**
Acetaldehyde	7.67E-04	6.50E-06	4.36E-03	2.18E-04	AP-42, Table 3.3-2
Acrolein	9.25E-05	7.84E-07	5.26E-04	2.63E-05	AP-42, Table 3.3-2
Naphthalene[b]	8.48E-05	7.19E-07	4.82E-04	2.41E-05	AP-42, Table 3.3-2
PAH (POM)[b]	1.68E-04	1.42E-06	9.55E-04	4.77E-05	AP-42, Table 3.3-2
[illegible]			[illegible]	[illegible]	[illegible]

Power (bhp) = 670
Hours of operation (hr/year) = 100
Number of Generators = 1
Highest HAP emissions.

Pounds per Ton = 2000
Conversion of lb/hp-hr to g/hp-hr based on a conversion factor of 453.6
g/hp-hr = 0.00809 lb/hp-hr * 453.6 = 3.67 g/hp-hr
lb/bhp-hr = lb/MMBtu *0.002544 / 0.3

Notes:
a) Assumed that 5% of the uncontrolled sulfur dioxide is further oxidized to sulfur trioxide and combined with water to form sulfuric acid; adjustment factor for
b) Regulated HAP is polycyclic organic matter (POM). AP-42 emission factor for PAH is assumed equivalent to POM for regulatory purposes. Naphthalene is excluded from HAP total because it is a subset of POM. POM is included in HAP total.
c) AP-42 Section 3.3 "Gasoline and Diesel Industrial Engines", Table 3.3-1 - Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines and Table 3.3-2 - Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines.

EPA Final Tier 4 Emission Factors - Emergency Generators 500 kW/650 HP

[illegible]	[illegible]	[illegible]
NO_x	0.40	0.3
NMHC	0.19	0.14
CO	3.5	2.6
PM	0.02	0.0149

Conversion of g/kw-hr to g/bhp-hr based on a conversion factor of 0.7457
g/bhp-hr = 0.40 g/kw-hr * 0.7457 = 0.3 g/bhp-hr

Example Calculations
HAP Emission Factor (lb/bhp-hr) = Emission Factor (lb/MMBtu) * 0.002544 (MMBtu/bhp-hr) / 0.3 (Mechanical Efficiency)
Estimated Emissions (lb/hr) = Power (bhp) * Emission Factor (lb/bhp-hr) * Number of Emergency Generators
Estimated Emissions (ton/year) = Estimated Emissions (lb/hr) * Hours of Operation (hr/year) / (2000 lb/ton)

SO2 Emissions (lbs/hr) = 670 bhp * 3.67 g/hp-hr * 1 = 5.4 lbs/hr
SO2 Emissions (tons/year) = 5.4 lbs/hr * 100 hours/year / 2000 lbs = 0.27 tons/year

H2SO4 Emissions (lbs/hr) = 670 bhp * 0.28 g/hp-hr * 1 = 0.4 lbs/hr
H2SO4 Emissions (tons/year) = 0.4 lbs/hr * 100 hours/year / 2000 lbs = 0.02 tons/year

NOx Emissions (lbs/hr) = 670 bhp * 0.30 g/hp-hr * 1 = 0.4 lbs/hr
NOx Emissions (tons/year) = 0.4 lbs/hr * 100 hours/year / 2000 lbs = 0.02 tons/year

PM/PM10/PM2.5 Emissions (lbs/hr) = 670 bhp * 0.01 g/hp-hr * 1 = 0.0 lbs/hr
PM/PM10/PM2.5 Emissions (tons/year) = 0.0 lbs/hr * 100 hours/year / 2000 lbs = 0.00 tons/year

CO Emissions (lbs/hr) = 670 bhp * 2.60 g/hp-hr * 1 = 3.8 lbs/hr
CO Emissions (tons/year) = 3.8 lbs/hr * 100 hours/year / 2000 lbs = 0.19 tons/year

VOC Emissions (lbs/hr) = 670 bhp * 0.14 g/hp-hr * 1 = 1.7 lbs/hr
VOC (tons/year) = 1.7 lbs/hr * 100 hours/year / 2000 lbs = 0.08 tons/year

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Table 2-8a
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Potential Regulated Air Pollutant Emissions from Plant Support - Emergency Generator (Greenhouse Gases)

Emission Factor Table

Fuel	Fuel Classification	Higher Heating Value (HHV)			CO_2 Emission Factor (EF)			CH_4 Emission Factor (EF)			N_2O Emission Factor		
		Value - HHV	Default - HHV	Units	Value - EF	Default - EF	Units	Value - EF	Default - EF	Units	Value - EF	Default - EF	Units
Diesel	Petroleum Products	0.138	1.380E-01	MMBtu/gal	73.96	73.96	kg/MMBtu	0.003	3.0E-03	kg/MMBtu	0.0006	6.0E-04	kg/MMBtu

Notes:
a) Default values for diesel fuel were obtained from the EPA Greenhouse Gas Reporting Rule (10/30/2009) Tables C-1 and C-2. Table C-1 - Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel. Table C-2 - Default CH_4 and N_2O Emission Factors for Various Types of Fuel. Factors for CO_2 were taken from Table C-1 - Residual No. 2 Fuel Oil and factors for CH_4 and N_2O were taken from Table C-2 - Petroleum.

Annual GHG Calculations (By GHG Rule Eq. C-2a and C-2b)

2,800				
EF[b] (kg/MMBtu)	73.96	0.003	0.0006	--
Estimated GHG Emissions (metric tons) - Emergency Generators	29	0.001	0.0002	--
Estimated GHG Emissions (tons) - Emergency Generators	**32**	**0.001**	**0.0003**	**--**
Global Warming Potential (GWP)[c] (kg CO_2e/kg)	1	21	310	--
Estimated GHG Emissions (metric tons CO_2e) - Emergency Generators	29	0.02	0.07	28.7
Estimated GHG Emissions (tons CO_2e) - Emergency Generators	**32**	**0.03**	**0.08**	**31.6**

Notes:
a) The default HHV value from Table C-1 of the EPA Greenhouse Gas Reporting Rule is substituted when no actual HHV data from fuel sampling is available. Use of the default HHV value constitutes the Tier 1 calculation method while use of HHV values obtained from fuel sampling constitutes Tier 2.
b) Emission factors (EF) for natural gas were obtained from Tables C-1 and C-2 of the EPA Greenhouse Gas Reporting Rule (40 CFR 98). Table C-1 - Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel. Table C-2 - Default CH_4 and N_2O Emission Factors for Various Types of Fuel.
c) Global warming potentials (GWP) were obtained from Table A-1 of the EPA Greenhouse Gas Reporting Rule (40 CFR 98).
d)Cummins DSGAB Datasheet - 28.0 US gph at full load. 28.0 x 100 = 2,800 gallons

Example Calculations
Estimated GHG Emissions (metric tons) = Fuel Use (MMBtu/hr) * Emission Factor (kg/MMBtu) * High Heat Value (MMBtu/gal) * 0.001
Estimated GHG Emissions (metric tons CO_2e) = Estimated GHG Emissions (metric tons) * Global Warming Potential (kg CO_2e/kg)
Estimated GHG Emissions (tons CO_2e) = Estimated GHG Emissions (metric tons CO_2e) * 1.10231

CO2 Emissions (metric tons) = 0.00E+00 scf/year * 31.50 kg/MMBtu * MMBtu/scf * 0.001 = 01 metric tons CO2
CO2 Emissions (metric tons CO2e) = 01 metric tons CO2 * 28.578144 kg CO2e/kg = 32 metric tons CO2e
CO2 Emissions (tons CO2e) = 32 metric tons CO2e * 1.10231 = 00 tons CO2e

CH4 Emissions (metric tons) = 0.00E+00 scf/year * 0.001 kg/MMBtu * MMBtu/scf * 0.001 = 21.00 metric tons CH4
CH4 Emissions (metric tons CO2e) = 21.00 metric tons CH4 * 0.0248432 kg CO2e/kg = 0.03 metric tons CO2e
CH4 Emissions (tons CO2e) = 0.03 metric tons CO2e * 1.10231 = 0.00 tons CO2e

N2O Emissions (metric tons) = 0.00E+00 scf/year * 0.0003 kg/MMBtu * MMBtu/scf * 0.001 = 310.00 metric tons N2O
N2O Emissions (metric tons CO2e) = 310.00 metric tons N2O * 0.0718704 kg CO2e/kg = 0.08 metric tons CO2e
N2O Emissions (tons CO2e) = 0.08 metric tons CO2e * 1.10231 = 0.00 tons CO2e

Table 2-9
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of Potential to Emit Regulated Air Pollutants from Silicon Manufacturing (Criteria Air Pollutants and HAPs)

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Material Transfer to and from Coal Storage Pile (AA-101)	Table 2-4	0.02	0.01	0.002	--	--	--	--	--	--	--	--
Material Transfer to and from Wood Storage Pile (AA-102)	Table 2-4	0.005	0.002	0.0003	--	--	--	--	--	--	--	--
Material Transfer to and from Quartz Storage Pile (AA-103)	Table 2-4	3.8	1.8	0.3	--	--	--	--	--	--	--	--
Limestone Material Handling (AA-104)	Table 2-4	0.0016	0.0008	0.0001								
Material Handling (Coal, Wood, Quartz) Baghouse (AA-101a, AA-102a, AA-103a)	Table 2-4a	6.8	6.8	6.8	--	--	--	--	--	--	--	--
Product Handling Area Baghouse (AA-301)	Table 2-4a	3.4	3.4	3.4	--	--	--	--	--	--	--	--
Submerged Arc Furnace (AA-201)[d]	Tables 2-2a, 2-2c & 2-2d	61.2	61.2	61.2	1892.2	2169.7	1429.6	92.5	0.08	--	9.6	13.61
Casting Frames (AA-201a)	Table 2-2e	0.1	0.1	0.1	--	--	--	--	--	--	--	--
Diesel Fired Emergency Generator (AA-501)	Table 2-8	0.001	0.001	0.001	0.02	0.27	0.19	0.083	--	0.021	3.35E-04	1.10E-03
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PSD Source Threshold Rates (tons per year)		250	250	250	250	250	250	250	--	--	--	--
Project Classified as PSD?		No	No	No	YES	YES	YES	No	--	--	--	--
PSD Major Source Threshold Rates (tons per year) and HAP Major Source Threshold (tons/year)		25	15	10	40	40	100	40	0.6	7	10	25
Pollutant Subject to PSD Review or Classified as a Major Source of HAPS?		YES	YES	YES	YES	YES	YES	YES	No	No	No	No
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Natural Gas Combustion - Ladle Pre-Heaters (AA-202)	Tables 2-3a and 2-3b	0.1	0.1	0.1	14.0	0.10	14.4	0.9	4.4E-08	--	0.3	0.3
Wood Chipper (AA-102b)	Table 2-4b	0.42	0.042	0.042	--	--	--	--	--	--	--	--
Silica Fume Silos (AA-404)	Table 2-4d	0.15	0.15	0.15	--	--	--	--	--	--	--	--
Storage Piles Processing (i.e., Bulldozing) (AA-105)	Table 2-5	9.2	1.7	0.2	--	--	--	--	--	--	--	--
In-plant Gravel Roads (AA-402)	Table 2-6	13.0	3.7	0.37	--	--	--	--	--	--	--	--
In-plant Paved Roads - Raw Material Transport (AA-402a)	Table 2-6a	1.1	0.3	0.3	--	--	--	--	--	--	--	--
Storage Piles Wind Erosion (AA-106 and AA-403)	Tables 2-7a, 2-7b, 2-7c, 2-7d	5.0	2.5	0.4	--	--	--	--	--	--	--	--
Total Fugitive Source PTE		**28.9**	**8.5**	**1.5**	**14.0**	**0.1**	**14.4**	**0.9**	**4.4E-08**	**--**	**0.3**	**0.3**
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Notes:

(a) Ton per year (TPY) estimates based on appropriate average emission factor (i.e., lbs/MMBtu) and 8,760 hours per year. Short term emissions may exceed this average factor.

(b) "Fugitive emissions" means those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening. The fugitive emissions of a stationary source shall not be considered in determining whether it is a major stationary source for the purposes of Section 302(j) of the Clean Air Act, unless the source belongs to one of the designated categories of stationary sources. The proposed silicon manufacturing and purification plant is not one of the designated categories.

(c) Controlled emissions includes systems that are inherent to operation of the equipment (excludes fugitive source operations).

(d) Emissions from Pb based on coal and wood combustion in the SAF

Table 2-10
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of Potential to Emit Regulated Air Pollutants from the Silicon Manufacturing Process (Hazardous Air Pollutants)

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Formaldehyde	50000	1.26E-02	1.96E-01	1.29E-02	3.35E-04	2.22E-01
2-Methylnaphthalene	91576	--	--	4.12E-06	--	4.12E-06
3-Methylchloranthrene	56495	--	--	3.09E-07	--	3.09E-07
7,12-Dimethylbenz(a)anthracene	57976	--	--	2.75E-06	--	2.75E-06
Acenaphthene	83329	2.68E-05	1.01E-03	3.09E-07	--	1.03E-03
Acenaphthylene	208968	1.31E-05	5.53E-03	3.09E-07	--	5.55E-03
Acetophenone	98-86-2	7.88E-04	3.54E-06	--	--	7.92E-04
Anthracene	120127	1.10E-05	3.32E-03	4.12E-07	--	3.33E-03
Antimony	7440-36-0	9.46E-04	8.74E-03	--	--	9.69E-03
Arsenic	ARSENIC	2.15E-02	2.43E-02	3.44E-05	--	4.59E-02
Benz(a)anthracene	56553	4.20E-06	7.19E-05	3.09E-07	--	7.64E-05
Benz(a)pyrene	50328	2.00E-06	2.88E-03	2.06E-07	--	2.88E-03
Benzene	71432	6.83E-02	1.23E-02	3.61E-04	2.65E-04	8.12E-02
Benzo(b)fluoranthene	205992	--	1.11E-04	3.09E-07	--	1.11E-04
Benzo(b,j,k)fluoranthene	205992	5.78E-06	1.77E-04	--	--	1.83E-04
Benzo(e)pyrene	192-97-2	--	2.88E-03	--	--	2.88E-03
Benzo(g,h,i)perylene	191242	1.42E-06	1.03E-04	2.06E-07	--	1.05E-04
Benzo(k)fluoranthene	207089	--	3.98E-05	3.09E-07	--	4.01E-05
Benzyl chloride	100-44-7	3.68E-02	--	--	--	3.68E-02
Beryllium	BERYLLIUM	1.10E-03	1.22E-03	2.06E-06	--	2.32E-03
Biphenyl	92-52-4	8.94E-05	--	--	--	8.94E-05
Bis(2-ethylhexyl)phthalate (DEHP)	117-81-7	3.84E-02	5.20E-05	--	--	3.84E-02
Bromoform	75-25-2	2.05E-03	--	--	--	2.05E-03
Cadmium	CADMIUM	2.68E-03	4.54E-03	1.89E-04	--	7.41E-03
Carbon disulfide	75-15-0	6.83E-03	--	--	--	6.83E-03
Carbon tetrachloride	56-23-5	--	4.98E-02	--	--	4.98E-02
Chlorine	7782-50-5	--	8.74E-01	--	--	8.74E-01
2-Chloroacetophenone	532-27-4	3.68E-04	--	--	--	3.68E-04
Chlorobenzene	108-90-7	1.16E-03	3.65E-02	--	--	3.77E-02
Chloroform	67-66-3	3.10E-03	3.10E-02	--	--	3.41E-02
Chromium	CHROMIUM	1.37E-02	2.32E-02	2.40E-04	--	3.71E-02
Chrysene	218019	5.26E-06	4.20E-05	3.09E-07	--	4.76E-05
Cobalt	COBALT	5.26E-03	7.19E-03	1.44E-05	--	1.25E-02
Cumene	98-82-8	2.79E-04	--	--	--	2.79E-04
Cyanide	75-90-8	1.31E-01	--	--	--	1.31E-01
Decachlorobiphenyl	2051-24-3	--	2.99E-07			2.99E-07
Dibenzo(a,h)anthracene	53703	--	1.01E-05	2.06E-07	--	1.03E-05
Dichlorobenzene	106467	--	--	2.06E-04	--	2.06E-04
Dichloromethane	75-09-2	--	3.21E-01	--	--	3.21E-01
Dimethyl sulfate	77-78-1	2.52E-03	--	--	--	2.52E-03
2,4-Dinitrotoluene	121-14-2	1.47E-05	1.99E-04	--	--	2.14E-04
Ethyl Benzene	100-41-4	4.94E-03	3.43E-02	--	--	3.92E-02
Ethyl chloride	75-00-3	2.21E-03	--	--	--	2.21E-03
Ethylene dichloride	107-06-2	2.10E-03	--	--	--	2.10E-03
Ethylene Dibromide	106-93-4	6.31E-05	--	--	--	6.31E-05
Fluoranthene	206440	3.73E-05	1.77E-03	5.15E-07	--	1.81E-03
Fluorene	86737	4.78E-05	3.76E-03	4.81E-07	--	3.81E-03
Hexane	110543	3.52E-03	--	3.09E-01	--	3.13E-01
Hydrochloric Acid	**7647010**	**--**	**9.63E+00**	**--**	**--**	**9.63E+00**
Indeno(1,2,3-cd)pyrene	193395	3.21E-06	9.63E-05	3.09E-07	--	9.98E-05
Isophorone	78-59-1	3.05E-02	--	--	--	3.05E-02
Manganese	MANGANESE	2.58E-02	2.74E-01	6.53E-05	--	3.00E-01
Mercury	MERCURY	4.36E-03	3.87E-03	4.47E-05	--	8.28E-03
Methyl Bromide	74-83-9	8.41E-03	1.66E-02	--	--	2.50E-02
Methyl Chloride	74-87-3	2.79E-02	2.54E-02	--	--	5.33E-02
Methyl Ethyl Ketone	78-93-3	2.05E-02	5.97E-03	--	--	2.65E-02
Methyl Hydrazine	60-34-4	8.94E-03	--	--	--	8.94E-03
Methyl methacrylate	80-62-6	1.05E-03	--	--	--	1.05E-03
Methyl tert-butyl Ether	1634-04-4	1.84E-03	--	--	--	1.84E-03
Methylene Chloride	75-09-2	1.52E-02	--	--	--	1.52E-02
Naphthalene	91203	6.83E-04	--	1.05E-04	--	7.88E-04
Nickel	NICKEL	1.47E-02	3.65E-02	3.61E-04	--	5.16E-02
4-Nitrophenol	100-02-7	--	1.22E-04			1.22E-04
Phenanathrene	85018	1.42E-04	7.74E-03	2.92E-06	--	7.89E-03
Phenol	108-95-2	8.41E-04	5.64E-02	--	--	5.73E-02
Propionaldehyde	123-38-6	2.00E-02	6.75E-02	--	--	8.75E-02
Pyrene	129000	1.73E-05	--	8.59E-07	--	1.82E-05
Selenium	SELENIUM	6.83E-02	3.10E-03	4.12E-06	--	7.14E-02
Tetrachloroethylene	127-18-4	2.26E-03		--	--	2.26E-03
Toluene	108883	1.26E-02	5.09E-03	5.84E-04	1.16E-04	1.84E-02
1,1,1-Trichloroethane	71-55-6	1.05E-03	--	--	--	1.05E-03
2,4,6-Trichlorophenol	88-06-2	--	2.43E-05	--	--	2.43E-05
Styrene	100-42-5	1.31E-03	6.20E-04	--	--	1.93E-03
Xylenes	1330207	1.94E-03	2.77E-02	--	8.10E-05	2.97E-02
Vinyl acetate	108-05-4	3.99E-04	--	--	--	3.99E-04
Vinyl Chloride	75-01-	--	1.99E-02	--	--	1.99E-02
1,3-Butadiene	106990	--	--	--	1.11E-05	1.11E-05
Acetaldehyde	75070	3.00E-02	9.18E-01	--	2.18E-04	9.48E-01
Acrolein	107028	1.52E-02	1.08E-02	--	2.63E-05	2.61E-02
Naphthalene*	91203	--	1.07E-01	--	2.41E-05	1.07E-01
PAH (POM)*	POLYCYCLIC ORGANIC MATTER	--		--	4.77E-05	4.77E-05
Lead	Lead Compounds	2.21E-02	5.31E-02	4.38E-08	--	7.52E-02
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

13.94

[illegible] = Highest individual HAP emission rate

*Regulated HAP is polycyclic organic matter (POM). AP-42 emission factor for PAH is assumed equivalent to POM for regulatory purposes. Naphthalene is excluded from diesel HAP total because it is a subset of POM. POM is included in HAP total.

Table 2-11
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of Potential to Emit Regulated Air Pollutants from the Silicon Manufacturing Process (Greenhouse Gases)

[redacted]								
[redacted]	[redacted]	[redacted]			[redacted]			[redacted]
		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
Submerged Arc Furnaces (AA-201)	Table 2-2b	381,866.12	--	--	381,866.12	--	--	381,866.12
Natural Gas-Fired Combustion Sources (AA-202)	Table 2-3c	20,478.94	0.39	0.04	20,478.94	8.11	11.97	20,499.03
Emergency Generator (AA-501)	Table 2-8a	31.50	0.001	0.000	31.50	0.03	0.08	31.61
[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Section 3: Regulatory Applicability

The proposed silicon manufacturing plant will be subject to regulations incorporated in MDEQ's Air Pollution Code (APC) for air emission sources constructed and operated in Mississippi. These rules impose permitting requirements and specific standards for air emissions. This section discusses the pertinent federal, state, and local air pollution control regulations that may be applicable to the proposed plant. These types of regulations typically include:

- Requirements to obtain a construction permit prior to commencing construction;
- Emission limitations;
- Monitoring and testing requirements; and
- Recordkeeping and reporting requirements.

This section also includes a discussion on how the proposed plant will comply with these applicable regulations.

The following sections are intended to provide the following:

- **Section 3.1. Air Quality Status -** This section identifies the current air quality status for Tishomingo County, which depending on specific air quality designation status will dictate specific air permitting requirements that must be satisfied before a construction / operating permit can be issued.

- **Section 3.2. Permitting Requirements –** This section identifies the permitting requirements required by federal and state regulations, including PSD applicability that must be satisfied prior to construction / operating permit issuance.

- **Section 3.3. State and Local Requirements -** This section identifies the state and local air pollutant regulations. Table 3-4a lists the MDEQ air regulations. Those regulations that have been deemed applicable to the plant's emission sources have been highlighted. Table 3-4b includes a summary of requirements contained in "*APC-S-1 - Section 3. Specific Criteria for Sources of Particulate Matter*" and Table 3-4c includes a summary of requirements in "*APC-S-1 - Section 4. Specific Criteria for Sources of Sulfur Compounds*". A discussion on how MS Silicon will comply with these requirements is provided in the subsections of 3.3.

- **Section 3.4. Federal Requirements, Section 3.5. NSPS Requirements and Section 3.6. NESHAP Requirements -** These sections identify the federal air pollutant regulations and Table 3-1 summarizes the federal air pollution regulations. Included in this section are tables listing the federal air regulations, including Table 3-2a which lists the New Source Performance Standards (NSPS) and Tables 3-3a and 3-3b which list the National Emission Standards for Hazardous Air Pollutants (NESHAPs). Those regulations that have been deemed applicable to the plant's

emission sources have been highlighted in the tables. A discussion on how MS Silicon will comply with these requirements is provided in the subsections of 3.4, 3.5 and 3.6. Highlighted are only those regulations that impose emission standards or limits, establish monitoring and testing requirements or enforce other relevant requirements that are intended to protect human health and welfare. Applicable requirements that identify general administrative type requirements have not been identified.

3.1 Air Quality Status

The proposed project is located in Tishomingo County, Mississippi. The current air quality status of the county is as follows:

AIR POLLUTANT	ATTAINMENT STATUS
Nitrogen Dioxides (NO_2)	Attainment
Sulfur Dioxide (SO_2)	Attainment
Particulate Matter less than 10 microns (PM_{10}) and 2.5 microns ($PM_{2.5}$)	Attainment
Carbon Monoxide (CO)	Attainment
Ozone (O_3)	Attainment
Lead (Pb)	Attainment

Since the proposed site area is classified as attainment for all regulated air pollutants, the proposed project would be governed by the regulations for attainment areas, as defined in the Mississippi rules. Attainment areas are areas defined by EPA as meeting the National Ambient Air Quality Standards (NAAQS) which were established to protect human health and welfare.

3.2 Permitting Requirements

This section identifies the permitting requirements required by state and federal regulations including PSD applicability.

3.2.1 State Requirements

APC-S-5 of the MDEQ regulations includes PSD requirements. The requirements contained in APC-S-5 have been adopted and incorporate the federal PSD requirements. The MDEQ has not created new PSD requirements nor have they modified the federal PSD requirements.

3.2.2 PSD Applicability

The PSD regulations specify that any **major** new stationary source within an air quality attainment area must undergo PSD review. A major source is defined as:

- Any stationary source (or any group of stationary sources that are located on one or more contiguous or adjacent properties, and are under common control of the same person (or persons under common control)) belonging to a single major industrial grouping and that is described in Paragraph a., b., or c. of this APC-S-5-I-A-17. For the purposes of defining "major source", a stationary source or group of stationary sources shall be considered part of a single industrial grouping if all of the pollutant emitting activities at such source or group of sources on contiguous or adjacent properties belong to the same Major Group (i.e., all have the same two-digit code) as described in the Standard Industrial Classification Manual, 1987.

- A major stationary source of air pollutants, as defined in Section 302 of the Federal Act, that directly emits or has the potential to emit, 100 tpy or more of any air pollutant subject to regulation (including any major source of fugitive emissions of any such pollutant, as determined by rule by the Administrator). The fugitive emissions of a stationary source shall not be considered in determining whether it is a major stationary source for the purposes of Section 302(j) of the Federal Act, unless the source belongs to one of the 28 designated categories of stationary sources. A list of the 28 designated source categories is found in Table 3-5a.

If the proposed project is one the 28 designated stationary sources specified in Table 3-5a, then it is subject to a PSD threshold limit of 100 tons per year. Any stationary source which is not one of the 28 designated source categories is subject to a PSD threshold of 250 tons per year or more of a regulated air pollutant.

"Potential to emit" is defined as the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design consistent with 40 CFR 52.21. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation is established in a construction permit required by the EPA approved Mississippi SIP for New Source Review (NSR) or a Title V permit. This term does not alter or affect the use of this term for any other purposes under the Federal Act, or the term "capacity factor" as used in Title IV of the Federal Act or the regulations promulgated there under.

A PSD review is triggered in certain instances when emissions associated with a new major source or emission increase resulting from a major modification are "significant". "Significant" emission thresholds are defined in two ways. The first is in terms of emission rates (tons/year) for listed air pollutants (refer to Table 3-5b) for which significant emission rates have been established.

Significant increases in emission rates are subject to PSD review in two circumstances:

- For a new source which is major for at least one regulated attainment or non-criteria pollutant (i.e., is subject to PSD review), all pollutants for which the area is not classified as nonattainment and which are emitted in amounts equal to or greater than those specified in Table 3-6 are subject to PSD review; and
- For a modification to an existing major stationary source, if both the potential increase in emissions due to the modification itself, and the resulting new emission increase of any regulated, attainment or non-criteria pollutants are equal to or greater than the respective pollutants' significant emissions rates listed in Table 3-6, the modification is "major" and are also subject to PSD review.

The second type of "significant" emission threshold is defined as any emissions rate at a new major stationary source (or any net emissions increase associated with a modification to an existing major stationary source) that is constructed within 10 kilometers of a Class I area and which would increase the 24-hour average concentration of any regulated pollutant in that area by 1 $\mu g/m^3$ or greater. Exceedance of this threshold triggers PSD review.

PSD review consists of:

- A case-by-case Best Available Control Technology (BACT) demonstration, taking into account energy, environmental, and economic impacts as well as technical feasibility for any new source or source that is physically changed;
- An ambient air quality impact analysis to determine whether the allowable emissions from the proposed project would cause or contribute to a violation of the applicable PSD increments and National Ambient Air Quality Standards (NAAQS) (refer to Table 3-6);
- An assessment of the direct and indirect effects of the proposed project on general growth, soil, vegetation, and visibility;
- Public comment, including an opportunity for a public hearing; and
- Possibly an ambient air quality monitoring program for up to one year.

An applicant may be exempt from the ambient air quality monitoring requirements if there are existing air quality monitoring data representative of the site, or if the impacts from the project are less than the monitoring de minimis concentrations listed in Table 3-6.

Tishomingo County is designated attainment, unclassifiable, or better than the national standards for all criteria air pollutants. Based on the estimated regulated criteria air pollutant emission rates associated with the proposed silicon manufacturing plant (refer to Table 2-9), emissions of $PM/PM_{10}/PM_{2.5}$, NO_x, CO, SO_2 and VOC will exceed the PSD significant emission rate (expressed in tons/year) applicability threshold. The proposed project will be considered a major source since at least one regulated air pollutant exceeds 250 tons/year.

After a careful review of the 28 designed source categories, the proposed plant is not considered one of the 28 designated source categories. One of the listed categories is secondary metal processing, which is described as the processing of metal containing materials to recover and reuse the metal. Since MS Silicon is not proposing to use scrap or other reused metals, this category was determined not to apply to the proposed plant. Thus, the plant would be subject to a 250 tons/year PSD major source applicability threshold.

Subsequently, each of above pollutants will be subject to PSD review. The requirements associated with PSD review for emissions of $PM/PM_{10}/PM_{2.5}$, NO_x, CO, SO_2 and VOC as well as MS Silicon's compliance status with these review requirements, is provided in the following sections (4.0 through 6.0) of this application.

3.3 Applicable State Requirements

Standards and limitations for visible and particulate matter emissions, sulfur emissions, organic material emissions, carbon monoxide emissions, and nitrogen oxide emissions are also contained in the state rules and regulations. These are discussed below, along with emission standards or limitations contained in these rules that may apply to the sources associated with the proposed silicon manufacturing plant. Table 3-4a provides a list of applicable and non-applicable state air pollution regulations.

3.3.1 APC-S-1 - Air Emission Regulations for the Prevention, Abatement, and Control of Air Contaminants

3.3.1.1 Section 3 – Specific Criteria for Sources of Particulate Matter

Smoke – No person shall cause, permit, or allow the emission of smoke from a point source into the open air from any manufacturing, industrial, commercial or waste disposal process which exceeds forty (40) percent opacity subject to the exceptions provided in (b) & (c).

General Nuisances – No person shall cause, permit, or allow the emissions of particles or any contaminants in sufficient amounts or of such duration from any process as to be injurious to humans, animals, plants, or property, or to be a public nuisance, or create a condition of air pollution.

Fuel Burning – Fossil Fuel Burning - The maximum permissible emissions of ash and/or particulate matter from fossil fuel burning installations shall be limited as follows: Emissions from installations of less than 10 million BTU per hour heat input shall not exceed 0.6 pounds per million BTU per hour heat input.

Manufacturing Process – General - Except as otherwise specified, no person shall cause, permit, or allow the emission from any manufacturing process, in any one hour from any point source, particulate matter in total quantities in excess of the amount determined by the relationship

$$E = 4.1\ p^{0.67}$$

Where E is the emission rate in pounds per hour and p is the process weight input rate in tons per hour.

Sampling Ports – New Equipment - The owner or operator of any new air pollution control equipment, obtained after May 8, 1970, and vented to the atmosphere, shall have necessary sampling ports and ease of accessibility.

Compliance with These Requirements

The emission sources associated with the proposed plant will be constructed and operated to satisfy the requirements contained within Section 3 of APC-S-1, refer to Table 3-4b for specific requirements.

3.3.1.2 Section 4 – Specific Criteria for Sources of Sulfur Compounds

Sulfur Dioxide Emissions from Fuel Burning – The maximum discharge of sulfur oxides from any fuel burning installation in which the fuel is burned primarily to produce heat or power by indirect heat transfer shall not exceed 4.8 pounds (measured at sulfur dioxide) per million BTU heat input.

The proposed plant will be using natural gas and low sulfur fuel oil (i.e., emergency equipment only) for plant specific fuel burning operations. Use of these fuels will easily satisfy SO_2 emission limitations required in the section. Refer to Table 3-4c for specific requirements related to this section.

3.3.1.3 Section 6 – New Sources (Subsection 3 – NSPS)

This section incorporates the Federal NSPS standards. The proposed plant will be in compliance with the applicable NSPS standards. Refer to Section 3.5 of this application for a discussion on each applicable NSPS standards.

3.3.1.4 Section 9 – Stack Height Considerations

Stack Height Effect on Emission Limitations – The degree of emission limitation required of any source for control of any air pollutants shall not be affected by so much of any source's stack height that exceeds good engineering practice (GEP) or by any other dispersion technique, except as provided as exemptions or exclusions defined within the regulation itself.

3.3.2 APC-S-2 – Permit Regulations for the Construction and/or Operation of Air Emissions Equipment

3.3.2.1 I – General Requirements (Subpart D "Permitting Requirements")

Unless otherwise provided by Sections XIII and XV, or other provisions of these Regulations, any new stationary source or modification of a stationary source must have a permit to construct or multi-media permit incorporating such permit before beginning construction.

The exhaust stacks associated with the proposed plant will be in compliance with the stack height limitations contained within Section 9.

3.3.2.2 II – General Standards Applicable to All Permits (Subpart B "General Provisions")

Applicants for all permits to construct or operate, or to renew a State Permit to Operate, shall specify in their application the air emission rate for each air pollutant subject to regulations under the Federal Act that can be reasonably expected to be emitted into the air as a result of operations from the source.

Each application must be signed by the responsible official. The signature of the applicant shall constitute an agreement that the applicant assumes the responsibility for any alterations, additions or changes in operation that may be necessary to achieve and maintain compliance with all Applicable Rules and Regulations.

No permit for the construction or relocation of equipment which will cause the issuance of air contaminants shall be issued when said equipment cannot comply with buffer zone requirements as follows: All sources of air emissions must be at least 150 feet from the nearest residential or recreational area.

The proposed plant will not be located within 150 feet of a residential or recreational area.

3.3.2.3 V – Application Review

Subsection A: Standards for Approving an Application for a Permit to Construct

- The stationary source shall be designed and constructed so as to operate without causing a violation of any Applicable Rules and Regulations.
- The stationary source shall be designed and constructed so as to operate without interfering with the attainment and maintenance of State and National Ambient Air Quality Standards.
- The stationary source shall be designed and constructed so as to operate such that the emission of air toxics does not result in an ambient concentration sufficient to adversely affect human health and well-being or unreasonably and adversely affect plant or animal life beyond the stationary source boundaries. The permit board may require the applicant to provide data necessary to evaluate the impacts of air toxics, including the predicted emission rates and ambient concentrations, when it deems necessary. The construction of the stationary source shall be performed in such a manner so as to reduce fugitive dust emission from construction activities to a minimum.

Subsection D: Certification of Construction, Beginning Operation, and Application for Permit to Operate

Upon completion of construction or installation of an approved stationary source or modification, the applicant shall notify the Permit Board that construction or installation was performed in accordance with

the approved plans and specifications on file with the Permit Board. A new stationary source issued a Permit to Construct cannot begin operation until certification of construction by the permittee.

Compliance with APC-S-2 Requirements

MS Silicon has made a good faith effort to submit adequate information required for the permit application review and will make timely efforts to submit any supplemental information requested by the state in the future. As show in the information provided, the identified air emission units will be in compliance with applicable state and federal air statutes. These air emission units were shown through atmospheric dispersion modeling that predicted concentrations should be below state and federal health standards.

3.3.3 APC-S-3 – Mississippi Regulations for the Prevention of Air Pollution Emergency Episodes

3.3.3.1 Section 4 – Emission Control Action Programs

Any person responsible for the operation of a source of air contaminant which emits 0.25 tons per day or more of air contaminants for which air standards have been adopted shall prepare emission control action programs, consistent with good industrial practice and safe operating procedures, for reducing the emission of air contaminants into outdoor atmosphere during periods of an air pollution alert, air pollution warning, and air pollution emergency. Emission control action programs shall be designed to reduce or eliminate emissions of air contaminants into the outdoor atmosphere in accordance with the objectives set forth in Tables 1-5 which are part of this Mississippi Regulation.

MS Silicon is aware of this requirement and the proposed plant will be in compliance with the rules and regulations stated under APC-S-3, Section 4.

3.3.4 APC-S-4 – Mississippi Ambient Air Quality Standards

Except for odor, as covered, below, the ambient air quality standards for Mississippi shall be the Primary and Secondary National Ambient Air Quality Standards as duly promulgated by the U.S. Environmental Protection Agency in (or to be printed in) 40 CFR Part 50, pursuant to the Federal Clean Air Act, as amended. All such standards promulgated by the U.S. Environmental Protection Agency as of June 22, 1988, are hereby adopted and incorporated herein by the Commission by reference as the official ambient air quality standards of the State of Mississippi and shall hereafter be enforceable as such (except that the word "Administrator" in said standards shall be replaced by the words "Executive Director" and the word "Agency" in said standards shall be replaced by the word "Department")

There shall be no odorous substances in the ambient air concentrations sufficient to adversely and unreasonably:

1. Affect human health and well-being;

2. Interfere with the use or enjoyment of property; or

3. Affect plant or animal life.

In determining that concentrations of such substances in the ambient air are adversely and unreasonably affecting human well-being or the use or enjoyment of property, of plant or animal life, the factors to be considered by the Commission will include, without limiting the generality of the foregoing, the number of complaints or petitioners alleging that such a condition exists, the frequency of the occurrence of such substances in the ambient air as confirmed by the Department of Environmental Quality staff, and the land use of the affected area.

MS Silicon is aware of this requirement and the proposed plant will be in compliance with the rules and regulations stated under APC-S-4.

3.3.5 APC-S-5 – Mississippi Regulations for the Prevention of Significant Deterioration of Air Quality

This section incorporates the Federal PSD standards. The proposed plant will be in compliance with the applicable standards. Refer to Section 3.2.2 of this application for applicable PSD standards.

3.4 Applicable Federal Requirements

USEPA has developed regulations that are designed to control air pollution. These regulations include permitting requirements for new or modified major stationary sources located in non-attainment areas, as well as Standards of Performance for certain types of new sources.

Provided below is a summary of the federal regulatory requirements potentially triggered by the proposed silicon manufacturing plant. Other federal requirements not listed in the table below were determined to be not applicable to the proposed operations.

Summary of Potentially Applicable Federal Regulatory Requirements

Air Regulation	Applicability Determination	Compliance Status
40 CFR Part 60 – New Source Performance Standards (NSPS)		
Subpart A – General Provisions	The proposed plant is subject to this requirement because construction commenced after 1/5/1981. Applicability of the General Provisions is trigged based on the plant triggering Subparts Z and IIII.	The proposed plant will be in compliance with these Subparts

Air Regulation	Applicability Determination	Compliance Status
Subpart Z – Ferroalloy Production Facilities	The proposed semi-enclosed submerged arc furnace is subject to this requirement because the SAF will produce silicon metal and construction commenced after 10/21/1974.	The proposed SAF will be in compliance with this Subpart
Subpart OOO – Nonmetallic Mineral Processing Plants	The proposed silicon manufacturing plant is not subject to this subpart because the plant will not be crushing or grinding any nonmetallic minerals. Quartz will be used in the manufacturing process but will not be crushed prior to use in the semi-enclosed submerged arc furnace.	NA
Subpart IIII – Stationary Compression Ignition Internal Combustion Engines	The proposed diesel-fired emergency generators are subject to this subpart because they have displacement of less than 30 liters per cylinder and are 2007 model year or later.	The proposed emergency generators will be in compliance with this Subpart
40 CFR Part 63 – National Emission Standards for Hazardous Air Pollutants (NESHAPs) (MACT)		
40 CFR Part 63, Subpart A – General Provisions	The proposed plant is subject to this subpart because the plant will be considered an area source of HAP emissions. Applicability of the General Provisions is trigged based on the emergency equipment triggering Subpart ZZZZ.	The plant will be in compliance with this Subpart
Subpart ZZZZ - Stationary Reciprocating Internal Combustion Engines	The proposed emergency generators are subject to this subpart because the emergency equipment meets the definition of a reciprocating internal combustion engines (RICE). This subpart has specific requirements for specified engine types at area and major sources of HAP emissions. The proposed fire pumps will be rated below the applicability threshold under this rule.	The emergency equipment will be in compliance with this Subpart
JJJJJJ - Area Sources: Industrial, Commercial, and Institutional Boilers	This subpart applies to industrial, commercial, or institutional boilers located at an area source of HAPs. The proposed natural gas fired ladle pre-heaters and electric fired semi-enclosed submerged arc furnaces do not meet the definition of a boiler thus are not subject to this subpart.	NA
YYYYYY - Area Sources: Ferroalloys	This subpart applies to ferroalloy production facilities that manufacture silicon metal and are an area source of HAPs. The	The SAF will be in compliance with this

Air Regulations	Applicability Determination	Compliance Status
Production Facilities	proposed plant will manufacture silicon metal and is an area source of HAPs thus is subject to this subpart.	Subpart
Additional Federal Regulations		
40 CFR Part 64 – Compliance Assurance Monitoring (CAM)	The proposed plant is subject to this subpart since the plant is not subject to a MACT standard proposed after 11/15/1990.	The plant will be in compliance with this Subpart
40 CFR Part 68 – Chemical Accident Prevention Provisions	MS Silicon does not anticipate processing any chemicals that would trigger applicability of the accidental release prevention requirements.	NA
40 CFR Part 82, Subpart F – Recycling and Emissions Reduction	MS Silicon does not anticipate producing or consuming any ozone-depleting substances that would trigger applicability of the protection of stratospheric ozone requirements. MS Silicon will abide by the applicable requirements that involve replacement of ozone depleting substances in plant process equipment (i.e., air conditioners, refrigerators, chillers or freezers).	The plant will be in compliance with this Subpart

Refer to Tables 3-1, 3-2a, 3-3a and 3-3b for inclusive lists showing applicable and non-applicable federal air pollution regulations for the proposed plant.

3.5 New Source Performance Standards (NSPS)

The NSPS have been developed by USEPA for specific source categories. These standards, which are codified in the Code of Federal Regulations (CFR) under Part 60 (40 CFR 60), apply to applicable equipment covered under each source category that is constructed, reconstructed or modified after a specific baseline date. A review of the existing NSPS, as well as any NSPS being proposed, was performed to determine applicability to the proposed project. Refer to Table 3-2a for a list of the NSPS regulations.

3.5.1 40 CFR Part 60, Subpart Z – Standards of Performance for Ferroalloy Production Facilities

40 CFR Part 60, Subpart Z applies to the following affected facilities "*electric submerged arc furnaces which produce silicon metal, ferrosilicon, calcium silicon, silicomanganese zirconium, ferrochrome silicon, silvery iron, high-carbon ferrochrome, charge chrome, standard ferromanganese, silicomanganese,*

ferromanganese silicon, or calcium carbide; and dust-handling equipment". This subpart applies to any facility that commences construction or modification after October 21, 1974.

According to Subpart Z, electric submerged arc furnace means "*any furnace wherein electrical energy is converted to heat energy by transmission of current between electrodes partially submerged in the furnace charge*" and silicon metal means "*any silicon alloy containing more than 96 percent silicon by weight*". The proposed silicon manufacturing plant will be subject to Subpart Z since it meets the definition of a ferroalloy production facility and will commence construction after October 21, 1974.

The proposed silicon manufacturing plant including the semi-enclosed submerged arc furnace will be subject to the emission limitations, testing, monitoring, reporting and recordkeeping requirements contained in this Subpart. According to this Subpart, an initial performance test should be conducted based on 60.8.

Standards for Particulate Matter

Based on 60.262 – Standard for Particulate Matter, the following limits should be met for each submerged arc furnace:

- Exit from a control device and contain PM in excess of 0.45 kg/MW-hr (0.99 lb/MW-hr) while silicon metal, ferrosilicon, calcium silicon, or silicomanganese zirconium is being produced;
- Exit from a control device and exhibit 15 percent opacity or greater;
- Exit from an electric submerged arc furnace and escape the capture system and are visible without the aid of instruments;
- Escape the capture system at the tapping station and are visible without the aid of instruments for more than 40 percent of each tapping period; and
- Dust-handling equipment should not discharge any gases which exhibit 10 percent opacity or greater.

Standards for Carbon Dioxide

According to 60.263 – Standards for Carbon Monoxide, the submerged arc furnace should not discharge any gases which contain, on a dry basis, 20 or greater volume percent of CO.

This subpart states that the owner or operator shall install, calibrate, maintain and operate a continuous monitoring system for measurements of the opacity of emissions discharged into the atmosphere from the control device and also requires the owner/operator of an electric arc furnace to maintain daily records.

Operating Requirements

Section 60.265 of this subpart also states that a continuous monitoring device should be installed to continuously record the furnace power input, and the volumetric flow rate through each separately ducted hood of the capture system.

MS Silicon is aware of the requirements contained in this subpart and will be in compliance with all of the applicable requirements. The applicable requirements of 40 CFR 60, Subpart Z are summarized in Table 3-2b.

3.5.2 40 CFR Part 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

This subpart applies to stationary compression ignition (CI) internal combustion engines (ICE) that commence construction after July 11, 2005, where the CI ICE are manufactured after April 1, 2006 (and are not fire pump engines), or manufactured after July 1, 2006 (for certified National Fire Protection Association fire pump engines).

NSPS Subpart IIII specifies emission limitations, monitoring, reporting, and recordkeeping requirements for NO_x, CO, non-methane hydrocarbons (NMHC) and PM. Applicable NSPS IIII emission standards for the emergency generator and fire water pump CI ICEs are summarized as follows:

- Owners and operators of 2007 model year and later emergency stationary CI ICE with a displacement of less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards for new non-road CI engines in 40 CFR 60.4202, for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary CI ICE.
- Owners and operators of fire pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards in Table 4 to NSPS Subpart IIII, for all pollutants.

NSPS Subpart IIII also stipulates specific sulfur requirements for diesel fuels. Beginning October 1, 2007 engines that use diesel fuel must meet a sulfur content of 0.05% by weight (40 CFR 80.510(a)). As of October 1, 2010 engines with a displacement of less than 30 liters/cycle and that use a diesel fuel must meet a sulfur content of 0.0015% by weight.

MS Silicon will be utilizing a diesel fuel with a sulfur content of 0.0015% by weight or less. The emergency generator is designed to have a displacement of less than 30 liters per cylinder and will comply with the applicable requirements of NSPS Subpart IIII. The applicable requirements of 40 CFR 60, Subpart IIII are summarized in Table 3-2c.

3.5.3 40 CFR Part 60, Subpart OOO – Standards of Performance for Nonmetallic Mineral Processing Plants

Applicability of Subpart OOO applies to affected facilities in fixed or portable nonmetallic processing plants, including each crusher, grinding plant, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, and enclosed truck loading station. Nonmetallic mineral processing plant means any combination of equipment that is used to crush or grind any nonmetallic mineral at any type of plant. Nonmetallic mineral means any of the following minerals or any mixture of which the majority is any of the following minerals *"(1) Crushed and Broken Stone, including Limestone, Dolomite, Granite, Traprock, Sandstone, Quartz, Quartzite, Marl, Marble, Slate, Shale, Oil Shale, and Shell."*

This subpart contains standards for particulate matter, monitoring of operations, test methods and procedures as well as reporting and recordkeeping requirements.

Based on the design of the proposed silicon manufacturing plant, it does not appear that the plant will be considered a nonmetallic mineral processing plant since the quartz used in the process will not be used in any crushing or grinding processes. Thus, this subpart is not applicable to the proposed plant.

3.6 Hazardous Air Pollutant Regulations

The proposed plant will have the potential to emit regulated HAPs in quantities **less than 10 tons/year as an individual HAP and 25 tons/year in aggregate**; therefore, the proposed plant is considered a minor source of HAPs.

On December 15, 1996, the USEPA promulgated the final regulations implementing Section 112(g). This section addresses new and reconstructed major sources of hazardous air pollutants (HAPs). A primary requirement of this section is that those sources apply Maximum Achievable Control Technology (MACT) for control of HAPs. Section 112(g) is intended to address those sources for which USEPA has not yet established an intended source category specific MACT standard. In this sense, Section 112(g) may be seen as the "case-by-case" MACT standard.

The proposed project will not trigger case-by-case MACT since this requirement applies to new or reconstructed major stationary sources of hazardous air pollutant emissions.

USEPA has developed National Emission Standards for Hazardous Air Pollutants (NESHAP) for numerous source categories. Refer to Tables 3-3a and 3-3b for an all-inclusive list of the NESHAP and MACT standards.

3.6.1 40 CFR Part 63, Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutants: Stationary Reciprocating Internal Combustion Engines

Pursuant to 40 CFR 63.6585, the proposed silicon manufacturing plant, is subject to the NESHAP for Stationary Reciprocating Internal Combustion Engines, since it will utilize stationary internal combustion reciprocating engines (RICE). The proposed emergency generator will have an initial rating of 670 HP thus making it an affected source.

MS Silicon is aware of the requirements imposed by 40 CFR 63, Subpart ZZZZ; and selection of the final generator type and size will confirm the general requirements as they pertain to emergency generators located at area sources of HAP emissions.

The applicable requirements of 40 CFR 60, Subpart ZZZZ are summarized in Table 3-3c.

3.6.2 40 CFR Part 63, Subpart JJJJJJ – National Emission Standards for Hazardous Air Pollutants for Area Sources: Industrial, Commercial, and Institutional Boilers

40 CFR Part 63, Subpart JJJJJJ applies to all industrial, commercial, or institutional boilers that are located at, or are part of, an area source of HAPs.

According to this Subpart, boiler means "*an enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam or hot water. Controlled flame combustion refers to a steady-state or near steady-state, process wherein fuel and/or oxidizer feed rates are controlled. Waste heat boilers are excluded from this definition.*"

This subpart does not apply since no boilers are being installed at the proposed plant.

3.6.3 40 CFR Part 63, Subpart YYYYYY - National Emission Standards for Hazardous Air Pollutants for Area Sources: Ferroalloy Production Facilities

This subpart applies to ferroalloys production facilities in an area source of HAP emissions. A ferroalloy production facility manufactures silicon metal, ferrosilicon, ferrotitanium using the aluminum reduction process, ferrovanadium, ferromolybdenum, calcium silicon, silicomanganese zirconium, ferrochrome silicon, silvery iron, high-carbon ferrochrome, charge chrome, standard ferromanganese, silicomanganese, ferromanganese silicon, calcium carbide or other ferroalloy products using electrometallurgical operations including electric arc furnaces (EAFs) or other reaction vessels. An electrometallurgical operation affected source is new if construction or reconstruction of the EAF or other reaction vessel commenced after September 15, 2008.

This subpart contains opacity standards along with monitoring, testing, notification, reporting and recordkeeping requirements.

The proposed silicon manufacturing plant is considered a ferroalloy production facility and will be installing four semi-enclosed submerged arc furnaces. Since the facility will be considered an area source of HAPs, the requirements of this subpart are applicable. MS Silicon is aware of the requirements contained in this subpart and will be in compliance with all of the applicable requirements. The applicable requirements of 40 CFR 60, Subpart YYYYYY are summarized in Table 3-3d.

3.7 Title V Greenhouse Gas Tailoring Rule

The greenhouse gas tailoring rule sets thresholds for the greenhouse gas (GHG) emissions that define when permits under the PSD and Title V Operating Permit programs are required for new and modified industrial facilities. If the proposed project is one the 28 designated stationary sources specified in Table 3-5a, then it is subject to a criteria pollutant PSD threshold limit of 100 tons per year. Any stationary source which is not one of the 28 designated source categories is subject to a criteria pollutant PSD threshold of 250 tons per year or more. While these thresholds are appropriate for criteria pollutants, they are not feasible for GHGs because GHGs are emitted in much higher volumes. Without the tailoring rule, the lower emissions thresholds would have automatically taken effect on January 2, 2011. EPA has phased in the CAA permitting requirements for GHGs in three steps.

3.7.1 Step 1 - January 2, 2011 – June 30, 2011

Step 1 states that the permitting requirements for GHG emissions would only be subject to those sources currently subject to PSD requirements. BACT would need to be determined for sources that have an increase in total GHG emissions of at least 75,000 tpy, on a CO_2e basis. During this time, no sources would be subject to Clean Air Act permitting requirements due solely to GHG emissions.

3.7.2 Step 2 - July 1, 2011 – June 30, 2013

In Step 2, PSD permitting requirements cover new construction projects that emit GHG emissions of at least 100,000 tpy even if they do not exceed the permitting thresholds for other pollutants. Modifications at existing facilities that cause an increase of at least 75,000 tpy of GHG emissions are also subject to the permitting requirements. During this step, operating permit requirements apply to sources based on their GHG emissions even if they would not apply based on emissions of other pollutants. Facilities that emit at least 100,000 tpy CO_2e are subject to Title V permitting requirements.

3.7.3 Step 3 - June 30, 2013

On February 24, 2012, the U.S. Environmental Protection Agency (EPA) proposed to keep greenhouse gas (GHG) permitting thresholds at current levels. This step continues to focus GHG permitting on the largest emitters by retaining the permitting thresholds that were established in Steps 1 and 2.

As show in Section 2, the potential CO_2e emissions from the proposed silicon manufacturing plant are approximately 403,000 tons/year and are above the 75,000 tons/year threshold. As a result, emissions of GHG's will be subject to PSD review, which essentially entails a BACT evaluation (refer to Section 4 of this document).

3.8 Compliance Assurance Monitoring

Pursuant to requirements concerning enhanced monitoring and compliance certification under the Clean Air Act, EPA has promulgated regulations (40 CFR 64) to implement compliance assurance monitoring (CAM) for major stationary sources of air pollution that are required to obtain operating permits under Title V of the Act. The regulations require owners or operators of such sources to conduct monitoring that satisfies particular criteria established in the rule to provide a reasonable assurance of compliance with application requirements under the Act. Monitoring focuses on emissions units that rely on pollution control device equipment to achieve compliance with applicable standards. The effective date of this rule was November 21, 2007. **Compliance with the requirements of this Part will be addressed as part of the proposed plant's Part 70 Operating Permit initial application process**.

3.9 Accidental Release Provisions

Federal chemical accidental release prevention requirements have been established in 40 CFR Part 68. These requirements cover risk management planning at facilities with more than a threshold quantity of a listed regulated substance in a single process. The rule lists 77 acutely toxic substances with threshold quantities ranging from 500 to 20,000 pounds, and also lists an additional 63 flammable gases and volatile liquids, each with a 10,000 pound threshold quantity as part of the proposed repowering project. **MS Silicon does not anticipate processing any chemicals that would trigger applicability of the accidental release prevention requirements.**

3.10 Protection of Stratospheric Ozone

The requirements for the protection of stratospheric ozone have been established in 40 CFR Part 82. These requirements were created to impose limits on the production and consumption of certain ozone-depleting substances. The purpose of 40 CFR 82 Subpart F, "Recycling and Emissions Reduction", is to reduce emissions of class I and class II refrigerants and their substitutes to the lowest achievable level by maximizing the recapture and recycling of such refrigerants during the service, maintenance, repair, and disposal of appliances. This Subpart applies to the servicing, maintaining, or repairing of appliances and also applies to the disposal of appliances.

MS Silicon may be involved in the servicing, maintaining or repairing of equipment subject to the handling and recycling provisions of this subpart. MS Silicon will follow the requirements as mandated by this subpart.

3.11 Mandatory Greenhouse Gas Reporting

40 CFR 98 established mandatory greenhouse gas (GHG) reporting requirements for owners and operators of certain facilities that directly emit GHG as well as for certain fossil fuel supplies and industrial GHG suppliers.

Included in this rule is the requirement to quantify and report GHG emissions on an annual basis. The first report was due to USEPA on March 31, 2011 for emissions released during the calendar year 2010.

MS Silicon is aware of this requirement and will evaluate its applicability and reporting requirements upon operation of the proposed plant.

Table 3-1
Mississippi Silicon, LLC.
Proposed Silicon Manufacturing Plant
Burnsville, MS
List of Applicable and Non-Applicable Federal Air Pollution Regulations

40 C.F.R. Part 50	National Primary and Secondary Ambient Air Quality Standards
40 C.F.R. Part 51	Requirements for Preparation, Adoption and Submittal of Implementation Plans
40 C.F.R. Part 52	Approval and Promulgation of Implementation Plans
40 C.F.R. Part 53	Ambient Air Monitoring Reference and Equivalent Methods
40 C.F.R. Part 54	Prior Notice of Citizen Suits
40 C.F.R. Part 55	Outer Continental Shelf Air Regulations
40 C.F.R. Part 56	Regional Consistency
40 C.F.R. Part 57	Primary Nonferrous Smelter Orders
40 C.F.R. Part 58	Ambient Air Quality Surveillance
40 C.F.R. Part 59	National Volatile Organic Compound Emission Standards for Consumer and Commercial Products
40 C.F.R. Part 60	**Standards of Performance for New Stationary Sources**
40 C.F.R. Part 61	National Emission Standards for Hazardous Air Pollutants
40 C.F.R. Part 62	Approval and Promulgation of State Plans for Designated Facilities and Pollutants
40 C.F.R. Part 63	**National Emission Standards for Hazardous Air Pollutants for Source Categories**
40 C.F.R Part 64	Compliance Assurance Monitoring
40 C.F.R. Part 65	Consolidated Federal Air Rule
40 C.F.R. Part 66	Assessment and Collection of Noncompliance Penalties by EPA
40 C.F.R. Part 67	EPA Approval of State Noncompliance Penalty Program
40 C.F.R. Part 68	Chemical Accident Prevention Provisions
40 C.F.R. Part 69	Special Exemptions from Requirements of the Clean Air Act
40 C.F.R. Part 70	State Operating Permit Programs
40 C.F.R. Part 71	Federal Operating Permit Programs
40 C.F.R. Parts 72,73,74,75,76,77 and 78	Permits Regulation (Part 72)
40 C.F.R. Parts 79 and 80	Registration and Regulation of Fuels and Fuel Additives (Sulfur Limits for Gasoline and Diesel Fuel)
40 C.F.R. Part 81	Designation of Areas for Air Quality Planning Purposes
40 C.F.R. Part 82	Protection of Stratospheric Ozone
40 C.F.R. Part 85	Control of Air Pollution from Mobile Sources

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Table 3-1
Mississippi Silicon, LLC.
Proposed Silicon Manufacturing Plant
Burnsville, MS
List of Applicable and Non-Applicable Federal Air Pollution Regulations

40 C.F.R. Part 86	Control of Emissions from New and In-Use Highway Vehicles and Engines
40 C.F.R. Part 87	Control of Air Pollution from Aircraft and Aircraft Engines
40 C.F.R. Part 88	Clean-Fuel Vehicles
40 C.F.R. Part 89	Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines
40 C.F.R. Part 90	Control of Emissions from Nonroad Spark-Ignition Engines at or below 19 Kilowatts
40 C.F.R. Part 91	Control of Emissions from Marine Spark-Ignition Engines
40 C.F.R. Part 92	Control of Air Pollution from Locomotives and Locomotive Engines
40 C.F.R. Part 93	Determining Conformity of Federal Actions to State or Federal Implementation Plans
40 C.F.R. Part 94	Control of Air Pollution from Marine Compression-Ignition Engines
40 C.F.R. Part 95	Mandatory Patent Licenses
40 C.F.R. Part 96	NO_x Budget Trading Program and CAIR NO_x and SO_2 Trading Programs for State Implementation Plans
40 C.F.R. Part 97	Federal NO_x Budget Trading Program and CAIR NO_x and SO_2 Trading Programs
40 C.F.R. Part 98	Mandatory Green House Gas Reporting
40 C.F.R. Part 99	Reserved

Notes:

Shaded items identify those Federal air regulations that contain emission standards or limits, monitoring or testing requirements, or other relevant requirements that are intended to protect human health and welfare and have been determined to be applicable to the proposed silicon manufacturing facility for Mississippi Silicon, LLC located in Burnsville, Mississippi.

Non-shaded regulations have been determined to be not applicable to the proposed silicon manufacturing facility for Mississippi Silicon, LLC located in Burnsville, Mississippi.

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Table 3-2a
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of Applicable New Source Performance Standards (NSPS)

[illegible]	[illegible]	[illegible]
A	**General Provisions**	**Yes**
B	Adoption and Submittal of State Plans for Designate Facilities	No
C	Emission Guidelines for Compliance Times	No
Ca	Reserved	No
Cb	Emission Guidelines and Compliance Times for Municipal Waste Combusters That Are Constructed on or Before September 20, 1994	No
Cc	Emission Guidelines for Compliance Times for Municipal Solid Waste Landfills	No
Cd	Emission Guidelines for Compliance Times for Sulfuric Acid Production Units	No
Ce	Emission Guidelines for Compliance Times for Hospital/Medical/Infectious Waste Incinerators	No
D	Fossil Fuel Fired Steam Generators for which Construction is Commenced After August 17, 1971	No
Da	Electric Utility Steam Generator Units for which Construction is Commenced After September 18, 1978	No
Db	Industrial, Commercial, Institutional Steam Generating Units	No
Dc	Small Industrial, Commercial, Institutional Steam Generating Units	No
E	Incinerators	No
Ea	Municipal Waste Combusters for Which Construction is Commenced After December 20, 1989 and On or Before September 20, 1994	No
Eb	Large Municipal Waste Combustors for Which Construction is Commenced After September 20, 1994 or for Which Modification or Reconstruction is Commenced After June 19, 1996	No
Ec	Hospital/Medical/Infectious Waste Incinerators for which Construction is Commenced on or after June 20, 1996	No
F	Portland Cement Plants	No
G	Nitric Acid Plants	No
H	Sulfuric Acid Plants	No
I	Hot Mix Asphalt Plants	No
J	Petroleum Refineries	No
Ja	Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007	No
K	Storage Vessels for Petroleum Liquids for which Construction, Reconstruction or Modification Commenced On or After June 11, 1973 and Prior to May 19, 1978	No
Ka	Storage Vessels for Petroleum Liquids for which Construction, Reconstruction or Modification Commenced After May 18, 1978 and Prior July 23, 1984.	No
Kb	Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for which Construction, Reconstruction or Modification Commenced After July 23, 1984	No
L	Secondary Lead Smelters	No
M	Secondary Brass and Bronze Production Plants	No
N	Primary Emissions from Basic Oxygen Process Furnaces for which Construction is Commenced After June 11, 1973	No
Na	Secondary Emissions from Basic Oxygen Steelmaking Facilities for which Construction is Commenced After January 20, 1983	No
O	Sewage Treatment Plants	No
P	Primary Copper Smelters	No
Q	Primary Zinc Smelters	No
R	Primary Lead Smelters	No
S	Primary Aluminum Reduction Plants	No

Table 3-2a
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of Applicable New Source Performance Standards (NSPS)

Subpart Designation	[illegible]	[illegible]
T	Phosphate Fertilizer Industry - Wet Process Phosphoric Acid Plants	No
U	Phosphate Fertilizer Industry - Superphosphoric Acid Plants	No
V	Phosphate Fertilizer Industry - Diammonium Phosphate Plants	No
W	Phosphate Fertilizer Industry - Triple Superphosphate Plants	No
X	Phosphate Fertilizer Industry - Granular Triple Superphosphate Storage Facilities	No
Y	Coal Preparation and Processing Plants	No
Z	**Ferroalloy Production Facilities**	**Yes**
AA	Steel Plants - Electric Arc Furnaces Constructed After October 21, 1974 and On or Before August 17, 1983	No
AAa	Steel Plants - Electric Arc Furnaces and Argon Oxygen Decarbonization Vessels Constructed After August 17, 1983	No
BB	Kraft Pulp Mills	No
CC	Glass Manufacturing Plants	No
DD	Grain Elevators	No
EE	Surface Coating of Metal Furniture	No
FF	Reserved	No
GG	Stationary Gas Turbines	No
HH	Lime Manufacturing Plants	No
KK	Lead Acid Battery Manufacturing Plants	No
LL	Metallic Mineral Processing Plants	No
MM	Automobile and Light Duty Truck Surface Coating Operations	No
NN	Phosphate Rock Plants	
PP	Ammonium Sulfate Manufacture	No
QQ	Graphic Arts Industry - Publication Rotogravure Printing	No
RR	Pressure Sensitive Tape and Label Surface Coating Operations	No
SS	Industrial Surface Coating of Large Appliances	No
TT	Metal Coil Surface Coating	No
UU	Asphalt Processing and Asphalt Roofing Manufacture	No
VV	Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry (SOCMI) for Which Construction, Reconstruction, or Modification Commenced After January 5, 1981, and On or Before November 7, 2006	No
VVa	Equipment Leaks of VOC in the SOCMI Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006	No
WW	Beverage Can Surface Coating Industry	No
XX	Bulk Gasoline Terminals	No
AAA	New Residential Wood Heaters	No
BBB	Rubber Tire Manufacturing Industry	No
CCC	Reserved	No
DDD	VOC Emission from the Polymer Manufacturing Industry	No
EEE	Reserved	No
FFF	Flexible Vinyl and Urethane Coating and Printing	No
GGG	Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After January 4, 1983, and On or Before November 7, 2006	No

Table 3-2a
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of Applicable New Source Performance Standards (NSPS)

[redacted]	[redacted]	[redacted]
GGGa	Equipment Leaks of VOC in Petroleum Refineries for which Construction, Reconstruction, or Modification Commenced After November 7, 2006	No
HHH	Synthetic Fiber Production Facilities	No
III	VOC Emissions from the SOCMI Air Oxidation Unit Processes	No
JJJ	Petroleum Dry Cleaners	No
KKK	Equipment Leaks of VOC from Onshore Natural Gas Processing Plants	No
LLL	Onshore Natural Gas Processing - SO2 Emissions	No
MMM	Reserved	No
NNN	VOC Emissions from SOCMI Distillation Operations	No
OOO	Nonmetallic Mineral Processing Plants	No
PPP	Wool Fiberglass Insulation Manufacturing Plants	No
QQQ	VOC Emissions from Petroleum Refinery Wastewater Systems	No
RRR	VOC Emission from SOCMI Reactor Processes	No
SSS	Magnetic Tape Coating Facilities	No
TTT	Industrial Surface Coating - Surface Coating of Plastic Parts for Business Machines	No
UUU	Calciners and Dryers in Mineral Industries	No
VVV	Polymeric Coating of Supporting Substrates Facilities	No
WWW	Municipal Solid Waste Landfills	No
AAAA	Small Municipal Waste Combustion Units for which Construction Commenced After August 30, 1999 or Which Modification or Reconstruction is Commenced After June 6, 2001	No
BBBB	Emission Guidelines and Compliance Times for Small Municipal Waste Combustion Units for Which Construction Commenced On or Before August 30, 1999	No
CCCC	Commercial and Industrial Solid Waste Incineration Units for which Construction is Commenced After November 30, 1999 or for Which Modification or Reconstruction is Commenced On or After June 1, 2001	No
DDDD	Emission Guidelinds and Compliance Times for Commercial and Industrial Solid Waste Incineration Units for which Construction is Commenced On or Before November 30, 1999	No
EEEE	Other Solid Waste Incineration Units for which Construction is Commenced After December 9, 2004 or for Which Modification or Reconstruction is Commenced On or After June 16, 2006	No
FFFF	Emission Guidelines and Compliance Times for Other Solid Waste Incineration Units that Commenced Construction On or Before December 9, 2004	No
GGGG	Reserved	No
HHHH	Emission Guidelines and Compliance Times for Coal-Fired Electric Steam Generating Units	No
IIII	**Stationary Compression Ignition Internal Combustion Engines**	**Yes**
JJJJ	Stationary Spark Ignition Internal Combustion Engines	No
KKKK	Stationary Combustion Turbines	No
LLLL	New Sewage Sludge Incineration Units	No
MMMM	Emission Guidelines and Compliance Times for Existing Sewage Sludge Incineration Units	No

Existing requirement applicable to the proposed silicon manufacturing facility

Table 3-2b
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NSPS Subpart Z - Standards of Performance for Ferroalloy Production Facilities
Applicability and Definitions

§ 60.260 Applicability and Designation of Affected Facility
(a) Applicable to the following affected facilities: **Electric submerged arc furnaces which produce silicon metal**, ferrosilicon, calcium silicon, silicomanganese zirconium, ferrochrome silicon, silvery iron, high-carbon ferrochrome, charge chrome, standard ferromanganese, silicomanganese, ferromanganese silicon, or calcium carbide; and dust-handling equipment. (b) Applies to any facility that **commences construction** or modification **after October 21, 1974.**
§ 60.261 Definitions
(a) **Electric submerged arc furnace** means any furnace wherein electrical energy is converted to heat energy by transmission of current between electrodes partially submerged in the furnace charge. (k) **Dust-handling equipment** means any equipment used to handle particulate matter collected by the air pollution control device (and located at or near such device) serving any electric submerged arc furnace subject to this subpart. (l) **Control device** means the air pollution control equipment used to remove particulate matter generated by an electric submerged arc furnace from an effluent gas stream. (m) **Capture system** means the equipment (including hoods, ducts, fans, dampers, etc.) used to capture or transport particulate matter generated by an affected electric submerged arc furnace to the control device. (x) **Silicon metal** means any silicon alloy containing more than 96 percent silicon by weight.

Table 3-2b
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NSPS Subpart Z - Standards of Performance for Ferroalloy Production Facilities
Applicable Standards for Particulate Matter (PM)

Pollutant
Particulate Matter (PM)
§ 60.262 Standards for Particulate Matter (PM)
(a) On and after the date on which the performance test required to be conducted by §60.8 is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any electric submerged arc furnace any gases which: (1) **Exit from a control device and contain particulate matter in excess of 0.45 kg/MW-hr (0.99 lb/MW-hr) while silicon metal,** ferrosilicon, calcium silicon, or silicomanganese zirconium **is being produced.** (3) **Exit from a control device and exhibit 15 percent opacity or greater.** (4) Exit from an electric submerged arc furnace and escape the capture system and are visible without the aid of instruments. The requirements under this paragraph apply only during periods when flow rates are being established under § 60.265(d). (5) Escape the capture system at the tapping station and are visible without the aid of instruments for more than 40 percent for each tapping period. There are no limitations or visible emissions under this subparagraph when a blowing tap occurs. he requirements under this paragraph apply only during periods when flow rates are being established under § 60.265(d). (6) On and after the date on which the performance test required to be conducted by §60.8 is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any dust-handling equipment any gases which exhibit 10 percent opacity or greater.

Table 3-2b
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NSPS Subpart Z - Standards of Performance for Ferroalloy Production Facilities
Applicable Standards for Carbon Monoxide (CO)

Pollutant
Carbon Monoxide (CO)
§ 60.263 Standards for Carbon Monoxide (CO)
(a) On and after the date on which the performance test required to be conducted by §60.8 is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any electric submerged arc furnace any gases which contain, **on a dry basis, 20 or greater volume percent of carbon monoxide.** Combustion of such gases under conditions acceptable to the Administrator constitutes compliance with this section. **Acceptable conditions include, but are not limited to, flaring of gases or use of gases as fuel for other processes.**

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Table 3-2b
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NSPS Subpart Z - Standards of Performance for Ferroalloy Production Facilities
Applicable Monitoring Requirements

§ 60.264 Emissions Monitoring

(a) The owner or operator subject to the provisions of this subpart shall **install, calibrate, maintain and operate a continuous monitoring system for measurement of the opacity of emissions discharged into the atmosphere from the control device(s).**

(b) For the purpose of reports required under §60.7(c), the owner or operator shall report as excess emissions all six-minute periods in which the average opacity is 15 percent or greater.

(c) The owner or operator subject to the provisions of this subpart shall submit a written report of any product change to the Administrator. Reports of product changes must be postmarked not later than 30 days after implementation of the product change.

§ 60.265 Monitoring of Operations

(a) The owner or operator of any electric submerged arc furnace subject to the provisions of this subpart shall **maintain daily records** of the following information:

(1) Product being produced.
(2) Description of constituents of furnace charge, including the quantity, by weight.
(3) Time and duration of each tapping period and the identification of material tapped (slag or product.)
(4) All furnace power input data obtained under paragraph (b) of this section.
(5) All flow rate data obtained under paragraph (c) of this section or all fan motor power consumption and pressure drop data obtained under paragraph (e) of this section.

(b) The owner or operator subject to the provisions of this subpart shall **install, calibrate, maintain, and operate a device to measure and continuously record the furnace power input.** The furnace power input may be measured at the output or input side of the transformer. The device must have an accuracy of +/- 5 percent over its operating range.

(c) The owner or operator subject to the provisions of this subpart shall **install, calibrate, and maintain a monitoring device that continuously measures and records the volumetric flow rate through each separately ducted hood of the capture system**, except as provided under paragraph (e) of this section. The owner or operator of an electric submerged arc furnace that is equipped with a water cooled cover which is designed to contain and prevent escape of the generated gas and particulate matter shall monitor only the volumetric flow rate through the capture system for control of emissions from the tapping station. The owner or operator may install the monitoring device(s) in any appropriate location in the exhaust duct such that reproducible flow rate monitoring will result. The flow rate monitoring device must have an accuracy of +/- 10 percent over its normal operating range and must be calibrated according to the manufacturer's instructions. The Administrator may require the owner or operator to demonstrate the accuracy of the monitoring device relative to Methods 1 and 2 of appendix A of this part.

(d) When performance tests are conducted under the provisions of §60.8 of this part to demonstrate compliance with the standards under §§60.262(a) (4) and (5), the volumetric flow rate through each separately ducted hood of the capture system must be determined using the monitoring device required under paragraph (c) of this section. The **volumetric flow rates must be determined for furnace power input levels at 50 and 100 percent of the nominal rated capacity of the electric submerged arc furnace. At all times the electric submerged arc furnace is operated, the owner or operator shall maintain the volumetric flow rate at or above the appropriate levels for that furnace power input level determined during the most recent performance test.** If emissions due to tapping are captured and ducted separately from emissions of the electric submerged arc furnace, during each tapping period the owner or operator shall maintain the exhaust flow rates through the capture system over the tapping station at or above the levels established during the most recent performance test. Operation at lower flow rates may be considered by the Administrator to be unacceptable operation and maintenance of the affected facility. The owner or operator may request that these flow rates be reestablished by conducting new performance tests under §60.8 of this part.

(e) The owner or operator may as an alternative to paragraph (c) of this section determine the volumetric flow rate through each fan of the capture system from the fan power consumption, pressure drop across the fan and the fan performance curve. Only data specific to the operation of the affected electric submerged arc furnace are acceptable for demonstration of compliance with the requirements of this paragraph. The owner or operator shall maintain on file a permanent record of the fan performance curve (prepared for a specific temperature) and shall:

(1) Install, calibrate, maintain, and operate a device to continuously measure and record the power consumption of the fan motor (measured in kilowatts), and

(2) Install, calibrate, maintain, and operate a device to continuously measure and record the pressure drop across the fan. The fan power consumption and pressure drop measurements must be synchronized to allow real time comparisons of the data. The monitoring devices must have an accuracy of ±5 percent over their normal operating ranges.

(f) **The volumetric flow rate through each fan of the capture system must be determined from the fan power consumption, fan pressure drop, and fan performance curve** specified under paragraph (e) of this section, during any performance test required under §60.8 to demonstrate compliance with the standards under §§60.262(a)(4) and (5). The owner or operator shall **determine the volumetric flow rate at a representative temperature for furnace power input levels of 50 and 100 percent of the nominal rated capacity of the electric submerged arc furnace. At all times the electric submerged arc furnace is operated, the owner or operator shall maintain the fan power consumption and fan pressure drop at levels such that the volumetric flow rate is at or above the levels established during the most recent performance test for that furnace power input level**. If emissions due to tapping are captured and ducted separately from emissions of the electric submerged arc furnace, during each tapping period the owner or operator shall maintain the fan power consumption and fan pressure drop at levels such that the volumetric flow rate is at or above the levels established during the most recent performance test. Operation at lower flow rates may be considered by the Administrator to be unacceptable operation and maintenance of the affected facility. The owner or operator may request that these flow rates be reestablished by conducting new performance tests under §60.8. The Administrator may require the owner or operator to verify the fan performance curve by monitoring necessary fan operating parameters and determining the gas volume moved relative to Methods 1 and 2 of appendix A to this part.

(g) **All monitoring devices** required under paragraphs (c) and (e) of this section are to be **checked for calibration annually** in accordance with the procedures under §60.13(b).

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Table 3-2b
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NSPS Subpart Z - Standards of Performance for Ferroalloy Production Facilities
Applicable Test Methods and Procedures

§ 60.266 Test Methods and Procedures

(a) During any performance test required in §60.8, the owner or operator shall not allow gaseous diluents to be added to the effluent gas stream after the fabric in an open pressurized fabric filter collector unless the total gas volume flow from the collector is accurately determined and considered in the determination of emissions.

(b) In conducting the performance tests required in §60.8, the owner or operator shall use as reference methods and procedures the test methods in appendix A of this part or other methods and procedures as specified in this section, except as provided in §60.8(b).

(c) The owner or operator shall determine compliance with the particulate matter standards in §60.262 as follows:

(1) The emission rate (E) of particulate matter shall be computed for each run using the following equation:

$E = [(\sum_{i=1}^{n} C_{si} Q_{sdi})] / (PK)$

where:

E=emission rate of particulate matter, kg/MW-hr (1b/MW-hr).

n=total number of exhaust streams at which emissions are quantified.

csi=concentration of particulate matter from exhaust stream "i", g/dscm (gr/dscf).

Qsdi=volumetric flow rate of effluent gas from exhaust stream "i", dscm/hr (dscf/hr).

P=average furnace power input, MW.

K=conversion factor, 1000 g/kg (7000 gr/lb).

(2) Method 5 shall be used to determine the particulate matter concentration (csi) and volumetric flow rate (Qsdi) of the effluent gas, except that the heating systems specified in sections 2.1.2 and 2.1.6 are not to be used when the carbon monoxide content of the gas stream exceeds 10 percent by volume, dry basis. If a flare is used to comply with §60.263, the sampling site shall be upstream of the flare. The sampling time shall include an integral number of furnace cycles.

(i) When sampling emissions from open electric submerged arc furnaces with wet scrubber control devices, sealed electric submerged arc furnaces, or semi enclosed electric arc furnaces, the sampling time and sample volume for each run shall be at least 60 minutes and 1.80 dscm (63.6 dscf).

(ii) When sampling emissions from other types of installations, the sampling time and sample volume for each run shall be at least 200 minutes and 5.66 dscm (200 dscf).

(3) The measurement device of §60.265(b) shall be used to determine the average furnace power input (P) during each run.

(4) Method 9 and the procedures in §60.11 shall be used to determine opacity.

(5) The emission rate correction factor, integrated sampling procedure of Method 3B shall be used to determine the CO concentration. The sample shall be taken simultaneously with each particulate matter sample.

(d) During the particulate matter run, the maximum open hood area (in hoods with segmented or otherwise moveable sides) under which the process is expected to be operated and remain in compliance with all standards shall be recorded. Any future operation of the hooding system with open areas in excess of the maximum is not permitted.

(e) To comply with §60.265 (d) or (f), the owner or operator shall use the monitoring devices in §60.265 (c) or (e) to make the required measurements as determined during the performance test.

Table 3-2b
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NSPS Subpart A - Applicable Performance Testing Requirements

NSPS Subpart
40 CFR Part 60 Subpart A - General Provisions
Applicable Performance Testing Requirements
§ 60.8 Performance Tests (a) Except as specified in paragraphs (a)(1),(a)(2), (a)(3), and (a)(4) of this section, within 60 days after achieving the maximum production rate at which the **affected facility** will be operated, but not later than 180 days after initial **startup** of such facility, or at such other times specified by this part, and at such other times as may be required by the Administrator under section 114 of the Act, the owner or operator of such facility shall conduct performance test(s) and furnish the Administrator a written report of the results of such performance test(s). (b) Performance tests shall be conducted and data reduced in accordance with the test methods and procedures contained in each applicable subpart unless the Administrator (1) specifies or approves, in specific cases, the use of a reference method with minor changes in methodology, (2) approves the use of an equivalent method, (3) approves the use of an alternative method the results of which he has determined to be adequate for indicating whether a specific source is in compliance, (4) waives the requirement for performance tests because the owner or operator of a source has demonstrated by other means to the Administrator's satisfaction that the **affected facility** is in compliance with the standard, or (5) approves shorter sampling times and smaller sample volumes when necessitated by process variables or other factors. Nothing in this paragraph shall be construed to abrogate the Administrator's authority to require testing under section 114 of the Act. (c) Performance tests shall be conducted under such conditions as the Administrator shall specify to the plant operator based on representative performance of the **affected facility**. The owner or operator shall make available to the Administrator such records as may be necessary to determine the conditions of the performance tests. Operations during periods of **startup**, **shutdown**, and **malfunction** shall not constitute representative conditions for the purpose of a performance test nor shall emissions in excess of the level of the applicable emission limit during periods of startup, shutdown, and malfunction be considered a violation of the applicable emission limit unless otherwise specified in the applicable standard. (d) The owner or operator of an **affected facility** shall provide the Administrator at least 30 days prior notice of any performance test, except as specified under other subparts, to afford the Administrator the opportunity to have an observer present. If after 30 days notice for an initially scheduled performance test, there is a delay (due to operational problems, etc.) in conducting the scheduled performance test, the owner or operator of an **affected facility** shall notify the Administrator (or delegated State or local agency) as soon as possible of any delay in the original test date, either by providing at least 7 days prior notice of the rescheduled date of the performance test, or by arranging a rescheduled date with the Administrator (or delegated State or local agency) by mutual agreement.

Applicable Definition(s):

Affected facility means, with reference to a stationary source, any apparatus to which a standard is applicable (§60.2).

Affected facility (§60.40Da(a)) - Except as specified in paragraph (e) of this section, the affected facility to which this subpart applies is each electric utility steam generating unit:
(1) That is capable of combusting more than 73 megawatts (MW) (250 million British thermal units per hour (MMBtu/hr)) heat input of fossil fuel (either alone or in combination with any other fuel); and
(2) For which construction, modification, or reconstruction is commenced after September 18, 1978.

Malfunction means any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions (§60.2).

Shutdown means the cessation of operation of an affected facility for any purpose (§60.2).

Startup means the setting in operation of an affected facility for any purpose (§60.2).

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Table 3-2c
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NSPS Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
Applicability and Definitions

§ 60.4200 Am I Subject to This Subpart?

(a) Applicable to manufacturers, owners, and operators of **stationary compression ignition (CI) internal combustion engines (ICE)** and other persons as specified in paragraphs (a)(1) through (4) of this section. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.

(1) Manufacturers of stationary CI ICE with a displacement of less than 30 liters per cylinder where the model year is:
(i) 2007 or later, for engines that are not fire pump engines;
(ii) The model year listed in Table 3 to this subpart or later model year, for fire pump engines.

(2) Owners and operators of stationary CI ICE that commence construction after July 11, 2005, where the stationary CI ICE are:
(i) Manufactured after April 1, 2006, and are not fire pump engines, or
(ii) Manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006.

(3) Owners and operators of any stationary CI ICE that are modified or reconstructed after July 11, 2005 and any person that modifies or reconstructs any stationary CI ICE after July 11, 2005.

(4) The provisions of §60.4208 of this subpart are applicable to all owners and operators of stationary CI ICE that commence construction after July 11, 2005.

§ 60.4219 What Definitions Apply to this Subpart?

Compression ignition means relating to a type of stationary internal combustion engine that is not a spark ignition engine.

Emergency stationary internal combustion engine means any stationary internal combustion engine whose operation is limited to emergency situations and required testing and maintenance. Examples include stationary ICE used to produce power for critical networks or equipment (including power supplied to portions of a facility) when electric power from the local utility (or the normal power source, if the facility runs on its own power production) is interrupted, or stationary ICE used to pump water in the case of fire or flood, etc. Stationary CI ICE used to supply power to an electric grid or that supply power as part of a financial arrangement with another entity are not considered to be emergency engines.

Stationary internal combustion engine means any internal combustion engine, except combustion turbines, that converts heat energy into mechanical work and is not mobile. Stationary ICE differ from mobile ICE in that a stationary internal combustion engine is not a nonroad engine as defined at 40 CFR 1068.30 (excluding paragraph (2)(ii) of that definition), and is not used to propel a motor vehicle, aircraft, or a vehicle used solely for competition. Stationary ICE include reciprocating ICE, rotary ICE, and other ICE, except combustion turbines.

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Table 3-2c
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NSPS Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
Emission Standards

§ 60.4205 What Emission Standards Must I Meet for Emergency Engines if I am an owner or operator of a stationary CI internal combustion engine?

(a) Owners and operators of pre-2007 model year emergency stationary CI ICE with a displacement of less than 10 liters per cylinder that are not fire pump engines must comply with the emission standards in Table 1 to this subpart. Owners and operators of pre-2007 model year emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards in 40 CFR 94.8(a)(1).

(b) Owners and operators of 2007 model year and later emergency stationary CI ICE with a displacement of less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards for new nonroad CI engines in §60.4202, for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary CI ICE.

(c) Owners and operators of fire pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards in table 4 to this subpart, for all pollutants.

(d) Owners and operators of emergency stationary CI engines with a displacement of greater than or equal to 30 liters per cylinder must meet the requirements in this section.

(1) For engines installed prior to January 1, 2012, limit the emissions of NOXin the stationary CI internal combustion engine exhaust to the following:
(i) 17.0 g/KW-hr (12.7 g/HP-hr) when maximum engine speed is less than 130 rpm;
(ii) 45 · n–0.2g/KW-hr (34 · n–0.2g/HP-hr) when maximum engine speed is 130 or more but less than 2,000 rpm, where n is maximum engine speed; and
(iii) 9.8 g/kW-hr (7.3 g/HP-hr) when maximum engine speed is 2,000 rpm or more.

(2) For engines installed on or after January 1, 2012, limit the emissions of NOXin the stationary CI internal combustion engine exhaust to the following:
(i) 14.4 g/KW-hr (10.7 g/HP-hr) when maximum engine speed is less than 130 rpm;
(ii) 44 · n–0.23g/KW-hr (33 · n–0.23g/HP-hr) when maximum engine speed is greater than or equal to 130 but less than 2,000 rpm and where n is maximum engine speed; and
(iii) 7.7 g/KW-hr (5.7 g/HP-hr) when maximum engine speed is greater than or equal to 2,000 rpm.

(3) Limit the emissions of PM in the stationary CI internal combustion engine exhaust to 0.40 g/KW-hr (0.30 g/HP-hr).

(e) Owners and operators of emergency stationary CI ICE with a displacement of less than 30 liters per cylinder who conduct performance tests in-use must meet the NTE standards as indicated in §60.4212.

(f) Owners and operators of any modified or reconstructed emergency stationary CI ICE subject to this subpart must meet the emission standards applicable to the model year, maximum engine power, and displacement of the modified or reconstructed CI ICE that are specified in paragraphs (a) through (e) of this section.

Table 3-2c
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NSPS Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
Applicable Monitoring Requirements

§ 60.4209 What are the Monitoring Requirements if I am an Owner or Operator of a Stationary CI Internal Combustion Engine?
If you are an owner or operator, you must meet the monitoring requirements of this section. In addition, you must also meet the monitoring requirements specified in §60.4211. (a) If you are an owner or operator of an emergency stationary CI internal combustion engine that does not meet the standards applicable to non-emergency engines, you must install a non-resettable hour meter prior to startup of the engine. (b) If you are an owner or operator of a stationary CI internal combustion engine equipped with a diesel particulate filter to comply with the emission standards in §60.4204, the diesel particulate filter must be installed with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached.

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Table 3-2c
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NSPS Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
Testing Requirements

§ 60.4212 Testing Requrements for Owners and Operators
Owners and operators of stationary CI ICE with a displacement of less than 30 liters per cylinder who conduct performance tests pursuant to this subpart must do so according to paragraphs (a) through (e) of this section. (a) The performance test must be conducted according to the in-use testing procedures in 40 CFR part 1039, subpart F, for stationary CI ICE with a displacement of less than 10 liters per cylinder, and according to 40 CFR part 1042, subpart F, for stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder.
(b) Exhaust emissions from stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR part 1039 must not exceed the not-to-exceed (NTE) standards for the same model year and maximum engine power as required in 40 CFR 1039.101(e) and 40 CFR 1039.102(g)(1), except as specified in 40 CFR 1039.104(d). This requirement starts when NTE requirements take effect for nonroad diesel engines under 40 CFR part 1039.
(c) Exhaust emissions from stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR 89.112 or 40 CFR 94.8, as applicable, must not exceed the NTE numerical requirements, rounded to the same number of decimal places as the applicable standard in 40 CFR 89.112 or 40 CFR 94.8, as applicable, determined from the following equation: Where: STD = The standard specified for that pollutant in 40 CFR 89.112 or 40 CFR 94.8, as applicable. Alternatively, stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR 89.112 or 40 CFR 94.8 may follow the testing procedures specified in §60.4213 of this subpart, as appropriate.
(d) Exhaust emissions from stationary CI ICE that are complying with the emission standards for pre-2007 model year engines in §60.4204(a), §60.4205(a), or §60.4205(c) must not exceed the NTE numerical requirements, rounded to the same number of decimal places as the applicable standard in §60.4204(a), §60.4205(a), or §60.4205(c), determined from the equation in paragraph (c) of this section. Where: STD = The standard specified for that pollutant in §60.4204(a), §60.4205(a), or §60.4205(c). Alternatively, stationary CI ICE that are complying with the emission standards for pre-2007 model year engines in §60.4204(a), §60.4205(a), or §60.4205(c) may follow the testing procedures specified in §60.4213, as appropriate.
(e) Exhaust emissions from stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR part 1042 must not exceed the NTE standards for the same model year and maximum engine power as required in 40 CFR 1042.101(c).

Table 5-2c
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NSPS Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

Notification, Reporting and Recordkeeping Requirements

§ 60.4214 What are my notification, reporting, and recordkeeping requirements if I am an owner or operator of a stationary CI internal combustion engine?
(a) Owners and operators of non-emergency stationary CI ICE that are greater than 2,237 KW (3,000 HP), or have a displacement of greater than or equal to 10 liters per cylinder, or are pre-2007 model year engines that are greater than 130 KW (175 HP) and not certified, must meet the requirements of paragraphs (a)(1) and (2) of this section. (1) Submit an initial notification as required in §60.7(a)(1). The notification must include the information in paragraphs (a)(1)(i) through (v) of this section. (i) Name and address of the owner or operator; (ii) The address of the affected source; (iii) Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement; (iv) Emission control equipment; and (v) Fuel used. (2) Keep records of the information in paragraphs (a)(2)(i) through (iv) of this section. (i) All notifications submitted to comply with this subpart and all documentation supporting any notification. (ii) Maintenance conducted on the engine. (iii) If the stationary CI internal combustion is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards. (iv) If the stationary CI internal combustion is not a certified engine, documentation that the engine meets the emission standards.
(b) If the stationary CI internal combustion engine is an emergency stationary internal combustion engine, the owner or operator is not required to submit an initial notification. Starting with the model years in table 5 to this subpart, if the emergency engine does not meet the standards applicable to non-emergency engines in the applicable model year, the owner or operator must keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. The owner must record the time of operation of the engine and the reason the engine was in operation during that time.
(c) If the stationary CI internal combustion engine is equipped with a diesel particulate filter, the owner or operator must keep records of any corrective action taken after the backpressure monitor has notified the owner or operator that the high backpressure limit of the engine is approached.

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Table 3-2c
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NSPS Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

NSPS Subpart A - Applicable Notification and Recordkeeping Requirements

NSPS Subpart
40 CFR Part 60 Subpart A - General Provisions
Applicable Notification and Recordkeeping Requirements
§ 60.7 Notification and record keeping (a) Any owner or operator subject to the provisions of this part shall furnish the Administrator written notification or, if acceptable to both the Administrator and the owner or operator of a source, electronic notification, as follows: (1) A notification of the date **construction** (or reconstruction as defined under §60.15) of an affected facility is **commenced** postmarked no later than 30 days after such date. This requirement shall not apply in the case of mass-produced facilities which are purchased in completed form. (3) A notification of the actual date of initial startup of an affected facility postmarked within 15 days after such date. (6) A notification of the anticipated date for conducting the opacity observations required by §60.11(e)(1) of this part. The notification shall also include, if appropriate, a request for the Administrator to provide a visible emissions reader during a performance test. The notification shall be postmarked not less than 30 days prior to such date. (b) Any owner or operator subject to the provisions of this part shall maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of an affected facility; any malfunction of the air pollution control equipment; or any periods during which a continuous monitoring system or monitoring device is inoperative. (c) Each owner or operator required to install a continuous monitoring device shall submit excess emissions and monitoring systems performance report (excess emissions are defined in applicable subparts) and-or summary report form (see paragraph (d) of this section) to the Administrator semiannually, except when: more frequent reporting is specifically required by an applicable subpart; or the Administrator, on a case-by-case basis, determines that more frequent reporting is necessary to accurately assess the compliance status of the source. All reports shall be postmarked by the 30th day following the end of each six-month period. Written reports of excess emissions shall include the following information: (1) The magnitude of excess emissions computed in accordance with §60.13(h), any conversion factor(s) used, and the date and time of commencement and completion of each time period of excess emissions. The process operating time during the reporting period. (2) Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the affected facility. The nature and cause of any malfunction (if known), the corrective action taken or preventative measures adopted. (3) The date and time identifying each period during which the continuous monitoring system was inoperative except for zero and span checks and the nature of the system repairs or adjustments. (4) When no excess emissions have occurred or the continuous monitoring system(s) have not been inoperative, repaired, or adjusted, such information shall be stated in the report. (f) Any owner or operator subject to the provisions of this part shall maintain a file of all measurements, including **continuous monitoring system, monitoring device**, and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required by this part recorded in a permanent form suitable for inspection. The **file shall be retained for at least two years** following the date of such measurements, maintenance, reports, and records.

Applicable Definition(s):

Affected facility means, with reference to a stationary source, any apparatus to which a standard is applicable (§60.2).

Commenced means, with respect to the definition of new source in section 111(a)(2) of the Act, that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification (§60.2).

Construction means fabrication, erection, or installation of an affected facility (§60.2).

Continuous monitoring system means the total equipment, required under the emission monitoring sections in applicable subparts, used to sample and condition (if applicable), to analyze, and to provide a permanent record of emissions or process parameters (§60.2).

Monitoring device means the total equipment, required under the monitoring of operations sections in applicable subparts, used to measure and record (if applicable) process parameters (§60.2).

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Table 3-2c
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NSPS Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

NSPS Subpart A - Applicable Performance Testing Requirements

NSPS Subpart
40 CFR Part 60 Subpart A - General Provisions
Applicable Performance Testing Requirements
§ 60.8 Performance Tests (a) Except as specified in paragraphs (a)(1),(a)(2), (a)(3), and (a)(4) of this section, within 60 days after achieving the maximum production rate at which the **affected facility** will be operated, but not later than 180 days after initial **startup** of such facility, or at such other times specified by this part, and at such other times as may be required by the Administrator under section 114 of the Act, the owner or operator of such facility shall conduct performance test(s) and furnish the Administrator a written report of the results of such performance test(s). (b) Performance tests shall be conducted and data reduced in accordance with the test methods and procedures contained in each applicable subpart unless the Administrator (1) specifies or approves, in specific cases, the use of a reference method with minor changes in methodology, (2) approves the use of an equivalent method, (3) approves the use of an alternative method the results of which he has determined to be adequate for indicating whether a specific source is in compliance, (4) waives the requirement for performance tests because the owner or operator of a source has demonstrated by other means to the Administrator's satisfaction that the **affected facility** is in compliance with the standard, or (5) approves shorter sampling times and smaller sample volumes when necessitated by process variables or other factors. Nothing in this paragraph shall be construed to abrogate the Administrator's authority to require testing under section 114 of the Act. (c) Performance tests shall be conducted under such conditions as the Administrator shall specify to the plant operator based on representative performance of the **affected facility**. The owner or operator shall make available to the Administrator such records as may be necessary to determine the conditions of the performance tests. Operations during periods of **startup, shutdown**, and **malfunction** shall not constitute representative conditions for the purpose of a performance test nor shall emissions in excess of the level of the applicable emission limit during periods of startup, shutdown, and malfunction be considered a violation of the applicable emission limit unless otherwise specified in the applicable standard. (d) The owner or operator of an **affected facility** shall provide the Administrator at least 30 days prior notice of any performance test, except as specified under other subparts, to afford the Administrator the opportunity to have an observer present. If after 30 days notice for an initially scheduled performance test, there is a delay (due to operational problems, etc.) in conducting the scheduled performance test, the owner or operator of an **affected facility** shall notify the Administrator (or delegated State or local agency) as soon as possible of any delay in the original test date, either by providing at least 7 days prior notice of the rescheduled date of the performance test, or by arranging a rescheduled date with the Administrator (or delegated State or local agency) by mutual agreement. (e) The owner or operator of an **affected facility** shall provide, or cause to be provided, performance testing facilities as follows: (1) Sampling ports adequate for test methods applicable to such facility. This includes (i) constructing the air pollution control system such that volumetric flow rates and pollutant emission rates can be accurately determined by applicable test methods and procedures and (ii) providing a stack or duct free of cyclonic flow during performance tests, as demonstrated by applicable test methods and procedures. (2) Safe sampling platform(s). (3) Safe access to sampling platform(s). (4) Utilities for sampling and testing equipment. (f) Unless otherwise specified in the applicable subpart, each performance test shall consist of three separate runs using the applicable test method. Each run shall be conducted for the time and under the conditions specified in the applicable standard. For the purpose of determining compliance with an applicable standard, the arithmetic means of results of the three runs shall apply. In the event that a sample is accidentally lost or conditions occur in which one of the three runs must be discontinued because of forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions, or other circumstances, beyond the owner or operator's control, compliance may, upon the Administrator's approval, be determined using the arithmetic mean of the results of the two other runs.

Applicable Definition(s):

Affected facility means, with reference to a stationary source, any apparatus to which a standard is applicable (§60.2).

Malfunction means any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions (§60.2).

Shutdown means the cessation of operation of an affected facility for any purpose (§60.2).

Startup means the setting in operation of an affected facility for any purpose (§60.2).

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Table 3-3A
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of Applicable National Emission Standards for Hazardous Air Pollutants (NESHAPs)

[redacted]	[redacted]	[redacted]
A	General Provisions	No
B	Radon Emissions from Underground Uranium Mines	No
C	Beryllium	No
D	Beryllium Rocket Motor Firing	No
E	Mercury	No
F	Vinyl Chloride	No
G	Reserved	No
H	Radionuclides Other Than Radon From Department of Energy Facilities	No
I	Radionuclides Emissions From Federal Facilities Other Than Nuclear Regulatory Commission Licensees and Not Covered by Subpart H	No
J	Equipment Leaks (Fugitive Emission Sources) of Benzene	No
K	Radionuclide Emissions from Elemental Phosphorus Plants	No
L	Benzene Emissions From Coke By-Product Recovery Plants	No
M	Asbestos	No
N	Inorganic Arsenic Emissions From Glass Manufacturing Plants	No
O	Inorganic Arsenic Emissions From Primary Copper Smelters	No
P	Inorganic Arsenic Emissions From Arsenic Trioxide and Metallic Arsenic Production Facilities	No
Q	Radon Emissions from Department of Energy Facilities	No
R	Radon Emissions From Phosphogypsum Stacks	No
S	Reserved	No
T	Radon Emissions From the Disposal of Uranium Mill Tailings	No
U	Reserved	No
V	Equipment Leaks (Fugitive Emission Sources)	No
W	Radon Emissions From Operating Mill Tailings	No
X	Reserved	No
Y	Benzene Emissions From Benzene Storage Vessels	No
Z	Reserved	No
AA	Reserved	No
BB	Benzene Emissions From Benzene Transfer Operations	No
CC	Reserved	No
DD	Reserved	No
EE	Reserved	No
FF	Benzene Waste Operations	No

Existing requirement applicable to the proposed silicon manufacturing facility

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Table 3-3B
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of Applicable National Emission Standards for Hazardous Air Pollutants (NESHAPs) - MACT Source Categories

[redacted]	[redacted]	[redacted]
A	**General Provisions**	**Yes**
B	Requirements for Control Technology Determinations for Major Sources in Accordance with Clean Air Act Section 112(g) and 112(j)	No
C	List of Hazardous Air Pollutants, Petitions Process, Lesser Quantities Designations, Source Category List	No
D	Regulations Governing Compliance Extensions for Early Reductions of HAPS	No
E	Approval of State Programs and Delegation of Federal Authority	No
F	Synthetic Organic Chemical Manufacturing Industry (SOCMI)	No
G	SOCMI - Process Vents, Storage Vessels, Transfer Operations and Wastewater	No
H	Equipment Leaks	No
I	Certain Processes Subject to the Negotiated Regulation for Equipment Leaks	No
J	Polyvinyl Chloride and Copolymers Production	No
K	Reserved	No
L	Coke Oven Batteries	No
M	National Perchloroethylene Air Emissions Standards for Dry Cleaning Facilities	No
N	Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks	No
O	Ethylene Oxide Emission Standards for Sterilization Facilities	No
P	Reserved	No
Q	Industrial Process Cooling Towers	No
R	Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations	No
S	Pulp and Paper Industry	No
T	Halogenated Solvent Cleaning	No
U	Group I Polymers and Resins	No
V	Reserved	No
W	Epoxy Resin Production and Non-Vinyl Polymides Production	No
X	Secondary Lead Smelting	No
Y	Marine Tank Vessel Loading Operations	No
Z	Reserved	No
AA	Phosphoric Acid Manufacturing Plants	No
BB	Phosphate Fertilizers Production Plants	No
CC	Petroleum Refineries	No
DD	Off-Site Waste and Recovery Operations	No
EE	Magnetic Tape Manufacturing Operations	No
FF	Reserved	No
GG	Aerospace Manufacturing and Rework Facilities	No
HH	Oil and Natural Gas Production Facilitates	No
II	Shipbuilding and Ship Repair (Surface Coatings)	No
JJ	Wood Furniture Manufacturing Operations	No
KK	Printing and Publishing Industry	No
LL	Primary Aluminum Reduction Plants	No
MM	Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite, and Stand Alone Semi-chemical Pulp Mills	No
OO	Tanks Level 1	No
PP	Containers	No
QQ	Surface Impoundments	No
RR	Individual Drain Systems	No
SS	Closed Vent Systems, Control Devices, Recovery Devices and Routing to a Fuel Gas System or Process	No
TT	Equipment Leaks - Control Level 1	No

Table 3-3B
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of Applicable National Emission Standards for Hazardous Air Pollutants (NESHAPs) - MACT Source Categories

UU	Equipment Leaks - Control Level 2	No
VV	Oil-Water Separators and Organic-Water Separators	No
WW	Storage Vessels (Tanks) - Control Level 2	No
XX	Ethylene Manufacturing Process Units - Heat Exchange Systems and Waste Operations	No
YY	Source Categories - Generic MACT	No
ZZ - BBB	Reserved	No
CCC	Steel Pickling - HCL Process Facilities and HCL Regeneration Plants	No
DDD	Mineral Wool Production	No
EEE	Hazardous Waste Combustors	No
GGG	Pharmaceuticals Production	No
HHH	Natural Gas Transmissions and Storage Facilities	No
III	Flexible Polyurethane Foam Production	No
JJJ	Group IV Polymers and Resins	No
KKK	Reserved	No
LLL	Portland Cement Manufacturing Industry	No
MMM	Pesticide Active Ingredient Production	No
NNN	Wool Fiberglass Manufacturing	No
OOO	Manufacture of Amino/Phenolic Resins	No
PPP	Polyether Polyols Production	No
QQQ	Primary Copper Smelting	No
RRR	Secondary Aluminum Production	No
TTT	Primary Lead Smelting	No
UUU	Petroleum Refineries - Catalytic Cracking Units, Catalytic Reformer Units, Sulfur Recovery Units	No
VVV	Publically Owned Treatment Works (POTWs)	No
WWW	Reserved	No
XXX	Ferroalloys Production: Ferromanganese and Silomanganese	No
AAAA	Municipal Solid Waste Landfills	No
CCCC	Manufacturing of Nutritional Yeast	No
DDDD	Plywood and Composite Wood Products	No
EEEE	Organic Liquids Distribution (Non-Gasoline)	No
FFFF	Miscellaneous Organic Chemical Manufacturing	No
GGGG	Solvent Extraction for Vegetable Oil Production	No
HHHH	Wet Formed Fiberglass Mat Production	No
IIII	Surface Coating of Automobiles and Light Duty Trucks	No
JJJJ	Paper and Other Web Coatings	No
KKKK	Surface Coating of Metal Cans	No
MMMM	Surface Coatings of Miscellaneous Metal Parts and Products	No
NNNN	Surface Coating of Large Appliances	No
OOOO	Printing, Coating and Dyeing of Fabrics and Other Textiles	No
PPPP	Surface Coating of Plastic Parts and Products	No
QQQQ	Surface Coating of Wood Building Products	No
RRRR	Surface Coating of Metal Furniture	No
SSSS	Surface Coating of Metal Coil	No
TTTT	Leather Finishing Operations	No
UUUU	Cellulose Products Manufacturing	No
VVVV	Boat Manufacturing	No
WWWW	Reinforced Plastics Composites Manufacturing	No
XXXX	Rubber Tire Manufacturing	No

Table 3-3B
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of Applicable National Emission Standards for Hazardous Air Pollutants (NESHAPs) - MACT Source Categories

[redacted]	[redacted]	[redacted]
YYYY	Stationary Combustion Turbines	No
ZZZZ	**Stationary Reciprocating Internal Combustion Engines**	**Yes**
AAAAA	Lime Manufacturing	No
BBBBB	Semiconductor Manufacturing	No
CCCCC	Coke Ovens: Pushing, Quenching, and Battery Stacks	No
DDDDD	Industrial, Commercial and Instructional Boilers and Process Heaters (Major Sources)	No
EEEEE	Iron and Steel Foundries	No
FFFFF	Integrated Iron and Steel Manufacturing Facilities	No
GGGGG	Site Remediation	No
HHHHH	Miscellaneous Coating Manufacturing	No
IIIII	Mercury Emissions from Mercury Cell Chlor-Alkali Plants	No
JJJJJ	Brick and Structural Clay Products Manufacturing	No
KKKKK	Clay Ceramics Manufacturing	No
LLLLL	Asphalt Processing and Asphalt Roofing Manufacturing	No
MMMMM	Flexible Polyurethane Foam Fabrication Operations	No
NNNNN	Hydrochloric Acid Production	No
OOOOO	Reserved	No
PPPPP	Engine Test Cells/Stands	No
QQQQQ	Friction Materials Manufacturing Facilities	No
RRRRR	Taconite Iron Ore Processing	No
SSSSS	Refractory Products Manufacturing	No
TTTTT	Primary Magnesium Refining	No
UUUUU*	Coal- and Oil-Fired Electric Utility Steam Generating Units	No
UUUUU - VVVVV	Reserved	No
WWWWW	Hospital Ethylenne Oxide Sterilizers	No
XXXXX	Reserved	No
YYYYY	Area Sources: Electric Arc Furnace Steelmaking Facilities	No
ZZZZZ	Iron and Steel Foundries Area Sources	No
AAAAAA	Reserved	No
BBBBBB	Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities	No
CCCCCC	Gasoline Dispensing Facilities	No
DDDDDD	Polyvinyl Chloride and Copolymers Production Area Sources	No
EEEEEE	Primary Copper Smelting Area Sources	No
FFFFFF	Secondary Copper Smelting Area Sources	No
GGGGGG	Primary Nonferrous Metals Area Sources - Zinc, Cadmium, and Beryllium	No
HHHHHH	Paint Stripping and Miscellaneous Surface Coating Operations at Area Sources	No
IIIIII	Reserved	No
JJJJJJ	Industrial, Commercial, and Institutional Boilers Area Sources	no
KKKKKK	Reserved	No
LLLLLL	Acrylic and Modacrylic Fibers Production Area Sources	No
MMMMMM	Carbon Black Production Area Sources	No
NNNNNN	Chemical Manufacturing Area Sources: Chromium Compounds	No
OOOOOO	Flexible Polyurethane Foam Production and Fabrication Area Sources	No
PPPPPP	Lead Acid Battery Manufacturing Area Sources	No
QQQQQQ	Wood Preserving Area Sources	No
RRRRRR	Clay Ceramics Manufacturing Area Sources	No
SSSSSS	Glass Manufacturing Area Sources	No
TTTTTT	Secondary Nonferrous Metals Processing Area Sources	No

Table 3-3B
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of Applicable National Emission Standards for Hazardous Air Pollutants (NESHAPs) - MACT Source Categories

[redacted]	[redacted]	[redacted]
UUUUUU	Reserved	No
VVVVVV	Chemical Manufacturing Area Sources	No
WWWWWW	Area Source Standards for Plating and Polishing Operations	No
XXXXXX	Area Source Standards for Nine Metal Fabrication and Finishing Source Categories	No
YYYYYY	**Area Sources: Ferroalloys Production Facilities**	**Yes**
ZZZZZZ	Area Source Standards for Aluminum, Copper, and Other Nonferrous Foundries	No
AAAAAAA	Area Sources: Asphalt Processing and Asphalt Roofing Manufacturing	No
BBBBBBB	Area Sources: Chemical Preparations Industry	No
CCCCCCC	Area Sources: Paints and Allied Products Manufacturing	No
DDDDDDD	Area Source Standards for Prepared Feeds Manufacturing	No
EEEEEEE	Gold Mine Ore Processing and Production Area Source Category	No

Notes:
*Subpart UUUUU - Coal- and Oil-Fired Electric Utility Steam Genrating Units is a proposed Subpart and has not yet been promulgate
Existing requirement applicable to the proposed silicon manufacturing facility

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Ta

Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NESHAP MACT Subpart ZZZZ - NESHAPS for Stationary Reciprocating Internal Combustion Engines
Applicability and Definitions

§ 63.6580 - What is the purpose of Subpart ZZZZ?

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

§ 63.6585 - Am I Subject to this Subpart?

You are subject to this subpart if you own or operate a stationary RICE at a major or area source of HAP emissions.

(a) A **Stationary RICE** is any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile.

(b) A **Major Source of HAP Emissions** is a plant site that emits or has the potential to emit any single HAP at a rate of 10 tons (9.07 mega grams) or more per year or any combination of HAP at are ate of 25 tons (22.69 mega grams) or more per year, except that for oil and gas production facilities, a major source of HAP emissions is determined for each surface site.

(c) An **Area Source of HAP Emissions** is a source that is not a major source.

§ 63.6590 - What Parts of My Plant does this Subpart Cover?

(a) **Affected Source** is any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions, excluding stationary RICE being tested at a stationary RICE test cell/stand.

(2) **New Stationary RICE**
(i) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions is new if you commenced construction of the stationary RICE on or after December 19, 2002.
(ii) A stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.
(iii) A stationary RICE located at an area source of HAP emissions is new if you commenced construction of the stationary RICE after June 12, 2006.

(b) Stationary RICE Subject to Limited Requirements

(1) An **affected source** which meets either of the criteria in paragraphs (b)(1)(i) through (ii) of this section**does not have to meet the requirements of this subpart and of subpart A of this part except for the initial notification requirements of 63.6645(f)**

(i) The stationary RICE is a new or reconstructed emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions.
(ii) The stationary RICE is a new or reconstructed limited use stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions.

(c) **Stationary RICE Subject to Regulations under 40 CFR 60 - An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR 60, Subpart IIII, for compression ignition engines** or 40 CFR 60, Subpart JJJJ, for spark ignition engines. **No further requirements apply for such engines under this part.**

(1) A new or reconstructed stationary RICE located at an area source.
(2) A new or reconstructed 2SL8 stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions.
(3) A new or reconstructed 4SL8 stationary RICE with a site rating of less than 250 brake HP located at a major source of HAP emissions.
(4) A new or reconstructed spark ignition 4 stroke rich burn (4SRB) stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions.
(5) A new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis.
(6) A new or reconstructed emergency or limited use stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions.
(7) A new or reconstructed compression ignition (CI) stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions.

§ 63.6595 - When do I have to Comply with this Subpart?

(a)(3) If you start up your new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions after August 6, 2004, you must comply with the applicable emission limitations and operating limitations in this subpart upon startup of your affected source.

(5) If you start up your new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions after January 18, 2008, you must comply with the applicable emission limitations and operating limitations in this subpart upon startup of your affected source.

Tab 3c
CMississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NESHAP MACT Subpart ZZZZ - NESHAPS for Stationary Reciprocating Internal Combustion Engines
Notifications, Reports and Records

63.6645 - What Notifications Must I Submit and When?
(f) If you are required to submit an Initial Notification but are otherwise not affected by the requirements of this subpart, in accordance with 63.6590(b), your notification should include the information in 63.9(b)(2)(i) through (v), and a statement that your stationary RICE has no additional requirements and explain the basis of the exclusion (for example, that it operates exclusively as an emergency stationary RICE if it has a site rating of m roe than 500 brake HP located at a major source of HAP emissions.

TaL 3c
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
NESHAP MACT Subpart A - General Provisions
63.9 - Notification Requirements

63.9 - Notification Requirements
(ii) If an area source that otherwise would be subject to an emission standard or other requirement established under this part if it were a major source subsequently increases its emissions of hazardous air pollutants (or its potential to emit hazardous air pollutants) such that the source is a major source that is subject to the emission standard or other requirement, such source shall be subject to the notification requirements of this section. (iii) Affected sources that are required under this paragraph to submit an initial notification may use the application for approval of construction or reconstruction under §63.5(d) of this subpart, if relevant, to fulfill the initial notification requirements of this paragraph. (2) The owner or operator of an affected source that has an initial startup before the effective date of a relevant standard under this part shall notify the Administrator in writing that the source is subject to the relevant standard. The notification, which shall be submitted not later than 120 calendar days after the effective date of the relevant standard (or within 120 calendar days after the source becomes subject to the relevant standard), shall provide the following information: (i) The name and address of the owner or operator; (ii) The address (i.e., physical location) of the affected source; (iii) An identification of the relevant standard, or other requirement, that is the basis of the notification and the source's compliance date; (iv) A brief description of the nature, size, design, and method of operation of the source and an identification of the types of emission points within the affected source subject to the relevant standard and types of hazardous air pollutants emitted; and (v) A statement of whether the affected source is a major source or an area source.

Table 3-3d
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
MACT Subpart YYYYYY - NESHAPS for Area Sources: Ferroalloys Production Facilities
Applicability, Compliance and Definitions

§ 63.11524 Am I Subject to this Subpart?

(a) You are subject to this subpart if you **own or operate** a **ferroalloys production facility that is an area source of hazardous air pollutant (HAP) emissions. A ferroalloys production facility manufactures silicon metal,** ferrosilicon, ferrotitanium using the aluminum reduction process, ferrovanadium, ferromolybdenum, calcium silicon, silicomanganese zirconium, ferrochrome silicon, silvery iron, high-carbon ferrochrome, charge chrome, standard ferromanganese, silicomanganese, ferromanganese silicon, calcium carbide or other ferroalloy products using electrometallurgical operations including electric arc furnaces (EAFs) or other reaction vessels.

(b) The provisions of this subpart apply to each existing and new electrometallurgical operation affected source as defined in paragraphs (b)(1) and (b)(2) of this section.

(1) An electrometallurgical operation affected source is existing if you commenced construction or reconstruction of the EAF or other reaction vessel on or before September 15, 2008.

(2) An **electrometallurgical operation affected source is new if you commenced construction or reconstruction of the EAF or other reaction vessel after September 15, 2008.**

§ 63.11525 What are My Compliance Dates?

(c) If you start up a **new affected source after December 23, 2008**, you must **achieve compliance** with the applicable provisions of this subpart **upon startup of your affected source**.

§ 63.11532 What Definitions Apply to this Subpart?

Capture system means the collection of components used to capture gases and fumes released from one or more emissions points and then convey the captured gas stream to a control device or to the atmosphere. A capture system may include but is not limited to, the following components as applicable to a give capture system design: duct intake devices, hoods, enclosures, ductwork, dampers, manifolds, plenums, and fans.

Control device means the air pollution control equipment used to remove PM from the effluent gas stream generated by an EAF furnace or other reaction vessel.

Electric arc furnace means any furnace wherein electrical energy is converted to heat energy by transmission of current between electrodes partially submerged in the furnace charge.

Electrometallurgical operations means the use of electric and electrolytic processes to purify metals or reduce metallic compounds to metals.

Table 3-3d
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
MACT Subpart YYYYYY - NESHAPS for Area Sources: Ferroalloys Production Facilities
Standards for Visible Emissions and Opacity

Pollutant
Visible Emissions and Opacity
§ 63.11526 What are the Standards for New and Existing Ferroalloys Production Facilities
(a) You must not discharge to the atmosphere **visible emissions (VE) from the control device that exceed 5 percent of accumulated occurrences in a 60-minute observation period.** (b) You must not discharge to the atmosphere **fugitive PM emissions from the furnace building containing the electrometallurgical operations that exhibit opacity greater than 20 percent (6-minute average), except for one 6-minute average per hour that does not exceed 60 percent.**

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Table 3-3d
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
MACT Subpart YYYYYY - NESHAPS for Area Sources: Ferroalloys Production Facilities
Applicable Monitoring Requirements

§ 63.11527 What are the Monitoring Requirements for New and Existing Sources?

(a) **EAF equipped with fabric filters** —(1) Visual monitoring. You must **conduct visual monitoring of the monovent or fabric filter outlet stack(s) for any VE** according to the schedule specified in paragraphs (a)(1)(i) and (a)(1)(ii) of this section.

(i) **Daily visual monitoring.** Perform visual determination of fugitive emissions once per day, on each day the process is in operation, during operation of the process.

(ii) **Weekly visual monitoring.** If no visible fugitive emissions are detected in consecutive daily visual monitoring performed in accordance with paragraph (a)(1)(i) of this section for 90 days of operation of the process, you may decrease the frequency of visual monitoring to once per calendar week of time the process is in operation, during operation of the process. If visible fugitive emissions are detected during these inspections, you must resume daily visual monitoring of that operation during each day that the process is in operation, in accordance with paragraph (a)(1)(i) of this section until you satisfy the criteria of this section to resume conducting weekly visual monitoring.

(2) If the visual monitoring reveals the presence of any VE, you must conduct a Method 22 (appendix A–7 of 40 CFR part 60) test following the requirements of §63.11528(b)(1) within 24 hours of determining the presence of any VE.

(3) If you own or operate an existing affected source, you may install, operate, and maintain a bag leak detection system for each fabric filter as an alternative to the monitoring requirements in paragraph (a)(1) of this section. If you own or operate a new affected source, you **must install, operate, and maintain a bag leak detection system for each fabric filter** according to the requirements in paragraphs (a)(3)(i) through (a)(3)(vii) of this section. Such source is not subject to the requirements in paragraphs (a)(1) and (a)(2) of this section.

(i) The system must be **certified by the manufacturer to be capable of detecting emissions of PM at concentrations of 10 milligrams per actual cubic meter (0.00044 grains per actual cubic foot) or less.**

(ii) The **bag leak detection system sensor must provide output of relative PM loadings** and the owner or operator shall **continuously record the output** from the bag leak detection system using a strip chart recorder, data logger, or other means.

(iii) The system must be **equipped with an alarm** that will sound when an increase in relative PM loadings is detected over the alarm set point established in the operation and maintenance plan, and the alarm must be located such that it can be heard, seen, or otherwise detected by the appropriate plant personnel.

(iv) The initial adjustment of the system must, at minimum, consist of establishing the baseline output by adjusting the sensitivity (range) and the averaging period of the device, and establishing the alarm set points. If the system is equipped with an alarm delay time feature, you also must establish a maximum reasonable alarm delay time.

(v) Following the initial adjustment, do not adjust the sensitivity or range, averaging period, alarm set point, or alarm delay time, except that, once per quarter, you may adjust the sensitivity of the bag leak detection system to account for seasonal effects including temperature and humidity.

(vi) For fabric filters that are discharged to the atmosphere through a stack, the **bag leak detector sensor must be installed downstream of the fabric filter and upstream of any wet scrubber.**

(vii) Where multiple detectors are required, the system's instrumentation and alarm may be shared among detectors.

(4) When operating a bag leak detection system, if an alarm sounds, conduct visual monitoring of the monovent or fabric filter outlet stack(s) as required in paragraph (a)(1) of this section within 1 hour. If the visual monitoring reveals the presence of any VE, you must conduct a Method 22 test following the requirements of §63.11528(b)(1) within 24 hours of determining the presence of any VE.

(5) You must prepare a **site-specific monitoring plan for each bag leak detection system**. You must operate and maintain each bag leak detection system according to the plan at all times. Each plan must address all of the items identified in paragraphs (a)(5)(i) through (a)(5)(v)of this section.

(i) Installation of the bag leak detection system.

(ii) Initial and periodic adjustment of the bag leak detection system including how the alarm set-point and alarm delay time will be established.

(iii) Operation of the bag leak detection system including quality assurance procedures.

(iv) Maintenance of the bag leak detection system including a routine maintenance schedule and spare parts inventory list.

(v) How the bag leak detection system output will be recorded and stored.

(b) **EAF equipped with wet scrubbers** —(1) Visual monitoring. You must **conduct visual monitoring of the wet scrubber outlet stack(s) for any VE** according to the schedule specified in paragraphs (b)(1)(i) and (b)(1)(ii) of this section.

(i) **Daily visual monitoring.** Perform visual determination of fugitive emissions once per day, on each day the process is in operation, during operation of the process.

(ii) **Weekly visual monitoring.** If no visible fugitive emissions are detected in consecutive daily visual monitoring performed in accordance with paragraph (b)(1)(i) of this section for 90 days of operation of the process, you may decrease the frequency of visual monitoring to once per calendar week of time the process is in operation, during operation of the process. If visible fugitive emissions are detected during these inspections, you must resume daily visual monitoring of that operation during each day that the process is in operation, in accordance with paragraph (b)(1)(i) of this section until you satisfy the criteria of this section to resume conducting weekly visual monitoring.

(2) If the visual monitoring reveals the presence of any VE, you must conduct a Method 22 (appendix A–7 of 40 CFR part 60) test following the requirements of §63.11528(b)(1) within 24 hours of determining the presence of any VE.

(3) If you own or operate an existing affected source, you may install, operate and maintain a continuous parameter monitoring system (CPMS) to measure and record the 3-hour average pressure drop and scrubber water flow rate as an alternative to the monitoring requirements specified in paragraph (b)(1) of this section. If you own or operate a **new sealed EAF affected source, you must install, operate, and maintain a CPMS for each wet scrubber.** Such source is not subject to the requirements in paragraph (b)(1) of this section.

(4) When operating a CPMS, if the 3-hour average pressure drop or scrubber water flow rate is below the minimum levels that indicate normal operation of the control device, conduct visual monitoring of the outlet stack(s) as required by paragraph (b)(1) of this section within 1 hour of determining that the 3-hour average parameter value is below the required minimum levels. Manufacturer's specifications for pressure drop and liquid flow rate will be used to determine normal operations. If the visual monitoring reveals the presence of any VE, you must conduct a Method 22 (appendix A–7 of 40 CFR part 60) test following the requirements of §63.11528(b)(1) within 24 hours of determining the presence of any VE.

Table 3-3d
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
MACT Subpart YYYYYY - NESHAPS for Area Sources: Ferroalloys Production Facilities
Applicable Testing and Compliance Requirements

§ 63.11528 What are the Performance Test and Compliance Requirements for New and Existing Sources?

(a) **Initial compliance demonstration deadlines.** You must conduct an initial Method 22 (appendix A–7 of 40 CFR part 60) test following the requirements of paragraph (b)(1) of this section of each existing electrometallurgical operation control device and an **initial Method 9 observation** following the requirements of paragraph (c)(1) of this section from the **furnace building due to electrometallurgical operations no later than 60 days after your applicable compliance date.** For any **new electrometallurgical operation control device**, you must **conduct an initial Method 22 test** following the requirements of paragraph (b)(1) of this section **within 15 days of startup of the control device.**

(b) **Visible emissions limit compliance demonstration.**

(1) You must **conduct a Method 22** (appendix A–7 of 40 CFR part 60) test to **determine that VE from the control device** do not exceed the emission standard specified in §63.11526(a). For a fabric filter, conduct the test for at least 60 minutes at the fabric filter monovent or outlet stack(s), as applicable. For a wet scrubber, conduct the test for at least 60 minutes at the outlet stack(s).

(2) You must **conduct a semiannual Method 22 test** using the procedures specified in paragraph (b)(1) of this section.

(c) **Furnace building opacity.** (1) You must conduct an **opacity test for fugitive emissions from the furnace building** according to the procedures in §63.6(h) and **Method 9** (appendix A–4 of 40 CFR part 60). The test must be conducted for at least 60 minutes and shall include tapping the furnace or reaction vessel. The observation must be focused on the part of the building where electrometallurgical operation fugitive emissions are most likely to be observed.

(2) **Conduct subsequent Method 9 tests no less frequently than every 6 months** and each time you make a process change likely to increase fugitive emissions.

(3) **After the initial Method 9 performance test, as an alternative to the Method 9 performance test, you may monitor VE using Method 22 (appendix A–7 of 40 CFR part 60) for subsequent semi-annual compliance demonstrations.** The Method 22 test is successful if no VE are observed for 90 percent of the readings over the furnace cycle (tap to tap) or 60 minutes, whichever is longer. If VE are observed greater than 10 percent of the time over the furnace cycle or 60 minutes, whichever is longer, then the facility must conduct another test as soon as possible, but no later than 15 calendar days after the Method 22 test using Method 9 (appendix A–4 of 40 CFR part 60) as specified in paragraph (c)(1) of this section.

Table 3-3d
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
MACT Subpart YYYYYY - NESHAPS for Area Sources: Ferroalloys Production Facilities
Applicable Notification, Reporting and Recordkeeping

§ 63.11529 What are the Notification, Reporing, and Recordkeeping Requirements?

Notifications

(a) **Initial notification.** You must submit the Initial Notification required by §63.9(b)(2) of the General Provisions **no later than 120 days after the date of publication of this final rule** in theFederal Register.The Initial Notification must include the information specified in §63.9(b)(2)(i) through (b)(2)(iv).

(b) **Notification of compliance status**. You must submit a Notification of Compliance Status in accordance with §63.9(h) of the General Provisions **before the close of business on the 30th day following the completion of the initial compliance demonstration**. This notification must include the following:

(1) The results of Method 22 (appendix A–7 of 40 CFR part 60) test for VE as required by §63.11528(a);

(2) If you have installed a bag leak detection system, documentation that the system satisfies the design requirements specified in §63.11527(a)(3) and that you have prepared a site-specific monitoring plan that meets the requirements specified in §63.11527(a)(5);

(3) The results of the Method 9 (appendix A–4 of 40 CFR part 60) test for building opacity as required by §63.11528(a).

Reporting

(c) **Annual compliance certification**. If you own or operate an affected source, you must submit an annual certification of compliance according to paragraphs (c)(1) through (c)(4) of this section.

(1) The results of any daily or weekly visual monitoring events required by §63.11527(a)(1) and (b)(1), alarm-based visual monitoring at sources equipped with bag leak detection systems as required by §63.11527(a)(4), or readings outside of the operating range at sources using CPMS on wet scrubbers required by §63.11527(b)(4).

(2) The results of the follow up Method 22 (appendix A–7 of 40 CFR part 60) tests that are required if VE are observed during the daily or weekly visual monitoring, alarm-based visual monitoring, or out-of-range operating readings as described in paragraph (c)(1) of this section.

(3) The results of the Method 22 (appendix A–7 of 40 CFR part 60) or Method 9 (appendix A–4 of 40 CFR part 60) tests required by §63.11528(b) and (c), respectively.

(4) If you operate a bag leak detection system for a fabric filter or a CPMS for a wet scrubber, submit annual reports according to the requirements in §63.10(e) and include summary information on the number, duration, and cause (including unknown cause, if applicable) for monitor downtime incidents (other than downtime associated with zero and span or other calibration checks, if applicable).

Recordkeeping

(d) You must keep the records specified in paragraphs (d)(1) through (d)(2) of this section.

(1) As required in §63.10(b)(2)(xiv), you must keep a **copy of each notification that you submitted** to comply with this subpart and **all documentation supporting any Initial Notification, Notification of Compliance Status, and annual compliance certifications** that you submitted.

(2) You must keep the records of **all daily or weekly visual, Method 22** (appendix A–7 of 40 CFR part 60), and **Method 9** (appendix A–4 of 40 CFR part 60) **monitoring data** required by §63.11527 and the information identified in paragraphs (d)(2)(i) through (d)(2)(v) of this section.

(i) The date, place, and time of the monitoring event;

(ii) Person conducting the monitoring;

(iii) Technique or method used;

(iv) Operating conditions during the activity; and

(v) Results, including the date, time, and duration of the period from the time the monitoring indicated a problem (e.g., VE) to the time that monitoring indicated proper operation.

(e) Your records must be in a form suitable and readily available for expeditious review, according to §63.10(b)(1).

(f) As specified in §63.10(b)(1), you must **keep each record for 5 years following the date of each recorded action.**

(g) You must **keep each record onsite for at least 2 years after the date of each recorded** action according to §63.10(b)(1). You **may keep the records offsite for the remaining 3 years.**

Table 3-4A

Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
List of Applicable and Non-Applicable State Air Pollution Regulations

APC-S-1 **Air Emission Regulations for the Prevention, Abatement and Control of Air Contaminants**

Section 1.	General
Section 2.	Definitions
Section 3.	**Specific Criteria for Sources of Particulate Matter**
Section 4.	**Specific Criteria for Sources of Sulfur Compounds**
Section 5.	Specific Criteria for Sources of Chemical Emissions
Section 6.	**New Sources**
Section 7.	Exceptions
Section 8.	**Provisions for Hazardous Air Pollutants**
Section 9.	Stack Height Considerations
Section 10.	Provisions for Upsets, Startups and Shutdowns
Section 11.	Severability
Section 12.	Provisions for Existing Hospital/Medical/Infectious Waste Incinerators
Section 13.	Provisions for Existing Commercial and Industrial Solid Waste Incineration Units
Section 14.	Provisions for the Clean Air Interstate Rule

APC-S-2 **Permit Regulations for the Construction and/or Operation of Air Emissions Equipment**

I	**General Requirements (Subpart D "Permitting Requirements")**
II	General Standards Applicable to All Permits
III	Application for Permit to Construct and State Permit to Operate New Stationary Source
IV	Public Participation and Public Availability of Information
V	Application Review
VI	Compliance Testing
VII	Emissions Evaluation Report
VIII	Procedures on Renewal of State Permit to Operate
IX	Reporting and Recordkeeping
X	Emission Reduction Schedule
XI	General Permits
XII	Multi-Media Permits
XIII	Exclusions

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Table 3-4A

Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
List of Applicable and Non-Applicable State Air Pollution Regulations

XIV	CAFOs
XV	Options
XVI	Permit Transfer
XVII	Severability

APC-S-3 Mississippi Regulations for the Prevention of Air Pollution Emergency Episodes

Section 1.	General
Section 2.	Definitions
Section 3.	Episode Criteria
Section 4.	Emission Control Action Programs
Section 5.	Emergency Orders
APC-S-3	Mississippi Regulations for the Prevention of Air Pollution Emergency Episodes

APC-S-4 Mississippi Ambient Air Quality Standards

	Mississippi Ambient Air Quality Standards

APC-S-5 Mississippi Regulations for the Prevention of Significant Deterioration of Air Quality

	Mississippi Regulations for the Prevention of Significant Deterioration of Air Quality

APC-S-6 Air Emissions Operating Permit Regulations for the Purposes of Title IV of the Federal Clean Air Act

I	General Requirements
II	Permit Applications
III	Permit Content
IV	Permit Issuance(s), Renewal(s), Reopening(s) and Revision(s)
V	Permit Review by EPA and Affected State(s)
VI	Permit Fees
VII	Insignificant Activities and Emissions

APC-S-7 Acid Rain Program Permit Regulations for Purposes of Title IV of the Federal Clean Air Act

	Acid Rain Program Permit Regulations for Purposes of Title IV of the Federal Clean Air Act

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Table 3-4A

Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
List of Applicable and Non-Applicable State Air Pollution Regulations

APC-S-8 **Air Toxics Regulations**

I	**Requirements for Control Technology Determination for Major Sources in Accordance with Clean Air Act Section 112(g)**
II	**Chemical Accident Prevention Provisions**

APC-S-9 **Regulations for Lead-Based Paint Activities**

	General Scope and Applicability
	Definitions
Chapter 1.	**Accreditation of Training Programs**
Chapter 2.	**Certification of Individuals and Firms Engaged in Lead-Based Paint Activities**
Chapter 3.	**Work Practice Standards for Conducting Lead-Based Paint Activities**
Chapter 4.	**Compliance Monitoring and Enforcement**

APC-S-10 **Regulations for Accreditation and Certification of Asbestos Abatement Personnel**

	Regulations for Accreditation and Certification of Asbestos Abatement Personnel

Notes:

Shaded items identify those State air regulations that contain emission standards or limits, monitoring or testing requirements, or other relevant requirements that are intended to protect human health and welfare and have been determined to be applicable to MS Silicon's proposed silicon manufacturing facility in Burnsville, Mississippi. Refer to discussion on applicability and compliance in Section 3 of this application.

Non-shaded regulations have been determined to be not applicable (do not contain any specific emission limitations, monitoring, recordkeeping, testing or reporting requirements) to MS Silicon's proposed silicon manufacturing facility in Burnsville, Mississippi.

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Pollutant

Particulate Matter (PM)

1. Smoke

(a) No person shall cause, permit, or allow the emission of smoke from a point source into the open air from any manufacturing, industrial, commercial or waste disposal process which exceeds forty (40) percent opacity subject to the exceptions provided in (b) & (c).

(b) Startup operations may produce emissions which exceed 40% opacity for up to fifteen (15) minutes per startup in any one hour and not to exceed three (3) startups per stack in any twenty-four (24) hour period.

2. Equivalent Opacity

Equivalent Opacity. No person shall cause, allow, or permit the discharge into the ambient air from any point source or emissions, any air contaminant of such opacity as to obscure an observer's view to a degree in excess of 40% opacity, equivalent to that provided in Section 3.1(a). This shall not apply to vision obscuration caused by uncombined water droplets.

3. General Nuisances

General Nuisances. No person shall cause, permit, or allow the emission of particles, or any contaminants in sufficient amounts or of such duration from any process as to be injurious to humans, animals, plants, or property, or to be a public nuisance, or create a condition of air pollution.

(a) No person shall cause or permit the handling or transporting or storage of any material in a manner which allows or may allow unnecessary amounts of particulate matter to become airborne.

(b) When dust, fumes, gases, mist, odorous matter, vapors, or any combination thereof escape from a building or equipment in such a manner and amount as to cause a nuisance to property other than that from which it originated or to violate any other provision of this regulation, the Commission may order such corrected in a way that all air and gases or air and gasborne material leaving the building or equipment are controlled or removed prior to discharge to the open air.

4. Fuel Burning

(a) Fossil Fuel Burning. The maximum permissible emission of ash and/or particulate matter from fossil fuel burning installations shall be limited as follows:

(1) Emissions from installations of less than 10 million BTU per hour heat input shall not exceed 0.6 pounds per million BTU per hour heat input.

(2) Emissions from installations equal to or greater than 10 million BTU per hour heat input but less than 10,000 million BTU per hour heat input shall not exceed an emission rate as determined by the relationship

$E = 0.8808 * I^{-0.1667}$

where E is the emission rate in pounds per million BTU per hour heat input and I is the heat input in millions of BTU per hour.

(3) Emissions from installations equal to or greater than 10,000 million BTU per hour heat input shall not exceed 0.19 pounds per million BTU per hour heat input.

6. Manufacturing Process

(a) General. Except as otherwise specified, no person shall cause, permit, or allow the emission of particulate matter in total quantities in any one hour from any manufacturing process, which includes any associated stacks, vents, outlets, or combination thereof, to exceed the amount determined by the relationship

$E = 4.1\ p^{0.67}$

where E is the emission rate in pounds per hour and p is the process weight input rate in tons per hour.

Conveyor discharge of coarse solid matter may be allowed if no nuisance is created beyond the property boundary where the discharge occurs.

Pollutant
Sulfur Compounds (SO_2)
1. Sulfur Dioxide Emissions from Fuel Burning
(a) The maximum discharge of sulfur oxides from any fuel burning installation in which the fuel is burned primarily to produce heat or power by indirect heat transfer shall not exceed 4.8 pounds (measured as sulfur dioxide) per million BTU heat input. (b) No person shall cause or permit the burning of fuel in any fuel burning equipment that results in an average emission of sulfur dioxide from any calendar year at a rate greater than was emitted by said fuel burning equipment for the corresponding calendar year 1970 unless otherwise authorized by the Commission. Installations under construction on January 25, 1972, are excluded from this requirement. (c) The maximum discharge of sulfur dioxide from any modified fuel burning unit whose generation capacity is less than 250 million BTU per hour and in which the fuel is burned primarily to produce heat or power by indirect heat transfer shall not exceed 2.4 pounds (measured as sulfur dioxide) per million BTU heat input. For the purposes of Section 4 of these regulations only, "modification" shall mean any physical change in an Air Contaminant Source which increases the amount of any air pollutant (to which a standard applies) emitted by such source or which results in the emission of any air pollutant (to which a standard applies) not previously emitted.
2. Sulfur Dioxide Emissions from Processes
(a) Except as otherwise provided herein, no person shall cause or permit the emission of gas containing sulfur oxides (measured as sulfur dioxide) in excess of 2,000 ppm (volume) from any process equipment in existence on January 25, 1972, or in excess of 500 ppm (volume) from any process equipment constructed after January 25, 1972. The 500 ppm (volume) requirement shall apply for equipment constructed after January 25, 1972 unless otherwise provided by the Commission.

Table 3-5a
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
List of 28 Designated Source Categories for PSD Permitting

PSD Listed Source Category	PSD Tons/Year Threshold*	Applicable to the Proposed Callsolar Project?**
Fossil Fuel-Fired Steam Electric Plants of More Than 250 Million Btu/hr Heat Input	100	No
Coal Cleaning Plants (with Thermal Dryers)	100	No
Kraft Pulp Mills	100	No
Portland Cement Plants	100	No
Primary Zinc Smelters	100	No
Iron and Steel Mill Plants	100	No
Primary Aluminum Ore Reduction Plants	100	No
Primary Copper Smelters	100	No
Municipal Incinerators Capable of Charging More Than 250 Tons of Refuse Per Day	100	No
Hydrofluoric Acid Plants	100	No
Sulfuric Acid Plants	100	No
Nitric Acid Plants	100	No
Petroleum Refineries	100	No
Lime Plants	100	No
Phosphate Rock Processing Plants	100	No
Coke Oven Batteries	100	No
Sulfur Recovery Plants	100	No
Carbon Black Plants	100	No
Primary Lead Smelters	100	No
Fuel Conversion Plants	100	No
Sintering Plants	100	No
Secondary Metal Production Plants	100	No
Chemical Process Plants	100	No
Fossil Fuel Boilers (or Combinations Thereof) Totaling More Than 250 Million Btu/hr Heat Input	100	No
Petroleum Storage and Transfer Units with a Total Storage Capacity Exceeding 300,000 Barrels	100	No
Taconite Ore Processing Plants	100	No
Glass Fiber Processing Plants	100	No
Charcoal Production Plants	100	No

*Please be aware that any other source which has the potential to emit 250 tons per year of any regulated pollutant is subject to PSD major source regulations regardless of the sources manufacturing operations.

**The proposed MS Silicon silicon manufacturing plant is not one of the 28 designated source categories thus is subject to the 250 tons/year PSD applicability threshold.

Table 3-5b
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
PSD Significant Emission Rates

Pollutant	PSD Significant Emission Rates (tons/year)
Carbon Monoxide (CO)	100
Nitrogen Dioxide (NO_x)	40
Particulate Matter (PM)	25
Particulate Matter (PM_{10})	15
Particulate Matter ($PM_{2.5}$)	10
Volatile Organic Compounds (VOC)	40
Sulfur Dioxide (SO_2)	40
Lead	0.6
Fluorides	3
Sulfuric Acid Mist	7
Hydrogen Sulfide (H_2S)	10
Total Reduced Sulfur (Including H_2S)	10
Reduced Sulfur Compounds (Including H_2S)	10
Greenhouse Gases (GHG)	CO_2e - 75,000

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Table 3-6
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary Standards		Primary Standards	
	Level	Averaging Time	Level	Averaging Time
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour [1]	None	
	35 ppm (40 mg/m^3)	1-hour [1]		
Lead	0.15 µg/m^3 [2]	Rolling 3-Month Average	Same as Primary	
Nitrogen Dioxide	53 ppb [3]	Annual (Arithmetic Average)	Same as Primary	
	100 ppb	1-hour [4]	None	
Particulate Matter (PM_{10})	150 µg/m^3	24-hour [5]	Same as Primary	
Particulate Matter ($PM_{2.5}$)	15.0 µg/m^3	Annual [6] (Arithmetic Average)	Same as Primary	
	35 µg/m^3	24-hour [7]	Same as Primary	
Ozone	0.075 ppm (2008 std)	8-hour [8]	Same as Primary	
	0.08 ppm (1997 std)	8-hour [9]	Same as Primary	
	0.12 ppm	1-hour [10]	Same as Primary	
Sulfur Dioxide	0.03 ppm [11] (1971 std)	Annual (Arithmetic Average)	0.5 ppm	3-hour [1]
	0.14 ppm [11] (1971 std)	24-hour [1]		
	75 ppb [12]	1-hour	None	

(1) Not to be exceeded more than once per year.

(2)Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

(3) The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

(4) To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective January 22, 2010).

(5) Not to be exceeded more than once per year on average over 3 years.

(6) To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.

(7) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3 (effective December 17, 2006).

(8) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008).

(9) (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
(b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
(c) EPA is in the process of reconsidering these standards (set in March 2008).

(10) (a) EPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").
(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is < 1.

(11) The 1971 sulfur dioxide standards remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

(12) Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

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Table 3-7
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
List of Federally Regulated Hazardous Air Pollutants

CAS Number	Chemical Name
75070	Acetaldehyde
60355	Acetamide
75058	Acetonitrile
98862	Acetophenone
53963	2-Acetylaminofluorene
107028	Acrolein
79061	Acrylamide
79107	Acrylic acid
107131	Acrylonitrile
107051	Allyl chloride
92671	4-Aminobiphenyl
62533	Aniline
90040	o-Anisidine
1332214	Asbestos
71432	Benzene (including benzene from gasoline)
92875	Benzidine
98077	Benzotrichloride
100447	Benzyl chloride
92524	Biphenyl
117817	Bis(2-ethylhexyl)phthalate (DEHP)
542881	Bis(chloromethyl)ether
75252	Bromoform
106990	1,3-Butadiene
156627	Calcium cyanamide
105602	Caprolactam(See Modification)
133062	Captan
63252	Carbaryl
75150	Carbon disulfide
56235	Carbon tetrachloride
463581	Carbonyl sulfide
120809	Catechol
133904	Chloramben
57749	Chlordane
7782505	Chlorine
79118	Chloroacetic acid
532274	2-Chloroacetophenone
108907	Chlorobenzene
510156	Chlorobenzilate
67663	Chloroform
107302	Chloromethyl methyl ether
126998	Chloroprene
1319773	Cresols/Cresylic acid (isomers and mixture)
95487	o-Cresol
108394	m-Cresol
106445	p-Cresol
98828	Cumene
94757	2,4-D, salts and esters
3547044	DDE
334883	Diazomethane
132649	Dibenzofurans
96128	1,2-Dibromo-3-chloropropane
84742	Dibutylphthalate
106467	1,4-Dichlorobenzene(p)
91941	3,3-Dichlorobenzidene
111444	Dichloroethyl ether (Bis(2-chloroethyl)ether)
542756	1,3-Dichloropropene

CAS Number	Chemical Name
302012	Hydrazine
7647010	Hydrochloric acid
7664393	Hydrogen fluoride (Hydrofluoric acid)
7783064	Hydrogen sulfide(See Modification)
123319	Hydroquinone
78591	Isophorone
58899	Lindane (all isomers)
108316	Maleic anhydride
67561	Methanol
72435	Methoxychlor
74839	Methyl bromide (Bromomethane)
74873	Methyl chloride (Chloromethane)
71556	Methyl chloroform (1,1,1-Trichloroethane)
78933	Methyl ethyl ketone (2-Butanone)(See Modification)
60344	Methyl hydrazine
74884	Methyl iodide (Iodomethane)
108101	Methyl isobutyl ketone (Hexone)
624839	Methyl isocyanate
80626	Methyl methacrylate
1634044	Methyl tert butyl ether
101144	4,4-Methylene bis(2-chloroaniline)
75092	Methylene chloride (Dichloromethane)
101688	Methylene diphenyl diisocyanate (MDI)
101779	4,4'-Methylenedianiline
91203	Naphthalene
98953	Nitrobenzene
92933	4-Nitrobiphenyl
100027	4-Nitrophenol
79469	2-Nitropropane
684935	N-Nitroso-N-methylurea
62759	N-Nitrosodimethylamine
59892	N-Nitrosomorpholine
56382	Parathion
82688	Pentachloronitrobenzene (Quintobenzene)
87865	Pentachlorophenol
108952	Phenol
106503	p-Phenylenediamine
75445	Phosgene
7803512	Phosphine
7723140	Phosphorus
85449	Phthalic anhydride
1336363	Polychlorinated biphenyls (Aroclors)
1120714	1,3-Propane sultone
57578	beta-Propiolactone
123386	Propionaldehyde
114261	Propoxur (Baygon)
78875	Propylene dichloride (1,2-Dichloropropane)
75569	Propylene oxide
75558	1,2-Propylenimine (2-Methyl aziridine)
91225	Quinoline
106514	Quinone
100425	Styrene
96093	Styrene oxide
1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin
79345	1,1,2,2-Tetrachloroethane
127184	Tetrachloroethylene (Perchloroethylene)

Table 3-7
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
List of Federally Regulated Hazardous Air Pollutants

CAS Number	Chemical Name
62737	Dichlorvos
111422	Diethanolamine
121697	N,N-Diethyl aniline (N,N-Dimethylaniline)
64675	Diethyl sulfate
119904	3,3-Dimethoxybenzidine
60117	Dimethyl aminoazobenzene
119937	3,3'-Dimethyl benzidine
79447	Dimethyl carbamoyl chloride
68122	Dimethyl formamide
57147	1,1-Dimethyl hydrazine
131113	Dimethyl phthalate
77781	Dimethyl sulfate
534521	4,6-Dinitro-o-cresol, and salts
51285	2,4-Dinitrophenol
121142	2,4-Dinitrotoluene
123911	1,4-Dioxane (1,4-Diethyleneoxide)
122667	1,2-Diphenylhydrazine
106898	Epichlorohydrin (l-Chloro-2,3-epoxypropane)
106887	1,2-Epoxybutane
140885	Ethyl acrylate
100414	Ethyl benzene
51796	Ethyl carbamate (Urethane)
75003	Ethyl chloride (Chloroethane)
106934	Ethylene dibromide (Dibromoethane)
107062	Ethylene dichloride (1,2-Dichloroethane)
107211	Ethylene glycol
151564	Ethylene imine (Aziridine)
75218	Ethylene oxide
96457	Ethylene thiourea
75343	Ethylidene dichloride (1,1-Dichloroethane)
50000	Formaldehyde
76448	Heptachlor
118741	Hexachlorobenzene
87683	Hexachlorobutadiene
77474	Hexachlorocyclopentadiene
67721	Hexachloroethane
822060	Hexamethylene-1,6-diisocyanate
680319	Hexamethylphosphoramide
110543	Hexane

CAS Number	Chemical Name
7550450	Titanium tetrachloride
108883	Toluene
95807	2,4-Toluene diamine
584849	2,4-Toluene diisocyanate
95534	o-Toluidine
8001352	Toxaphene (chlorinated camphene)
120821	1,2,4-Trichlorobenzene
79005	1,1,2-Trichloroethane
79016	Trichloroethylene
95954	2,4,5-Trichlorophenol
88062	2,4,6-Trichlorophenol
121448	Triethylamine
1582098	Trifluralin
540841	2,2,4-Trimethylpentane
108054	Vinyl acetate
593602	Vinyl bromide
75014	Vinyl chloride
75354	Vinylidene chloride (1,1-Dichloroethylene)
1330207	Xylenes (isomers and mixture)
95476	o-Xylenes
108383	m-Xylenes
106423	p-Xylenes
0	Antimony Compounds
0	Arsenic Compounds (inorganic including arsine)
0	Beryllium Compounds
0	Cadmium Compounds
0	Chromium Compounds
0	Cobalt Compounds
0	Coke Oven Emissions
0	Cyanide Compounds1
0	Glycol ethers2
0	Lead Compounds
0	Manganese Compounds
0	Mercury Compounds
0	Fine mineral fibers3
0	Nickel Compounds
0	Polycylic Organic Matter4
0	Radionuclides (including radon)5
0	Selenium Compounds

*List of federally regulated HAPs taken from 112b - The Clean Air Act Amendments of 1990 List of Hazardous Air Pollutants. List currently contains 187 regulated HAPs. http://www.epa.gov/ttn/atw/orig189.html

NOTE: For all listings above which contain the word "compounds" and for glycol ethers, the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e., antimony, arsenic, etc.) as part of that chemical's infrastructure.

1. X'CN where X = H' or any other group where a formal dissociation may occur. For example KCN or Ca(CN)2

2. Includes mono- and di- ethers of ethylene glycol, diethylene glycol, and triethylene glycol R-(OCH2CH2)n -OR' where
n = 1, 2, or 3
R = alkyl or aryl groups
R' = R, H, or groups which, when removed, yield glycol ethers with the structure: R-(OCH2CH)n-OH. Polymers are excluded from the glycol category.(See Modification)

3. Includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less.

4. Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100 º C.

5. A type of atom which spontaneously undergoes radioactive decay.

Table 3-7b
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
List of Federally Regulated Hazardous Air Pollutants - Modifications

CAS Number	Regulated HAP	Modification
105602	Caprolactam	On July 19, 1993, EPA received a petition from AlliedSignal, Inc., BASF Corporation, and DSM Chemicals North America, Inc. to delete caprolactam (CAS No. 10S-60-2) from the hazardous air pollutant list in Section 112(b)(1), 42 U.S.C., Section 7412(b)(1). A Notice of Recipt was published (S8FR45081, August 26, 1993) noting that the data filed were adequate to support decision making. After a comprehensive review of the data submitted, the EPA published a proposal to delist caprolactam (60FR48081, September 18, 199S). In order to help address public concern,on March 13, 1995, EPA executed two detailed agreements with AlliedSignal concerning the Irmo, South Carolina manufacturing facility and another facility located in Chesterfield, Virginia, copies of which are included in the public docket for this rulemaking. AlliedSignal agreed that, if caprolactam was delisted pursuant to the proposal, AlliedSignal would install emissions controls which EPA believed would be equivalent to the controls which would have been required had EPA issued a standard to control these sources under Section 112. The agreed emissions controls are incorporated in federally enforceable operating permits for the affected facilities, and will be in place years earlier than controls would have otherwise been required. In addition, AlliedSignal has agreed to establish a citizen advisory panel concerning the Irmo facility in order to improve communications with the community and to assure that citizens have an ongoing role in implementation of the agreed emission reductions. The public requesting a public hearing. On November 28, 1995, the EPA published a notice of public hearing and an extention of the comment period (60FR58S89). After considering all public comments, the EPA published a final rule delisting caprolactam (61FR30816, June 18, 1996).
7783064	Hydrogen Sulfide	A clerical error led to the inadvertent addition of hydrogen sulfide to the Section 112(b) list of Hazardous Air Pollutants. However, a Joint Resolution to remove hydrogen sulfide from the Section 112(b)(1) list was passed by the Senate on August 1, 1991 (Congressional Record page S11799), and the House of Representatives on November 25, 1991 (Congressional Record pages H11217-H11219). The Joint Resolution was approved by the President on December 4, 1991. Hydrogen Sulfide is included in Section 112(r) and is subject to the accidental release provisions.
78933	Methyl ethyl ketone (2-Butanone)	On December 19, 2005 the Environmental Protection Agency removed methyl ethyl ketone (MEK) from the list of toxic air pollutants. The total number of listed air toxics is now 187. After extensive technical review and consideration of public comments, EPA concluded that potential exposures to MEK emitted from industrial processes may not reasonably be anticipated to cause human health or environmental problems. MEK is used as a solvent in the surface coatings industry, specifically in manufacturing vinyl lacquers, some lacquers and acrylics. Industries also use MEK for producing adhesives, magnetic tapes, printing inks, degreasing and cleaning fluids, as a dewaxing agent for lubricating oils and as an intermediate in the production of antioxidants and perfumes. Emissions of MEK will continue to be regulated as a volatile organic compound because of its contribution to the formation of ground-level ozone.
0	Glycol Ethers	On November 21, 2003 (68FR65648), the EPA proposed to remove the compound ethylene glycol monobutyl ether (EGBE) (2-Butoxyethanol) (Chemical Abstract Service (CAS) No. 111-76-2) from the group of glycol ethers. On November 29, 2004 (69FR69320) this proposal was made final. On January 12, 1999 (64FR1780), the EPA proposed to modify the definition of glycol ethers to exclude surfactant alcohol ethoxylates and their derivatives (SAED). On August 2, 2000 (65FR47342), the EPA published the final action. This action deletes each individual compound in a group called the surfactant alcohol ethoxylates and their derivatives (SAED) from the glycol ethers category in the list of hazardous air pollutants (HAP) established by section 112(b)(1) of the Clean Air Act (CAA). Under section 112(b)(3)(D) of the CAA, EPA may delete specific substances from certain listed categories, including glycol ethers. To implement this action, EPA is revising the definition of glycol ethers to exclude the deleted compounds. This action is also making conforming changes with respect to designation of hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). These final rules are being issued by EPA in response to an analysis of potential exposure and hazards of SAED that was prepared by the Soap and Detergent Association (SDA) and submitted to EPA. Based on this information, EPA has made a final determination that there are adequate data on the health and environmental effects of these substances to determine that emissions, ambient concentrations, bioaccumulation, or deposition of these substances may not reasonably be anticipated to cause adverse human health or environmental effects.

Notes:
Taken from Modifications To The 112(b)1 Hazardous Air Pollutants - http://www.epa.gov/ttn/atw/pollutants/atwsmod.html

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Section 4: Best Available Control Technology (BACT)

4.1 Background

4.1.1 Best Available Control Technology (BACT) Evaluation Process

The following section describes the process of evaluating and defining BACT for emissions of PM_{10}, $PM_{2.5}$, NO_2, CO, SO_2 and GHG associated with the proposed silicon metal manufacturing process. Any major stationary source or major modification subject to PSD must conduct an analysis to ensure the application of best available control technology (BACT). The requirement to conduct a BACT analysis and determination is set forth in section 165(a)(4) of the Clean Air Act (Act), in federal regulations at 40 CFR 52.21(j), in regulations setting forth the requirements for State implementation plan approval of a State PSD program at 40 CFR 51.166(j), and in the SIP's of the various States at 40 CFR Part 52, Subpart A - Subpart FFF.

4.1.2 Process Description

The proposed plant will consist of a silicon manufacturing plant. The silicon manufacturing process consists of the continuous reduction of quartz (SiO_2) into silicon by a reducing mixture according to the simplified relation:

$$SiO_2 + 2C \rightarrow Si + 2CO.$$

As components of the mixture, carbon in the form of mineral carbon, petroleum coke, and wood-chips can be used. The electric current runs through the electrode between the contact plates and the tip of the electrode causing the ignition of the electric arc with its extremely high temperatures (> 2000°C) necessary for the reduction of quartz into silicon. The silicon is then tapped from the bottom of the submerged arc furnace.

The following emission sources will be included in this BACT analysis:

- Silicon Manufacturing Process (as defined in AP 42, Fifth Edition, Volume I, Chapter 12.4: Metallurgical Industry, Ferroalloy Production):
    - Submerged Arc Furnaces - Smelting in an electric arc furnace is accomplished by conversion of electrical energy to heat. An alternating current applied to the electrodes causes' current to flow through the charge between the electrode tips. This provides a reaction zone at temperatures up to 2000°C (3632°F). The tip of each electrode changes polarity continuously as the alternating current flows between the tips. The carbonaceous material in the furnace charge reacts with oxygen in the metal oxides of the charge and reduces them to base metals. The reactions produce large quantities of carbon monoxide (CO) that passes upward through the furnace charge. Large amounts of carbon monoxide and organic materials also are emitted by submerged electric arc furnaces. Carbon monoxide is

formed as a byproduct of the chemical reaction between oxygen in the metal oxides of the charge and carbon contained in the reducing agent (coke, coal, etc.). Reduction gases containing organic compounds and carbon monoxide continuously rise from the high-temperature reaction zone, entraining fine particles and fume precursors. The mass weight of carbon monoxide produced sometimes exceeds that of the metallic product. The heat-induced fume consists of oxides of the products being produced and carbon from the reducing agent. The fume is enriched by silicon dioxide, calcium oxide, and magnesium oxide, if present in the charge.

- Natural Gas Fired Ladle Preheaters;
- Material Handling – Receiving, Material Handling, Storage and Truck Loadout – Includes the following materials:
  - Coal;
  - Wood; and
  - Quartz.
- Product Refining;
- Fugitive Emissions from Roadways; and
- Emergency Support Equipment.

4.1.3 Definition of BACT

The BACT requirement is defined as:

"an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under the Clean Air Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR Parts 60 and 61. If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results."

4.1.3.1 BACT Demonstration Approach

BACT by definition is the most effective control option which is technically feasible considering economic, energy, and other environmental impacts. Control options can be eliminated as BACT on a basis of technical, economic, energy, or environmental considerations. The determination of BACT follows a Top-Down approach. In the top-down approach, progressively less stringent control technologies are analyzed until a level of control considered BACT is reached on the basis of environmental, energy and economic impacts. The key steps in the Top-Down process are as follows:

STEP 1: Identify Available Control Technologies: For the source, emissions unit, activity, or process requiring BACT, identify and list all "available" emissions control options for each pollutant. Available control options are those control technologies and techniques with a practical potential for application to the source, emissions unit, activity, or process. In general, any control option in commercial use in the United States at the time the analysis is performed should be included on the list of available control options.

STEP 2: Eliminate Technically Infeasible Options: Considering site-specific factors and constraints, remove from the list compiled in STEP 1 all technically infeasible control options. A control option can be considered as technically infeasible if technical difficulties such as physical, chemical, or engineering constraints would preclude the successful use of the control option in the particular application in question. For all control options eliminated, demonstration that a control option is technically infeasible should be clearly documented in the BACT Analysis and included with the BACT submittal.

STEP 3: Rank Remaining Control Technologies by Control Effectiveness: Rank and list all remaining control options in order of control effectiveness with the most effective control alternative at the top of the list. As noted above, the control technologies to be evaluated and ranked will apply to those associated with controlling emissions from similar emission sources.

STEP 4: Energy, Environmental, and Economic Considerations: Using the "Top Down" procedure specified below, control options may be eliminated as BACT candidates on the basis of energy, environmental, and economic impacts of the option. Energy impacts include but are not limited to energy efficiency impacts, fuel cycle efficiency considerations, and fuel availability. Environmental impacts include but are not limited to ground water and water impacts, solid and hazardous waste impacts, and air quality impacts from increases in emissions of other air pollutants that result from implementing the control option. Economic impacts include the sum of up-front capital cost and annual operation and maintenance costs of implementing the control option.

A control option may be eliminated as a BACT candidate on grounds of significant energy, environmental, or economic impacts. Rationale for eliminating a control option should be well documented and included in the analysis. Economic impacts should be evaluated by comparing the cost effectiveness of the control option with generally acceptable cost effectiveness ranges for control of the particular pollutant in question.

The Top Down process is defined in Steps 4A through 4E below:

- **STEP 4.A:** Start with the most effective control option from the list compiled in STEP 3 (i.e., those associated with controlling emissions from similar emission units.
- **STEP 4.B:** Provide the information specified in items (a) through (g) below for the control option being considered.

  a. **Control Efficiency:** Enter the percent of the pollutant removed by the control option. Control efficiency should be calculated based on the control achieved from the control option in question only.

  b. **Potential Emissions:** Potential emissions in pounds of pollutant per hour and tons of pollutant per year should be calculated based on the maximum potential to emit rather than actual emissions. Potential emissions represent the maximum capacity of a source, emissions unit, process, or activity to emit an air pollutant under physical constraints considering air pollutant emission controls and applicable regulatory limits. Operational factors such as hours of operation or partial loading which influence emissions may be included as constraints which limit the potential to emit provided that the project proponent agrees to incorporate these constraints in enforceable regulatory compliance limits.

  c. **Expected Emissions:** Expected emissions in tons of pollutant per year should be calculated considering expected operational considerations such as down time for maintenance, periods of partial load, capacity factors, etc.

  d. **Annual Expected Emission Reduction:** Using the expected emission rate computed in "c" and control efficiency entered in "a", compute the expected annual emission reduction in tons per year.

  e. **Annual Cost of Control Option:** Compute the annual cost of the control option using standard economic principles. Annual cost should include both the initial capital costs as well as operation and maintenance costs. All costs should be amortized over the expected life of the control option (default is ten years). Include in the analysis the calculations, assumptions, and economic parameters used in the calculations.

  f. **Cost Effectiveness:** Cost effectiveness is the ratio of the annual cost computed in "e" to the annual expected emission reduction computed in "d".

  g. **Other Considerations:** List all other media impacts (water, solid waste, etc.) and energy impacts which are associated with the control option.

- **STEP 4.C:** If there are no outstanding issues regarding energy, environmental and economic impacts the analysis is ended and this control option is proposed as BACT.
- **STEP 4.D:** In the event that the control option is determined to be inappropriate due to energy, environmental, or economic impacts, this control option is eliminated and the analysis proceeds to the next control option on the list. Rationale for elimination of a control option on grounds of significant energy, environmental or economic impacts should be well documented and included with the analysis.
- **STEP 4.E:** Go to STEP 4.B and proceed with the analysis for the next control option on the list.

STEP 5: Documentation: Include with the analysis all information, calculations, assumptions, and data used in making the BACT determination.

Since MS Silicon has selected the "Top-Level" of control or design with inherent control technique, taking into account any technical limitations, the BACT evaluation that follows does not address economic, energy and environmental impacts related to a specific control device. This follows EPA's suggested approach for performing this type of BACT evaluation.

4.2 Best Available Control Technology (BACT) Analysis - Emissions of Greenhouse Gases (GHG)

This evaluation follows the guidance developed by USEPA during 2010 under the Tailoring Rule. Under this rule, any project occurring after July 1, 2011 and having a net increase of equal to or greater than 75,000 tons/year of CO_2 on an equivalence basis triggers a BACT evaluation. As defined in USEPA's document entitled "PSD and Title V Permitting Guidance for Greenhouse Gases", dated March 2011, the BACT evaluation process is required to include five (5) steps. These steps are essentially those steps that make up the Top-Down evaluation process.

This BACT evaluation focused on the control technologies that have been demonstrated and commercially available for equipment associated with silicon production. Because of the importance of controlling GHG emissions, MS Silicon evaluated technologies that have been demonstrated on similar processes so that emissions of GHG will be controlled to the levels specified. Technologies or concepts for controlling GHG emissions are and will continue to emerge on paper and on a trial basis. Since these technologies have not been proven to be reliable (i.e., demonstrated technologies), evaluation of these technologies are not being addressed in this BACT evaluation. MS Silicon is very reluctant to install a non-proven technology that may require significant on-site adjustments, while at the same time not meeting required GHG emission limits.

4.2.1 GHG Emission Sources Subject to Control Technology Evaluation

The following GHG emission sources are present at silicon manufacturing operations:

- Semi-Enclosed Submerged Arc Furnaces (AA-201);
- Natural Gas Combustion Equipment (AA-202); and
- Emergency Equipment (AA-501).

For a summary of the estimated GHG emission rates for the sources identified above, please refer to the following table.

GHG Emission Rates for Sources Evaluated for BACT

Equipment Description	GHG CO_2e Emission Rate (tons/year)
AA-201 - Semi-Enclosed Submerged Arc Furnaces (4 SAFs)	381,866
AA-202 - Natural Gas Combustion Equipment	20,499
AA-501 - Emergency Generator	32
TOTAL	402,397

A summary of the BACT determinations for GHG emissions is presented in Table 4-1.

4.2.2 BACT Analysis for GHG Emissions from Silicon Manufacturing

The production of ferroalloys results in emission of greenhouse gases. In ferroalloy production, raw ore, carbon materials and slag forming materials are mixed and heated to carbon sources. While CO_2 is the main greenhouse gas from ferroalloy production, recent research has shown that CH_4 and N_2O account for an equivalent greenhouse gas emission of up to 5 % of the CO_2 emissions from ferrosilicon (FeSi) and silicon-metal (Si-metal) production.[1]

The most significant greenhouse gas (GHG) emissions are related to the generation of carbon dioxide during the chemical reactions occurring in the metallurgical furnaces, where carbon is used to reduce the quartz to silicon metal. The second source of CO_2 emissions in silicon metal production comes from the use of natural gas in combustion processes. **The use of emergency equipment is limited to 100 hours per year and generates an insignificant amount of GHG and thus will not be included in this BACT analysis.**

4.2.3 BACT Analysis for GHG Emissions from Semi-Enclosed Submerged Arc Furnaces (AA-201)

Step One - Identify Available GHG Control Technologies

The first step of the Top-Down BACT analysis is to assess the proposed emission reduction options. The sources of information on emission reduction options vary for the air emission sources being analyzed. The following information resources were consulted in searching for the alternatives available for

[1] Greenhouse Gas Emissions from Ferroalloy Production. T. Lindstad, S.E. Olsen, G. Tranell, T. Færden and J. Lubetsky, 2007

controlling GHG emissions from semi-enclosed submerged arc furnaces used in silicon production operations:

1. On-line USEPA Control Technology Database;
2. State Air Quality Permits; and
3. Control Technology Vendors.

Review of the above sources did not identify information on controlling GHG emissions from the semi-enclosed submerged arc furnaces used in silicon production processes. In electric arc furnaces, electrical resistance generates the heat required: the resistance in a SAF furnace is the atmosphere, while in a submerged-arc furnace the slag or charge forms the resistance. No control options for emissions from the SAF were identified in this review.

The possible control options that will be evaluated have been divided into two (2) distinct areas; 1) energy efficiency improvement options, and 2) add-on controls. The application of methods, systems, or techniques to increase energy efficiency is a key GHG-reducing opportunity. Use of inherently lower-emitting technologies, including energy efficiency measures, represents an opportunity for GHG reductions. While energy efficiency can reduce emissions of all combustion-related emissions, it is a particularly important consideration for GHGs since the use of add-on controls to reduce GHG emissions is not as well advanced as it is for most combustion-derived pollutants.

Opportunities to further improve energy efficiency from electric arc furnaces in general are described below[2].

Control Measure	Description	Discussion
Improved Process Control	Process control can optimize operations and thereby significantly reduce electricity consumption. Control and monitoring systems for SAF are moving towards integration of real-time monitoring of process variables	This control measure is feasible and will be included in the SAF design.
Adjustable Speed Drives	As flue gas flow varies over time, adjustable speed drives offer opportunities to operate dust collection fans in a more energy efficient manner.	This control measure is feasible and will be included in the SAF design.
Transformer Efficiency—Ultra-High–Power	Ultra-high–power (UHP) transformers help to reduce energy loss and increase productivity. Location of the furnace transformers minimizing the length of the HV	This control measure is feasible and will be included in the SAF design.

[2] Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from the Iron and Steel Industry

Control Measure	Description	Discussion
Transformers	cables, less power losses.	
Post-Combustion of the Flue Gases	Post-combustion is a process for utilizing the chemical energy in the CO and hydrogen evolving to heat the SAF ladle or to preheat other materials 570-1,470°F (300-800°C). It reduces electrical energy requirements and increases the productivity of the SAF.	This control measure is not applicable to the silicon metal production process. There are no post combustion processes for silicon metal. This control measure will be excluded from further consideration in this BACT analysis.
Direct Current Arc Furnace	The direct current (DC) arc furnace was pioneered in Europe, and these single-electrode furnaces have recently been commercialized in North America. The DC arc furnaces use DC rather than alternating current (AC). In a DC furnace one single electrode is used, and the bottom of the vessel serves as the anode. However, compared to new AC furnaces, the savings are limited.	This technology is feasible but the technology has been only tested on an experimental scale with poor results. Direct current arc furnaces have never been performed on a large scale for silicon metal production. This control measure will be excluded from further consideration in this BACT analysis.
Engineered Refractories	Refractories in SAF have to withstand extreme conditions such as temperatures over 2,900°F (1,600°C), oxidation, thermal shock, erosion and corrosion. Refractories can be provided by a controlled microstructure: alumina particles and mullite microballoons coated uniformly with carbon and carbides.	This control measure is feasible and will be included in the SAF design.
Airtight Operation	A large amount of air enters the SAF: around 1,000,000 ft^3 (30,000 m^3) in a standard SAF. This air is at ambient temperature, and the air's nitrogen and non-reactive oxygen are heated in the furnace and exit losses. The potential benefit for an industrial furnace with an airtight process including a post combustion practice and an efficient fume exhaust control are about 100 kWh/ton for an industrial furnace having a current electric consumption of 450 kWh/ton.	The furnace is semi-closed. In order to charge the furnace with the raw materials and place them in the proper position, the furnace doors will need to be open in order to "push the raw materials" using the "stoking machine" into place. Doors will be closed when not needed.
Flue Gas Monitoring and Control	The use of VSDs can reduce energy usage of the flue gas fans, which in turn reduces the losses in the flue gas.	This control measure is feasible and will be included in the SAF design.

Control Measure	Description	Discussion
Bottom Tapping	Bottom tapping leads to slag-free tapping, shorter tap-to-tap times, reduced refractory and electrode consumption, and improved ladle life	This control measure is feasible and will be included in the SAF design.
Carbon Capture and Storage	Carbon capture and storage involves separation and capture of CO_2 from the flue gas, pressurization of the captured CO_2, transportation of the CO_2 via pipeline, and finally injection and long-term geologic storage of the captured CO_2. Several different technologies, at varying stages of development, have the potential to separate and capture CO_2. Some have been demonstrated at the slip-stream or pilot-scale, while many others are still at the bench-top or laboratory stage of development	See below.

Step Two – Eliminate Technically Infeasible Control Options

All of the control options identified under Step 1 with the exception of Direct Current Arc Furnace, Post-Combustion of the Flue Gases, and Carbon Capture and Storage are technically feasible and will be included in this BACT evaluation.

Carbon capture and sequestration (CCS) has not been applied to SAFs in the past and has not been demonstrated in practice for these emission types. CCS is generally used for facilities with sources emitting CO_2 in large amounts, such as fossil fuel-fired power plants, and for industrial facilities with high-purity CO_2 streams.

CCS involves capturing CO_2, transporting it as necessary, and permanently storing it instead of releasing it into the atmosphere. The process involves three main steps:

- Capturing CO_2 at its source by separating it from other gases produced by an industrial process. Once CO_2 is separated and captured, it then can be compressed under high pressure for transport to an appropriate geological storage site;
- Transporting the captured CO_2 to a suitable storage location (typically in compressed form); and
- Storing the CO_2 away from the atmosphere for a long period of time, for instance in underground geological formations, in the deep ocean, or within certain mineral formations.

The process of transporting CO_2 is typically considered via pipeline and has substantial associated logistic hurdles and operational penalties. Transportation infrastructure issues include pipeline routing, acquisition of rights-of-way, and associated environmental impacts. In addition, additional energy must be expended to compress and transport the compressed CO_2. An alternative means of transporting the

compressed CO_2 is via a ship, similar to transporting liquid natural gas. Again, there are similar logistic hurdles and operational penalties for transporting compressed CO_2 via ship that can be substantial.

Carbon sequestration usually involves the injection of CO_2 into deep geological formations of porous rock that are capped by one or more nonporous layers of rock. Injected at high pressure, the CO_2 exists as a liquid that flows through the porous rock to fill the voids. Saline formations, exhausted oil and gas fields, and unmineable coal seams are candidates for CO_2 storage. Also, CO_2 injected for enhanced oil recovery projects can result in long-term sequestration depending on the geologic conditions. Other schemes include liquid storage in the ocean, solid storage by reactions leading to the creation of carbonates, and terrestrial sequestration. This type of infrastructure does not exist at the proposed plant site.

Another important technical consideration is that carbon capture is simpler when CO_2 is produced in high purity and high concentration streams as the byproduct of certain industrial processes, such as natural gas processing, hydrogen production, and synthetic fuel production. In contrast, it is relatively more difficult to capture CO_2 from flue gas emissions, which may require the reengineering of certain established and reliable production techniques. Apart from the technical issues of cleaning such dirty gas streams so they are suitable for CCS, unlike power plants, where CO_2 concentrations are comparatively high and consistent, metallurgical operations have more dilute concentrations of CO_2, the off gas is dirty and difficult to handle, and CO_2 production varies widely depending on the process step.

In summary, CCS is excluded from this BACT evaluation for the following reasons:

- Installation and operate of CCS is not commercially available and has not been installed in conjunction with any SAF process installed and currently operating worldwide;
- Currently there is no infrastructure available at the project site that will allow MS Silicon the ability to capture it's CO_2 gas streams and pipe them to a nearby facility for further processing, such as a beverage plant;
- Currently there is no infrastructure available at the project site that will MS Silicon the ability to capture and store it's CO_2 gas stream for future use in the event a beverage plant would be installed in the vicinity of the proposed plant site;
- CO_2 produced at the proposed plant will require significant enhancements to improve its quality prior to being used by another source to produce a product; and
- Cost estimates are not being provided in support of removing CCS as a cost effective control alternative since EPA has not provided any guidance or established thresholds on what cost, expressed as a dollar per ton would be considered cost excessive.

Because of the various reasons provided above, MS Silicon is eliminating CCS has a viable control option for GHG control based on its 1) not being commercially available and 2) not being shown to be a proven control option that has been demonstrated in actual operation.

Based on the above technical issues, CCS is consequently deemed not technically feasible for controlling GHG emissions from the proposed SAFs.

Step Three – Assessment of Proposed BACT Emission Reduction Options

This step of the Top-Down analysis provides an assessment of the performance and feasibility of the emission reduction options evaluated. MS Silicon is proposing to utilize the newest generation of submerged arc furnace with inherently lower-emitting technologies, including energy efficiency measures. This new generation furnace is designed to more efficiently convert raw materials to the silicon intermediate product. It is almost impossible to evaluate each option defined above and establish a CO_2 percent reduction.

For purposes of this GHG BACT evaluation, MS Silicon has concluded that the new generation furnace is the most effective control at reducing GHG emissions.

Step - Four Evaluate Most Effective Control and Document Results

As discussed above, various emission reduction options (i.e., new generation furnace) are being proposed by MS Silicon that are considered the **Top Level** of emission reduction available for controlling GHG emissions from the production of silicon. Since MS Silicon has selected the "Top-Level" of control or design with inherent control technique, taking into account any technical limitations, the BACT evaluation that follows does not address economic, energy and environmental impacts related to a specific control device. This follows EPA's suggested approach for performing this type of BACT evaluation.

Step Five – Select BACT

A detailed review was conducted to determine the emission reduction options incorporated at other submerged arc furnaces. Review of recently permitted GHG sources and the RBLC database did not reveal BACT determinations for submerged arc furnaces.

BACT for GHG emissions from the semi-enclosed submerged arc furnace has been determined to be:

- **Utilization of a new generation furnace with inherently lower-emitting technologies and energy efficiency measures (i.e., semi-enclosed SAF);**
- **CO_2e emission limitation of 381,866 tons/year; and**
- **Good operation and maintenance to improve energy efficiency.**

4.2.4 BACT Analysis for GHG Emissions from Natural Gas Combustion (AA-202)

The following natural gas combustion emission sources are included in this review:

Description	Heat Input (MMBTU/hr)	Heat Input (MMscf/year)	Total GHG Emissions (CO_2e) (tons/year)
Natural Gas fired Ladle Pre-Heaters – 4 Units – 10.0 MMBtu/hr each	40.0	350,00	20,499

Step One – Identify Available GHG Control Technologies

The first step of the Top-Down BACT analysis is to assess the proposed emission reduction options. The sources of information on emission reduction options vary for the air emission sources being analyzed. The following information resources were consulted in searching for the alternatives available for controlling GHG emissions from natural gas combustion equipment:

1. On-line USEPA Control Technology Database;
2. State Air Quality Permits; and
3. Control Technology Vendors.

The application of methods, systems, or techniques to increase energy efficiency is a key GHG-reducing opportunity from combustion sources. Use of inherently lower-emitting technologies, including energy efficiency measures, represents an opportunity for GHG reductions. Since GHG are the direct result of fuel combustion, any improvement in the efficiency of a process heater will reduce fuel use and GHG emissions. While energy efficiency can reduce emissions of all combustion-related emissions, it is a particularly important consideration for GHGs since the use of add-on controls to reduce GHG emissions is not as well advanced as it is for most combustion-derived pollutants.

Approaches for reducing GHG emissions from fossil fuel-fired equipment could include fuel switching or energy efficiency measures. In the case of natural gas-fired equipment, however, fuel switching to a lower carbon fuel is not an option because natural gas emits less CO_2 per amount of heat derived than other gaseous or liquid fuels commonly used.

Summary of Potentially Applicable GHG Energy Efficiency Measures – Natural Gas Combustion Sources

Control	Removal Effectiveness	Comments
Burner replacement	Replacing old burners with more efficient modern burners can lead to significant energy savings. Energy and cost savings vary widely based on the condition and efficiency of the burners being replaced.	• Energy efficient burners will be installed in the natural gas combustion equipment

Control	Removal Effectiveness	Comments
Boiler process control	Using a combination of CO and oxygen readings, it is possible to optimize the fuel/air mixture for high flame temperature (and thus the best energy efficiency) and lower air pollutant emissions	• Natural gas combustion equipment will optimize the fuel/air mixture for high flame temperature
Reduction of flue gas quantities	Excessive flue gas results from leaks in the boiler and/or in the flue. These leaks can reduce the heat transferred to the steam and increase pumping requirements. However, such leaks are often easily repaired, saving 2 to 5 percent of the energy formerly used by the boiler	• Equipment will be maintained to minimize any leaks
Reduction of excess air	Boilers must be fired with excess air to ensure complete combustion and to reduce the presence of CO in the unburned fuel in exhaust gases. When too much excess air is used to burn fuel, energy is wasted because excessive heat is transferred to the air rather than to the steam.	• Equipment will be maintained to ensure complete combustion
Carbon Capture and Storage	Carbon capture and storage involves separation and capture of CO_2 from the flue gas, pressurization of the captured CO_2, transportation of the CO_2 via pipeline, and finally injection and long-term geologic storage of the captured CO_2. Several different technologies, at varying stages of development, have the potential to separate and capture CO_2. Some have been demonstrated at the slip-stream or pilot-scale, while many others are still at the bench-top or laboratory stage of development	See below.

Step Two – Eliminate Technically Infeasible Control Options

With the exception of carbon capture and sequestration (CCS), all of the control options identified under Step 1 are technically feasible and will be included in this BACT evaluation. CCS was not evaluated in this BACT evaluation. This type of control technology has not been applied to natural gas combustion

sources in the past and has not been demonstrated in practice for these emission types. CCS is generally used for facilities with sources emitting CO_2 in large amounts, such as fossil fuel-fired power plants, and for industrial facilities with high-purity CO_2 streams. Based on this, CCS is consequently deemed not technically feasible for controlling the GHG emissions from the natural gas combustion sources that will support the proposed plant operations.

Thus, the available control options are as follows:

- Combustion of clean-burning fuel - Burners are designed to combust natural gas. Fuel switching to a lower carbon fuel is not an option because natural gas emits less CO_2 per amount of heat derived than other gaseous or liquid fuels commonly used;
- Energy efficiency pollution prevention options that are available for this type of combustion device include the following:
    - Burner efficiency;
    - Preventive Maintenance; and
    - Energy monitoring and management systems.

Step Three – Assessment of Proposed BACT Emission Reduction Options

This step of the Top-Down analysis provides an assessment of the performance and feasibility of the emission reduction options evaluated. Combustion of natural gas, low NO_x burners and good combustion practices and maintenance to improve energy efficiency are considered the top level of emission reduction available for the natural gas combustion equipment.

Step Four - Evaluate Most Effective Control and Document Results

The emission reduction options that are being proposed by MS Silicon that are considered the **Top Level** of emission reduction available for controlling GHG emissions from the combustion of natural gas. Since MS Silicon has selected the "Top-Level" of control or design with inherent control technique, taking into account any technical limitations, the BACT evaluation that follows does not address economic, energy and environmental impacts related to a specific control device. This follows EPA's suggested approach for performing this type of BACT evaluation.

Step Five - Select BACT

A detailed review was conducted to determine the emission reduction options incorporated at other natural gas fired burners. Review of the RACT/BACT/LAER Clearinghouse (RBLC) revealed the following BACT determinations for natural gas combustion equipment.

Facility/ RBLC ID	Permit Date	Basis	Process	GHG BACT Limit	Controls
Cargill, Inc. NE-0054 DRAFT DETERMINATION	3/1/13	BACT-PSD	300 MMBtu/hr Boiler	No Limit	Good combustion practice
Iowa Fertilizer Company IA-0105	10/26/12	BACT-PSD	472.4 MMBtu/hr Auxiliary Boiler	CO_2:117 lb/MMBtu Methane:0.0023 lb/MMBtu N_2O: 0.0006 lb/MMBtu	Good combustion practice
Iowa Fertilizer Company IA-0105	10/26/12	BACT-PSD	110.12 MMBtu/hr Startup Heater	CO_2:117 lb/MMBtu Methane:0.0023 lb/MMBtu N_2O: 0.0006 lb/MMBtu	Good combustion practice
Showa Denko Carbon, Inc. SC-0142	6/8/12	BACT-PSD	5 MMBtu natural gas fired hot oil heater	CO_2e: 3093 tpy	Good combustion practice, annual tune-up low NO_x burner
Port Dolphin Energy LLC FL-0330	12/1/11	BACT-PSD	Four 278 MMBtu/hr boilers	CO_2:117 lb/MMBtu	tuning, optimization, instrumentation and controls, insulation, and turbulent flow
Pyramax Ceramics, LLC GA-0147	2/8/12	BACT-PSD	9.8 MMBtu/hr natural gas fired boiler	CO_2e: 5809 tpy rolling average	Good Combustion Practices, design, and thermal insulation
Entergy Louisiana LLC, Nine Mile Point Electric Generating Plant LA-0254	08/16/11	BACT-PSD	Auxiliary Boiler 338 MMBtu/hr	CO_2:117 lb/MMBtu Methane:0.0022 lb/MMBtu N_2O: 0.0002 lb/MMBtu	Proper operation and good combustion practices

Summary of Potentially Applicable GHG Energy Efficiency Measures – Natural Gas Combustion Equipment

Control	Description	Comments
Use of Low Carbon Fuels	Burners will be combusting natural gas	• Burners are designed to combust natural gas. Fuel switching to a lower carbon fuel is not an option because natural gas emits less CO_2 per amount of heat derived than other gaseous or liquid fuels

Control	Description	Comments
Energy efficient processes and technologies	• Low NOx burners, • Good combustion practices to improve energy efficiency • Good maintenance of combustion equipment	• Burner design will incorporate low NOx burners and good combustion practices and maintenance to improve energy efficiency

Based on information reviewed for this BACT analysis, the GHG control measures focus on fuel type or energy efficiency measures. No other applicable GHG control measures were identified in this review. Provided below is a summary of the emission reduction options being incorporated into the natural gas fired combustion devices associated with the proposed silicon plant. Rationale for selection of BACT includes the use of natural gas as a clean burning fuel, use of low NO_x energy efficient burner technology and good combustion practice.

BACT for this emission unit is as follows:

- CO_2 – 117 lb/MMBtu
- Methane – 0.0022 lb/MMBtu
- N_2O – 0.0002 lb/MMBtu

Control techniques to be implemented to meet these emission limitations will be: 1) good combustion practices, 2) combustion of natural gas only, 3) selection of the most energy efficient burner design based on engineering selection process and 4) periodic maintenance.

4.3 Best Available Control Technology (BACT) Analysis - Emissions of $PM_{10}/PM_{2.5}$

Particulate matter," also known as particle pollution or PM, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. Particulate matter exists in the solid and liquid physical states, and gases or vapors may also condense to form particulate matter. The latter, condensable particulate matter, is of great concern due to the inherently small size of condensation products; overwhelmingly, condensable particulate can be classified as $PM_{2.5}$[3]. $PM_{2.5}$ is defined as particulate matter that has a diameter of 2.5 microns or less and is a subset of PM_{10} which is particulate with a size range of 10 microns or less. Even though both are particulate matter they have separate air quality standards and are considered separate pollutants for permitting purposes. The size of particles is directly linked to their potential for causing health problems. EPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. EPA groups particle pollution into two categories:

- "Inhalable coarse particles," such as those found near roadways and dusty industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter.
- "Fine particles," such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air.[4]

The BACT evaluation focuses on the control technologies that have been demonstrated and commercially available for the proposed silicon production plant. Because of the importance of controlling these emissions, MS Silicon evaluated technologies that have been demonstrated on similar processes so that emissions of $PM_{10}/PM_{2.5}$ will be controlled to the levels specified. Condensable $PM_{2.5}$ emissions occur when gas molecules are present in the exhaust gas stream that when cooled change into a particulate state. This change from gas vapor to solid is referred to as condensable particulates. USEPA is involved in extensive research on trying to better define this change over, as well as how best to quantify the presence of these condensable particulates. For purposes of this evaluation, since no specific technologies exist (i.e., commercially available and demonstrated), above and beyond that already selected in the form of a baghouse, for controlling $PM_{2.5}$ emissions, additional emphasize was

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[3] Condensable Particulate Matter, Regulatory History and Proposed Policy, January 27, 1998 http://www.ncair.org/enf/sourcetest/cpm/condensweb.pdf

[4] http://www.epa.gov/air/particlepollution/

placed on the availability of controls to reduce emissions of SO_2 and NO_x. Emissions of SO_2 and NO_x can be present in the gas phase that could convert to solids in the form of sulfates and nitrates. USEPA has identified SO_2 and NO_x as potential precursors to the formation of $PM_{2.5}$ emissions. However, USEPA has not provided, as of the date of this application, guidance on the effect of SO_2 and NO_x as potential precursors to the formation of $PM_{2.5}$ emissions. Subsequently, evaluation of the control options to reduce SO_2 and NO_x emissions to further reduce $PM_{2.5}$ emissions have not been included in this BACT evaluation.

4.3.1 $PM_{10}/PM_{2.5}$ Emission Sources Subject to Control Technology Evaluation

The $PM_{10}/PM_{2.5}$ emission sources associated with the proposed plant that are included in this $PM_{10}/PM_{2.5}$ BACT evaluation are as follows:

- Semi-Enclosed Submerged Arc Furnaces (SAFs) (AA-201);
- Casting Frames (AA-201a);
- Silica Fume Silos (AA-404);
- Natural Gas Fired Combustion Equipment (AA-202);
- Diesel Fired Emergency Generator (AA-501);
- Material storage and handling (AA-101, AA-101a, AA-102, AA-102a, AA-103, AA-103a, AA-104, AA-105, AA-106);
- Wood Chipper (AA-102b); and
- Roadways (AA-401, AA-402a).

For a summary of the estimated $PM_{10}/PM_{2.5}$ emission rates for the sources identified above, please refer to the following table:

$PM_{10}/PM_{2.5}$Emission Rates for Sources Evaluated for BACT

Equipment Description	PM_{10} Emission Rate (tons/year)	$PM_{2.5}$ Emission Rate (tons/year)
AA-201 - Semi-Enclosed Submerged Arc Furnaces (SAFs)	61.2	61.2
AA-201a- Casting Frames	0.3	0.3
AA-202 - Natural Gas Fired Ladle Preheaters	0.1	0.1
Diesel Fired Emergency Generator (AA-501)	0.001	0.001

Equipment Description	PM_{10} Emission Rate (tons/year)	$PM_{2.5}$ Emission Rate (tons/year)
Material Handling and Storage:		
• Material Transfer to and from Coal Storage Pile (AA-101)	0.01	0.002
• Material Transfer to and from Wood Storage Pile (AA-102)	0.002	0.0003
• Material Transfer to and from Quartz Storage Pile (AA-103)	1.8	0.3
• Limestone Material Handling (AA-104)	0.0008	0.0001
• Material Handling Area Baghouse (AA-101a, AA-102a, AA-103a)	6.8	6.8
• Product Handling Area Baghouse (AA-301)	3.4	3.4
• Storage Piles Processing (i.e., Bulldozing) (AA-105)	1.7	0.2
• Storage Piles Wind Erosion (AA-106, AA-403)	2.5	0.4
• Silica Fume Silos (AA-404)	0.15	0.15
AA-102b - Wood Chipper	0.042	0.042
AA-402 - In-Plant Gravel Roads	3.7	0.37
AA-402a - In-Plant Paved Roads	0.3	0.3
Total	**81.8**	**73.3**

4.3.2 BACT Analysis for $PM_{10}/PM_{2.5}$ Emissions from Semi-Enclosed Submerged Arc Furnaces

Step One - Identify Available $PM_{10}/PM_{2.5}$ Control Technologies

The first step of the Top-Down BACT analysis is to assess the proposed emission reduction options. The sources of information on emission reduction options vary for the air emission sources being analyzed. The following information resources were consulted in searching for the alternatives available for controlling $PM_{10}/PM_{2.5}$ emissions from plant operations:

1. On-line USEPA Control Technology Database; and
2. State Air Quality Permits;

Particulate control technologies exist today that are proven and reliable that that provide a high level of removal efficiency (i.e., in excess of 99%). These technologies are well suited for controlling particulate matter, including $PM_{2.5}$ in the form of solids or "filterable" particulates. As will be described in the BACT evaluation that follows, MS Silicon is installing a fabric filter bag-house which is considered the top level of $PM_{10}/PM_{2.5}$ control technology for filterable particulates from the semi-enclosed submerged arc furnace. MS Silicon will also be using Best Management Practices to minimize the generation of $PM_{10}/PM_{2.5}$ fugitive emissions.

Technologies will continue to emerge for controlling particulate matter emissions, including $PM_{2.5}$ that are in the vapor phase in the exhaust gas and when cooled by ambient air at the point of the exhaust stack release, change from a vapor phase to a solid phase. This change over is defined as "condensable" particulates. As part of the BACT evaluation that follows we have examined proven technologies that can further reduce these precursors, thus reducing the condensable portion of $PM_{2.5}$ from the exhaust gas stream. Condensable $PM_{2.5}$ emissions should be minimal from the fugitive sources.

The choice of which technology is most appropriate for a specific application depends upon several factors, including particle size to be collected, particle loading, stack gas flow rate, stack gas physical characteristics (e.g., temperature, moisture content, presence of reactive materials), and desired collection efficiency. Emissions of particulate matter are generally controlled with add-on control equipment designed to capture the emissions prior to the time they are exhausted to the atmosphere. In cases where the material being emitted is organic, particulate matter may be controlled through a combustion process. The following control technologies were identified and evaluated to control $PM_{10}/PM_{2.5}$ emissions from the SAF:

(a) Electrostatic Precipitator (ESP) - In an ESP, particles are electrically charged and then exposed to an electric field in which they are attracted to an electrode. Periodically, this electrode is cleaned through vibration and the freed particles are directed into a collection unit. While ESPs have been used on solid fuel combustion devices they have not been used on similar sources as the proposed plant

(b) High Efficiency Cyclones - Cyclones and multicyclones are a commonly used PM control technology in the United States. A cyclone removes particles based the principle of gravity and centrifugal force. A multicyclone uses the same concept as a cyclone but employs multiple, smaller diameter cyclones to improve its capturing capacity. The particle control efficiency of both devices decreases as the particle size decreases and therefore do not adequately control $PM_{2.5}$.

(c) High Energy Scrubbers – High energy scrubbers are a wet scrubbing system that combines a high energy venturi scrubber with a cyclonic separator. These scrubbers are effective in the removal of dusts, fumes, vapors, and mists; as well as a variety of other air pollutants, and

(d) Fabric Filters (i.e., baghouses) - Fabric filters have been widely used for controlling PM emissions from many different types of sources. Large industrial, commercial, and Institutional (ICI) boilers are equipped with these devices and have PM control efficiencies of 99 percent or higher. A fabric filter, or baghouse, is made up of cloth or woven specialty fibers. The flue gases are directed through the filter. The separation efficiency of bag filters is quite high. Because of their design (large surface area of bags and longer residence times in transit), fabric filters may capture a higher fraction of ultrafine particles than ESPs

Step 2 – Eliminate Technically Infeasible Control Options

The test for technical feasibility of any control option is whether it is both available and applicable to reducing $PM_{10}/PM_{2.5}$ emissions from the SAF operations. The previously listed information resources were consulted to determine the extent of applicability of each identified control alternative.

(a) ESPs - use an electrostatic field to charge particulate matter contained in the gas stream and then attract and collect the particles on a collection surface of opposite charge. ESPs have very high removal efficiencies (99% or better) for many sources of particulates. However, they are not suitable for all types of applications. Due to the electromagnetic properties of small charged particles of metal compounds in an electric field, the particles adhere very strongly to the collection plates of an ESP and are extremely difficult to dislodge, resulting in ineffectivity of the ESP. Therefore, ESP is considered technically infeasible for controlling particulate emissions from the SAF.

(b) High Efficiency Cyclones - Particulate removal in cyclone collectors is achieved through the action of inertial forces, especially centrifugal. As the gas stream enters the top of the cyclone, a vortex is induced as it is forced to travel a circular path. Centrifugal forces cause the heavier particles to concentrate near the outer wall of the cyclone and particle of lesser mass to remain closer to the center of the vortex. Frictional and gravitational forces then act on the particles closest to the wall, causing them to fall toward the bottom of the cyclone, where they are collected in a hopper. Within the lower segment of the cyclone, the direction of the gas-flow vortex is reversed, and an inner ascending vortex is formed. The inner vortex consists of comparatively particulate-free air, which is collected through an outlet duct at the top of the cyclone. Cyclone collectors are considered technically feasible. However, they achieve the lowest particulate removal efficiencies (less than 90%) of all particulate control devices, especially for submicron particulates that will be emitted from the SAF.

(c) High Energy Scrubbers - High energy wet scrubbers are technically feasible and can achieve a high particulate collection efficiency (90% or better), but at the expense of a punitive pressure drop (ranging from 6 - 20 inches of water), higher operational utilities, generation of large quantities of sludge along with the associated problem of sludge handling, de-watering, and disposal.

(d) Fabric filters or baghouses are technically feasible for collecting fine particulate matter emissions associated with SAFs or other types of furnaces that have high particulate emissions. They can also achieve the highest control efficiency, among other particulate control devices, as applied to SAF operations.

(i) Positive pressure baghouses operate at internal pressures greater than the atmospheric pressure. Typically, the fans are located before the fabric filters. This allows the fans to pull air from the SAF and push the dust laden air through the fabric filters and into the ambient air via a continuous ridge vent (old design) rather than a stack. The discharge area of a ridge vent is on the order of four times that of a single stack.

(ii) Negative pressure baghouses operate at internal pressure less than atmospheric. The fans are located after the fabric filters. This allows the fans to pull the gas laden air from the SAF, through the fabric filters, and then push the air up through a central stack.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

The following remaining control options are in order of descending control effectiveness:

(a) Fabric filters or baghouses - 99.9%;

(b) High Energy Scrubbers - 90% or more; or

(c) High Efficiency Cyclones - 50 to 90%.

Step 4 – Evaluate the Most Effective Controls and Document Results

Fabric filtration is the predominant control option for abatement of particulate emissions from SAF operations application due to their effectiveness. Scrubbers and cyclones are not considered as effective as fabric filters or baghouses for controlling particulate emissions from silicon production operations.

Step 5 – Select BACT

A review of USEPA's RACT/BACT/LAER Clearinghouse did not identify any BACT determinations for submerged arc furnaces or any other sources associated with the silicon production operations. Review of state permit information identified the following with respect to electric arc furnaces at silicon production plants:

Facility/	Permit Date	Process	PM_{10} Limit	Add-On Controls
Globe Metallurgical Inc Niagara Falls, NY Permit#: 9-2911-00078/00009	11/26/10	Two submerged-arc semi-enclosed-type electric furnaces (22 MW/hr)	PM: 21.3 lb/hr per furnace (based on process weight rate calculation	Fabric filter (baghouse)

Facility/	Permit Date	Process	PM_{10} Limit	Add-On Controls
Globe Metallurgical Selma, AL 104-0001	9/10/10	20 MW Electric Arc Furnaces (2) producing silicon metal	0.99 lb/MW-hr 6.2 lb/hr	Baghouse
West Virginia Alloy, Inc. Alloy, West Virginia R30-01900001-2006	01/18/06	Electric submerged arc furnace No. 15 for the production of silicon metal and ferroalloys	PM10: 22.71 lb/hr	Baghouse with >99% control
Globe Metallurgical Inc Waterford, OH ID: 06-84-00-0105	10/24/01	Electric Arc Furnaces (Ferrosilicon and Silicon metal production furnaces)	0.03 gr/dscf (filterable) or no visible particulate emissions, whichever is less stringent	Open roof Baghouse

As shown in the above table, PM emissions from submerged electric arc furnaces are controlled exclusively by baghouses and the BACT emission limits vary in how they are expressed. Because of the variations in the plant operations, it is very difficult to identify a consistent BACT emission limitation or permit limitation. For the $PM_{10}/PM_{2.5}$ emission sources associated with the SAFs at the proposed plant, a baghouse was the only control methods evaluated. The proposed BACT limit is at least as stringent as the permit limits presented in the table above.

Thus, BACT for $PM_{10}/PM_{2.5}$ emissions from the semi-enclosed submerged arc furnaces at the proposed plant is as follows:

- **Use of fabric filter control (i.e., baghouse); and**
- **$PM_{10}/PM_{2.5}$ – 0.005 grains per dry standard cubic foot (gr/dscf).**

4.3.3 BACT Analysis for $PM_{10}/PM_{2.5}$ Emissions from Casting Frames (AA-201a)

Molten product from the SAFs will be poured into low, flat pans that will provide rapid cooling and solidification of the molten metal. There is a potential for fume and dust to be generated during the casting process, however the amount of actual dust should be minimal.

Step One - Identify Available $PM/PM_{10}/PM_{2.5}$ Control Technologies

The first step of the Top-Down BACT analysis is to assess the proposed emission reduction options. Potential PM control technologies are identified in the previous section.

Step 2 – Eliminate Technically Infeasible Control Options

The test for technical feasibility of any control option is whether it is both available and applicable to reducing $PM/PM_{10}/PM_{2.5}$ emissions from the casting operations. The exhausting of casting emissions from a central canopy positioned over the casting installations to the SAF baghouse is neither practical nor economically feasible since it is too far away. In addition, the casting frame emissions in question are very low (< 1.0 tons/year) and can also be further minimized by the manner with which the unit is operated. The potential PM emissions are small and installation of a canopy and exhaust dust system is not very effective at capturing these small quantities of PM emissions. Thus, add-on controls are eliminated from further consideration in this BACT evaluation.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

The following remaining control option is best management practices.

Step 4 – Evaluate the Most Effective Controls and Document Results

Best management practices are the only effective control for this type of emission source.

Step 5 – Select BACT

A review of USEPA's RACT/BACT/LAER Clearinghouse did not identify any BACT determinations for casting operations associated with the silicon production operations. Review of state permit information also did not identify BACT determinations for casting operations associated with the silicon production operations.

MS Silicon will be using Best Management Practices to minimize the generation of $PM/PM_{10}/PM_{2.5}$ fugitive emissions from the casting frame operation.

BACT for $PM/PM_{10}/PM_{2.5}$ for the casting frames (AA-201a) is proposed as:

- Best Management Practices to minimize the generation of $PM/PM_{10}/PM_{2.5}$ fugitive emissions from the casting frame operation; and
- No emission limit is being proposed since there is no formal method for quantifying emissions from this type of indoor operation.

4.3.4 BACT Analysis for $PM_{10}/PM_{2.5}$ Emissions from Natural Gas Combustion (AA-202)

Because natural gas is a gaseous fuel, filterable PM emissions from combustion are typically low. Particulate matter from natural gas combustion has been estimated to be less than 1 micrometer in size and has filterable and condensable fractions. Particulate matter from natural gas combustion is usually

larger molecular weight hydrocarbons that are not fully combusted. Increased PM emissions may result from poor air/fuel mixing or maintenance problems[5].

Natural Gas Combustion Sources – Includes the following:

- AA-202: Ladle Pre-Heaters (Four 10 MMBtu/hr): 0.1 tpy $PM_{10}/PM_{2.5}$;

Step 1 – Identify Control Options, Step 2 – Eliminate Technically Infeasible Control Options, Step 3 – Rank Remaining Control Technologies by Control Effectiveness and Step 4 – Evaluate the Most Effective Controls and Document Results

There are no control options identified in the RBLC that are technically feasible to control $PM_{10}/PM_{2.5}$ that is emitted from small natural gas combustion units. See below table for summary of $PM_{10}/PM_{2.5}$ BACT determinations from the RBLC database:

Facility/ RBLC ID	Permit Date	Basis	Process	PM_{10} BACT Limit	$PM_{2.5}$ BACT Limit	Add-On Controls
SeverCorr LLC Columbus, Mississippi	07/15/11	BACT-PSD	Ladle preheaters, ladle dry-out heaters, Tundish preheaters, Tundish dry-out heaters, vertical ladle holding station, annealing furnaces, vacuum degasser boiler, boilers	None	None	Combustion of natural gas only
Nucor Steel, AR Blytheville, AR	06/10/11	BACT-PSD	Pickle Line Boilers, natural gas fired burners and dryers, ladle dryers	0.0076 lb/MMBtu	None	None
Sasol North America LA-0244	11/29/10	BACT-PSD	87.30 MMBtu/hr charge Heater	Total PM_{10}: 0.01 lb/MMBtu	-	No controls
Sasol North America LA-0244	11/29/10	BACT-PSD	21.00 MMBtu/hr startup Heater	Total PM_{10}: 0.01 lb/MMBtu	-	No controls

[5] AP 42, Fifth Edition, Volume I, Chapter 1.4: External Combustion Sources Natural Gas Combustion, July 1998

Facility/ RBLC ID	Permit Date	Basis	Process	PM_{10} BACT Limit	$PM_{2.5}$ BACT Limit	Add-On Controls
Lake Charles Cogeneration LLC LA-0231	06/22/09	BACT-PSD	34.20 MMBtu/hr Shift Reactor Startup Heater	Total PM_{10}: 0.007 lb/MMBtu	-	Good design and proper operations
Competitive Power Ventures MD-0040	11/12/08	BACT-PSD	1.70 MMBtu/hr Heater	Filterable PM_{10}: 0.0070 lb/MMBtu	Filterable 0.0070 lb/MMBtu (LAER)	No controls
Mid-American Steel and Wire Company OK-0128	09/08/08	BACT-PSD	Ladle Preheater and refractory drying	0.0076 lb/MMBtu (total)	-	Combustion of natural gas
Thysenkrupp Steel and Stainless USA, LLC AL-0230	08/17/07	BACT PSD	33.40 MMBtu/hr Batch Annealing Furnaces	0.0076 lb/MMBtu	-	No controls
Nucor Decatur, LLC AL-0231	06/12/07	BACT-PSD	98.7 MMBtu/hr Galvanizing Furnace	PM: 0.0076 lb/MMBtu	-	No control
Republic Engineered Products, Inc OH-0303	08/30/05	LAER	Ladle Dryers/Preheaters	7.6 lb/mmscf (filterable)	7.6 lb/mmscf (filterable)	Good combustion control with proper natural gas burner design, no add-on controls
6Nucor Steel IN-0090	01/19/01	BACT-PSD	Ladle Preheaters	-	-	Combustion of natural gas or propane
Arkansas Steel Associates AR-0044	01/05/01	BACT-PSD	Ladle Preheaters	0.20 lb/hr (filterable)	-	Natural gas combustion/ Good combustion practices

As shown in the above table, no add-on controls are used for $PM_{10}/PM_{2.5}$ from the natural gas combustion equipment.

Step 5 - Select BACT

The RACT/BACT/LAER Clearinghouse (RBLC) and review of other permits reveal that similar natural gas combustion devices use fuel specifications and good combustion practices for controlling PM emissions. No similar sized natural gas combustion devices were identified add-on PM controls as BACT.

Thus, BACT is defined as combustion of clean fuel and good combustion practices. For the natural gas combustion sources associated with the proposed Plant, combustion of natural gas and good combustion controls were the only control methods evaluated. Since the highest level of PM control as noted above will be implemented by MS Silicon, an analysis of economic, energy and environmental impacts was not performed.

BACT for the natural gas combustion devices is as follows:

- **Combustion of natural gas; and**
- **Good operating practices.**

4.3.5 BACT Analysis for $PM_{10}/PM_{2.5}$ from Material Storage and Handling (AA-101, AA-101a, AA-102, AA-102a, AA-103, AA-103a, AA-104, AA-301)

Raw materials will be received by truck at the site. The primary materials to be handled and stored at the silicon production plant are as follows:

- Coal;
- Wood;
- Limestone and
- Quartz.

Upon receipt the raw materials will be unloaded, conveyed and stored in outside piles. The raw materials will then be transferred via front end loaders to day bins in the submerged arc furnace building.

Add on control devices such as a baghouse or wet suppression will minimize particulate emission rates from material storage and handling. A baghouse is an air pollution abatement device used to trap particulates by filtering gas streams through large fabric bags. Baghouses typically achieve PM control efficiencies of greater than 99%.

Wet suppression systems use liquid sprays or foam to suppress the formation of airborne dust. The primary control mechanisms are those that prevent emissions through agglomerate formation by combining small dust particles with larger aggregate or with liquid droplets. The key factors that affect the degree of agglomeration and, hence, the performance of the system are the coverage of the material by the liquid and the ability of the liquid to wet small particles. There are two types of wet suppression systems: liquid sprays which use water or water/surfactant mixtures as the wetting agent and systems which supply foams as the wetting agent. Wet suppression systems typically achieve PM control efficiencies of 50-70%.

AA-101: Material Transfer to and from Coal Storage Pile

Coal will be delivered to the site either by truck. Fugitive emissions of PM will be generated during the receiving, transferring, and handling of coal.

Step 1 - Identify Available $PM_{10}/PM_{2.5}$ Control Technologies

- Add on control devices such as a fabric filter and enclosed conveyance can be used to minimize particulate emission rates from material storage and handling operations. A baghouse is an air pollution abatement device used to trap particulates by filtering gas streams through large fabric bags. Fabric filters typically achieve PM control efficiencies of greater than 99%.
- Wet suppression systems use liquid sprays or foam to suppress the formation of airborne dust. The primary control mechanisms are those that prevent emissions through agglomerate formation by combining small dust particles with larger aggregate or with liquid droplets. The key factors that affect the degree of agglomeration and, hence, the performance of the system are the coverage of the material by the liquid and the ability of the liquid to wet small particles. There are two types of wet suppression systems: liquid sprays which use water or water/surfactant mixtures as the wetting agent and systems which supply foams as the wetting agent. Wet suppression systems typically achieve PM control efficiencies of 50 to >90%.
- Best management plan (fugitive dust control plans) can provide for additional control of PM through managing the operations/equipment that generates the fugitive PM emissions. Implementation of these plans can reduce PM fugitive emissions by more than 50%.

Review of the RBLC database and recent permit applications indicated that viable PM controls for coal transfer to and from storage piles is a fugitive dust control plan (windscreen barrier, reduced drop heights, use of chemical stabilization dust suppressants and/or watering to reduce any visible emissions as required). Refer to table below for a listing of recent BACT determinations for coal receiving and handling operations.

Step 2 - Elimination of Technically Infeasible Fugitive PM Control Alternatives

The above technologies are technically feasible and will be ranked for evaluation as part of the BACT evaluation for controlling particulate emissions from this operation.

- Fabric Filter control devices: 99% control efficiency – The emissions from this source are fugitive in nature and thus cannot be effectively captured and controlled.

- Wet Suppression: 50 to > 90% control efficiency - The use of wet suppression systems for this source is feasible.

- Implementation of fugitive dust control plan: >50% control efficiency.

Step 3 - Rank the Remaining Control Technologies by Control Effectiveness

The top ranked control option is fugitive dust control plan including the use of wet suppression on an as needed basis. No control options were eliminated for economic reasons.

Step 4 - Evaluate the Most Effective Controls and Document the Results

The table below lists the proposed particulate BACT determination, along with the existing particulate BACT determinations, for coal receiving and handling and coal transferring. All data in the table is based on the U.S. EPA RACT/BACT/LAER Clearinghouse (RBLC), and electronic versions of permits available at the websites of other permitting agencies.

The limits being proposed by MS Silicon is equivalent to or lower than the BACT limitations established for coal handling operations at these facilities.

Existing $PM/PM_{10}/PM_{2.5}$ BACT Limits - Material Transfer to and from Coal Storage Pile

Facility	Date	Basis	Source	$PM_{10}/PM_{2.5}$ BACT Limit	BACT Control Method
East Kentucky Power Cooperative KY-0100	4/9/10	BACT-PSD	Coal Stockpile and unloading	PM: 10% opacity 3-minute	Wet suppression, dust suppressant, lowering well and compaction
Ohio River Clean Fuels, LLC OH-0317	11/20/08	BACT-PSD	Coal storage piles	PM_{10}: 12.3 tpy rolling 12-month period	3-Sided windscreen barrier, reduced drop heights, use of chemical stabilization dust suppressants and/or watering to reduce any visible emissions
Martin Marietta Magnesia Specialties OH-0321	11/13/08	BACT-PSD	Coal and coke material handling	PM_{10}: 0.95 tpy rolling 12-month period	Building enclosure and high moisture content coal and coke >5%
Homeland Energy Solutions, LLC IA-0089	08/28/07	BACT-PSD	Coal receiving and handling	Filterable PM_{10}: 0.005 gr/dscf	Use of baghouse and water fogging. (Baghouse used to control storage bins and water fogging used to eliminate PM in unloading area
University of Northern Iowa IA-0086	5/3/07	BACT-PSD	Coal pile receiving and reclaim	Filterable PM_{10}: 095% control	Dust suppressant

Step 5 - Select BACT

BACT for the Material Transfer to and from Coal Storage Pile (AA-101) is proposed as the following:

- Best management practices including the incorporation 3-sided windscreen barrier, reduced drop heights, use of chemical stabilization dust suppressants and/or watering to reduce any visible emissions;
- Development of a fugitive dust control plan to minimize PM emissions; and
- No emission limit is being proposed for this operation since there is no available test method to determine the $PM/PM_{10}/PM_{2.5}$ emission rate

Material Transfer to and from – Wood Storage Pile (AA-102)

Wood will be delivered to the site either by truck. Fugitive emissions of PM will be generated during the receiving, transferring, and handling of this material. Since these operations will have the potential to emit minor levels (due to the inherent moisture content of the wood to be handled and stored) of $PM_{10}/PM_{2.5}$ emissions and will typically be in the form of a fugitive type release, typical PM control technologies are not appropriate for these types of operations. The types of control measures used for materials handling operations can be classified as best management practices and include inherent pollution control techniques (covered conveyors, partially enclosed conveyor drop points, minimization of pile drop discharge distance, etc.).

Step 1 - Identify Available $PM_{10}/PM_{2.5}$ Control Technologies

- Add on control devices such as a fabric filter and enclosed conveyance can be used to minimize particulate emission rates from material storage and handling operations. A baghouse is an air pollution abatement device used to trap particulates by filtering gas streams through large fabric bags. Fabric filters typically achieve PM control efficiencies of greater than 99%.
- Wet suppression systems use liquid sprays or foam to suppress the formation of airborne dust. The primary control mechanisms are those that prevent emissions through agglomerate formation by combining small dust particles with larger aggregate or with liquid droplets. The key factors that affect the degree of agglomeration and, hence, the performance of the system are the coverage of the material by the liquid and the ability of the liquid to wet small particles. There are two types of wet suppression systems: liquid sprays which use water or water/surfactant mixtures as the wetting agent and systems which supply foams as the wetting agent. Wet suppression systems typically achieve PM control efficiencies of 50 to >90%.
- Best management plan (fugitive dust control plans) can provide for additional control of PM through managing the operations/equipment that generates the fugitive PM emissions. Implementation of these plans can reduce PM fugitive emissions by more than 50%.

Review of the RBLC database and recent permit applications indicated that viable PM controls for wood transfer to and from storage piles is a fugitive dust control plan (windscreen barrier, reduced drop heights, use of chemical stabilization dust suppressants and/or watering to reduce any visible emissions as required). Refer to table below for a listing of recent BACT determinations for wood receiving and handling operations.

Step 2 - Elimination of Technically Infeasible Fugitive PM Control Alternatives

The above technologies are technically feasible and will be ranked for evaluation as part of the BACT evaluation for controlling particulate emissions from this operation.

- Fabric Filter control devices: 99% control efficiency – The emissions from this source are fugitive in nature and thus cannot be effectively captured and controlled.
- Wet Suppression: 50 to > 90% control efficiency - The use of wet suppression systems for this source is feasible.
- Implementation of fugitive dust control plan: >50% control efficiency.

Step 3 - Rank the Remaining Control Technologies by Control Effectiveness

The top ranked control option is fugitive dust control plan including the use of wet suppression on an as needed basis. No control options were eliminated for economic reasons.

Step 4 - Evaluate the Most Effective Controls and Document the Results

The table below lists the proposed particulate BACT determination, along with the existing particulate BACT determinations, for wood pile receiving, handling, and transferring. All data in the table is based on the U.S. EPA RACT/BACT/LAER Clearinghouse (RBLC), and electronic versions of permits available at the websites of other permitting agencies.

The limits being proposed by MS Silicon is equivalent to or lower than the BACT limitations established for wood handling operations at these facilities.

Existing $PM/PM_{10}/PM_{2.5}$ BACT Limits – Wood Storage and Handling

Facility	Date	Basis	Source	$PM_{10}/PM_{2.5}$ BACT Limit	BACT Control Method
Southeast Regional Fuels, LLC FL-0322	12/23/10	BACT-PSD	Biomass material handling and preparation	5% opacity	To minimize fugitive, PM_{10} and $PM_{2.5}$, biomass conveyors shall be enclosed. Where required to meet the 5 % opacity requirement, the permittee shall install dust collectors on the conveyor transfer and drop points. The dust collectors shall be designed to obtain an outlet PM loading of 0.005 grains per dry standard cubic foot (gr/dscf). Additional practices: Enclosing material drop points, transfer points, shredders and screens wherever practical; Contouring storage piles to minimize wind erosion; Utilizing water sprays on storage piles as needed;

Facility	Date	Basis	Source	$PM_{10}/PM_{2.5}$ BACT Limit	BACT Control Method
Georgia Power Co. GA-0140	12/03/10	BACT-PSD	Biomass storage and handling	-	Partial enclosures for the conveyors; Partial enclosures for the transfer points
Ohio River Clean Fuels, LLC OH-0317	11/20/08	BACT-PSD	Biomass Storage Piles	AP-42 Calculation: 1.0 tpy fugitive PM_{10} No visible emissions except for 13-min in any 60-min period	3-sided windscreen barrier, reduced drop heights, use of chemical stabilization dust suppressants and/or watering to reduce any visible emissions
Weyerhauser Co. LA-0201	05/24/06	BACT-PSD	Chip Handling	Filterable PM_{10} 0.0001 lb/T	Covered conveyors
Kingsford Manufacturing Company MS-0081	09/09/05	BACT-PSD	Wood Receipt	Filterable PM_{10}: 0.0020 lb/T wood	Good work practice standards and partial enclosure of truck dump area
			Wood Storage	Filterable PM_{10}: 0.0065 lb/T wood	Good work practice standards

The above table presents BACT limits for $PM_{10}/PM_{2.5}$ emissions from wood/biomass material handling operations. The limit being proposed by MS Silicon is equivalent to or lower than the BACT limitations established for other material handling operations at other types of facilities.

Review of state permits for similar operations (i.e., ferroalloy operations) revealed the following:

Facility/	Process	PM_{10} BACT Limit	Add-On Controls
Globe Metallurgical Inc Niagara Falls, NY Permit#: 9-2911-00078/00009 Date: 11/26/10	Raw Material Handling - Raw Material Transfer and Storage operations begin with the receipt of raw materials via truck or rail. Coal, coke, charcoal, gravel, woodchips, and turnings are unloaded via crane to piles or directly to a below grade conveyor or pit. Coal is transferred to the pit, from which it is conveyed up to enclosed raw material storage bins or unloaded to outdoor storage piles. Gravel is unloaded to piles, transported by crane to a conveyor, screened, and conveyed up to enclosed storage bins. Wood chips are dumped from a trailer to the pit and transported up to enclosed storage bins. From indoor bins, the raw materials are weighed and dropped to a skip bucket from which they are transferred to the top of the furnace.	No limit	Enclosed storage bins
Globe Metallurgical Selma, AL 104-0001 Date: 9/10/10	Product Handling – Raw material receiving, transfer and storage	Process weight rate limitation 20% opacity in one 6-minute average in any 60 minute period	No add-on controls
West Virginia Alloy, Inc. Alloy, West Virgina R30-01900001-2006 Date: 01/18/06	Raw material storage piles	No limit	None
Globe Metallurgical Inc Waterford, OH ID: 06-84-00-0105 Date: 10/24/01	Raw material unloading and handling	20% opacity as a 3-minute average	Reasonable available control measures that are sufficient to minimize of eliminate visible emissions of fugitive dust

Facility/	Process	PM_{10} BACT Limit	Add-On Controls
	Raw Material and Waste Storage Piles – Load in or load out, wind erosion	No visible particulate emissions except for 13 minutes during any 60-minute period	Reasonable available control measures that are sufficient to minimize of eliminate visible emissions of fugitive dust

Step 5 -Select BACT

BACT for the wood material handling operations (AA-102) is proposed as the following:

- Best management practices including the incorporation 3-sided windscreen barrier, reduced drop heights, use of chemical stabilization dust suppressants and/or watering to reduce any visible emissions;
- Development of a fugitive dust control plan to minimize PM emissions; and
- No emission limit is being proposed for this operation since there is no available test method to determine the $PM/PM_{10}/PM_{2.5}$ emission rate

Material Transfer to and from Quartz/Limestone Storage Piles (AA-103, AA-104)

Quartz and limestone will be delivered to the site either by truck. Fugitive emissions of PM will be generated during the receiving, transferring, and handling of these materials. Since these operations will have the potential to emit $PM_{10}/PM_{2.5}$ emissions and will typically be in the form of a fugitive type release, typical PM control technologies are not appropriate for these types of operations. The types of control measures used for materials handling operations can be classified as best management practices and include inherent pollution control techniques (covered conveyors, partially enclosed conveyor drop points, minimization of pile drop discharge distance, etc.).

Step 1 - Identify Available $PM_{10}/PM_{2.5}$ Control Technologies

- Add on control devices such as a fabric filter and enclosed conveyance can be used to minimize particulate emission rates from material storage and handling operations. A baghouse is an air pollution abatement device used to trap particulates by filtering gas streams through large fabric bags. Fabric filters typically achieve PM control efficiencies of greater than 99%.
- Wet suppression systems use liquid sprays or foam to suppress the formation of airborne dust. The primary control mechanisms are those that prevent emissions through agglomerate formation by

combining small dust particles with larger aggregate or with liquid droplets. The key factors that affect the degree of agglomeration and, hence, the performance of the system are the coverage of the material by the liquid and the ability of the liquid to wet small particles. There are two types of wet suppression systems: liquid sprays which use water or water/surfactant mixtures as the wetting agent and systems which supply foams as the wetting agent. Wet suppression systems typically achieve PM control efficiencies of 50 to >90%.

- Best management plan (fugitive dust control plans) can provide for additional control of PM through managing the operations/equipment that generates the fugitive PM emissions. Implementation of these plans can reduce PM fugitive emissions by more than 50%.

Step 2 - Elimination of Technically Infeasible Fugitive PM Control Alternatives

The above technologies are technically feasible and will be ranked for evaluation as part of the BACT evaluation for controlling particulate emissions from this operation.

- Fabric Filter control devices: 99% control efficiency – The emissions from this source are fugitive in nature and thus cannot be effectively captured and controlled.
- Wet Suppression: 50 to > 90% control efficiency - The use of wet suppression systems for this source is feasible.
- Implementation of fugitive dust control plan: >50% control efficiency.

Step 3 - Rank the Remaining Control Technologies by Control Effectiveness

The top ranked control option is fugitive dust control plan including the use of wet suppression on an as needed basis. No control options were eliminated for economic reasons.

Step 4 - Evaluate the Most Effective Controls and Document the Results

Review of the U.S. EPA RACT/BACT/LAER Clearinghouse (RBLC) did not identify quartz handling and storage operations.

Review of state permits for similar operations (i.e., ferroalloy operations) revealed the following:

Facility/	Process	PM_{10} BACT Limit	Add-On Controls
Globe Metallurgical Inc Niagara Falls, NY Permit#: 9-2911-00078/00009 Date: 11/26/10	Raw Material Handling - Raw Material Transfer and Storage operations begin with the receipt of raw materials via truck or rail. Coal, coke, charcoal, gravel, woodchips, and turnings are unloaded via crane to piles or directly to a below grade conveyor or pit. Coal is transferred to the pit, from which it is conveyed up to enclosed raw material storage bins or unloaded to outdoor storage piles. Gravel is unloaded to piles, transported by crane to a conveyor, screened, and conveyed up to enclosed storage bins. Wood chips are dumped from a trailer to the pit and transported up to enclosed storage bins. From indoor bins, the raw materials are weighed and dropped to a skip bucket from which they are transferred to the top of the furnace.	No limit	Enclosed storage bins
Globe Metallurgical Selma, AL 104-0001 Date: 9/10/10	Product Handling – Raw material receiving, transfer and storage	Process weight rate limitation 20% opacity in one 6-minute average in any 60 minute period	No add-on controls
West Virginia Alloy, Inc. Alloy, West Virgina R30-01900001-2006 Date: 01/18/06	Raw material storage piles	No limit	None

Facility/	Process	PM_{10} BACT Limit	Add-On Controls
Globe Metallurgical Inc Waterford, OH ID: 06-84-00-0105 Date: 10/24/01	Raw material unloading and handling	20% opacity as a 3-minute average	Reasonable available control measures that are sufficient to minimize of eliminate visible emissions of fugitive dust
	Raw Material and Waste Storage Piles – Load in or load out, wind erosion	No visible particulate emissions except for 13 minutes during any 60-minute period	Reasonable available control measures that are sufficient to minimize of eliminate visible emissions of fugitive dust

The limit being proposed by MS Silicon is equivalent to or lower than the BACT limitations established for other material handling operations at other types of facilities.

Step 5 -Select BACT

BACT for the quartz and limestone storage pile handling operations (AA-103, AA-104) is proposed as the following:

- Best management practices including the incorporation 3-sided windscreen barrier, reduced drop heights, use of chemical stabilization dust suppressants and/or watering to reduce any visible emissions;
- Development of a fugitive dust control plan to minimize PM emissions; and
- No emission limit is being proposed for these operations since there is no available test method to determine the $PM/PM_{10}/PM_{2.5}$ emission rate.

Material Handling (Coal, Wood, Quartz) Baghouse (AA-101a, AA-102a, AA-103a) and Product Handling Area Baghouse (AA-301 and AA-403)

Material from the storage piles will be conveyed via front end loaders to enclosed day bins. From the day bins, the raw materials will be weighed and dropped to a skip bucket from which they will be transferred to the top of one (1) of four (4) semi-enclosed submerged arc furnaces for processing.

Step 1 - Identify Available $PM_{10}/PM_{2.5}$ Control Technologies

Since these operations will have the potential to emit $PM_{10}/PM_{2.5}$ emissions and will typically be in the form of point source release, these emission can be controlled using the particulate matter controls described in previous sections of this document.

Step 2 - Elimination of Technically Infeasible $PM_{10}/PM_{2.5}$ Control Alternatives

The test for technical feasibility of any control option is whether it is both available and applicable to reducing $PM_{10}/PM_{2.5}$ emissions from the SAF operations. The previously listed information resources were consulted to determine the extent of applicability of each identified control alternative.

(a) ESPs - use an electrostatic field to charge particulate matter contained in the gas stream and then attract and collect the particles on a collection surface of opposite charge. ESPs have very high removal efficiencies (99% or better) for many sources of particulates. However, they are not suitable for all types of applications. Due to the electromagnetic properties of small charged particles of metal compounds in an electric field, the particles adhere very strongly to the collection plates of an ESP and are extremely difficult to dislodge, resulting in ineffectivity of the ESP. Therefore, ESP is considered technically infeasible for controlling particulate emissions from the SAF.

(b) High Efficiency Cyclones - Particulate removal in cyclone collectors is achieved through the action of inertial forces, especially centrifugal. As the gas stream enters the top of the cyclone, a vortex is induced as it is forced to travel a circular path. Centrifugal forces cause the heavier particles to concentrate near the outer wall of the cyclone and particle of lesser mass to remain closer to the center of the vortex. Frictional and gravitational forces then act on the particles closest to the wall, causing them to fall toward the bottom of the cyclone, where they are collected in a hopper. Within the lower segment of the cyclone, the direction of the gas-flow vortex is reversed, and an inner ascending vortex is formed. The inner vortex consists of comparatively particulate-free air, which is collected through an outlet duct at the top of the cyclone. Cyclone collectors are considered technically feasible. However, they achieve the lowest particulate removal efficiencies (less than 90%) of all particulate control devices, especially for submicron particulates that will be emitted from the SAF.

(c) High Energy Scrubbers - High energy wet scrubbers are technically feasible and can achieve a high particulate collection efficiency (90% or better), but at the expense of a punitive pressure drop (ranging from 6 - 20 inches of water), higher operational utilities, generation of large quantities of sludge along with the associated problem of sludge handling, de-watering, and disposal.

(d) Fabric filters or baghouses are technically feasible for collecting fine particulate matter emissions associated with SAFs or other types of furnaces that have high particulate emissions. They can also achieve the highest control efficiency, among other particulate control devices, as applied to SAF operations.

(i) Positive pressure baghouses operate at internal pressures greater than the atmospheric pressure. Typically, the fans are located before the fabric filters. This allows the fans to pull

air from the SAF and push the dust laden air through the fabric filters and into the ambient air via a continuous ridge vent (old design) rather than a stack. The discharge area of a ridge vent is on the order of four times that of a single stack.

(ii) Negative pressure baghouses operate at internal pressure less than atmospheric. The fans are located after the fabric filters. This allows the fans to pull the gas laden air from the SAF, through the fabric filters, and then push the air up through a central stack.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

The following remaining control options are in order of descending control effectiveness:

(a) Fabric filters or baghouses - 99.9%;

(b) High Energy Scrubbers - 90% or more; or

(c) High Efficiency Cyclones - 50 to 90%.

Step 4 – Evaluate the Most Effective Controls and Document Results

Fabric filtration is the predominant control option for abatement of particulate emissions from material handling operations due to their effectiveness. Scrubbers and cyclones are not considered as effective as fabric filters or baghouses for controlling particulate emissions from silicon production operations.

Step 5 -Select BACT

BACT for the raw material and product handling operations (AA-101a, AA-102a, AA-103a, AA-301, AA-403) is proposed as the following:

- Baghouse for PM control; and
- A $PM_{10}/PM_{2.5}$ limitation of 0.003 gr/dscf.

It should be noted that MS Silicon is voluntarily designing the baghouse to meet 0.0015 gr/dscf to minimize the potential impact on $PM_{10}/PM_{2.5}$ air quality. This emission rate does not constitute BACT.

4.3.6 BACT Analysis for $PM_{10}/PM_{2.5}$ Emissions from Silica Fume Silos (AA-404)

Silica fumes collected in the SAF baghouses will be pneumatically transferred to the silica fume silos. In the silos, the silica fumes will be densified to about 45 lbs/cu.ft., prior to dispatch to cement and refractory manufacturers that can use this dust in their other operations (i.e., cement and refractory).

Step 1 - Identify Available $PM_{10}/PM_{2.5}$ Control Technologies

Since these operations will have the potential to emit $PM_{10}/PM_{2.5}$ emissions and will typically be in the form of point source release, these emission can be controlled using the particulate matter controls described in previous sections of this document.

Step 2 - Elimination of Technically Infeasible $PM_{10}/PM_{2.5}$ Control Alternatives

The test for technical feasibility of any control option is whether it is both available and applicable to reducing $PM_{10}/PM_{2.5}$ emissions from the SAF operations. The previously listed information resources were consulted to determine the extent of applicability of each identified control alternative.

(a) ESPs - use an electrostatic field to charge particulate matter contained in the gas stream and then attract and collect the particles on a collection surface of opposite charge. ESPs have very high removal efficiencies (99% or better) for many sources of particulates. However, they are not suitable for all types of applications. Due to the electromagnetic properties of small charged particles of metal compounds in an electric field, the particles adhere very strongly to the collection plates of an ESP and are extremely difficult to dislodge, resulting in ineffectivity of the ESP. Therefore, ESP is considered technically infeasible for controlling particulate emissions from the SAF.

(b) High Efficiency Cyclones - Particulate removal in cyclone collectors is achieved through the action of inertial forces, especially centrifugal. As the gas stream enters the top of the cyclone, a vortex is induced as it is forced to travel a circular path. Centrifugal forces cause the heavier particles to concentrate near the outer wall of the cyclone and particle of lesser mass to remain closer to the center of the vortex. Frictional and gravitational forces then act on the particles closest to the wall, causing them to fall toward the bottom of the cyclone, where they are collected in a hopper. Within the lower segment of the cyclone, the direction of the gas-flow vortex is reversed, and an inner ascending vortex is formed. The inner vortex consists of comparatively particulate-free air, which is collected through an outlet duct at the top of the cyclone. Cyclone collectors are considered technically feasible. However, they achieve the lowest particulate removal efficiencies (less than 90%) of all particulate control devices, especially for submicron particulates that will be emitted from the SAF.

(c) High Energy Scrubbers - High energy wet scrubbers are technically feasible and can achieve a high particulate collection efficiency (90% or better), but at the expense of a punitive pressure drop (ranging from 6 - 20 inches of water), higher operational utilities, generation of large quantities of sludge along with the associated problem of sludge handling, de-watering, and disposal.

(d) Fabric filters or baghouses are technically feasible for collecting fine particulate matter emissions associated with SAFs or other types of furnaces that have high particulate emissions. They can also achieve the highest control efficiency, among other particulate control devices, as applied to SAF operations.

(i) Positive pressure baghouses operate at internal pressures greater than the atmospheric pressure. Typically, the fans are located before the fabric filters. This allows the fans to pull air from the SAF and push the dust laden air through the fabric filters and into the ambient air via a continuous ridge vent (old design) rather than a stack. The discharge area of a ridge vent is on the order of four times that of a single stack.

(ii) Negative pressure baghouses operate at internal pressure less than atmospheric. The fans are located after the fabric filters. This allows the fans to pull the gas laden air from the SAF, through the fabric filters, and then push the air up through a central stack.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

The following remaining control options are in order of descending control effectiveness:

(a) Fabric filters or baghouses - 99.9%;

(b) High Energy Scrubbers - 90% or more; or

(c) High Efficiency Cyclones - 50 to 90%.

Step 4 – Evaluate the Most Effective Controls and Document Results

Fabric filtration is the predominant control option for abatement of particulate emissions from these operations. Scrubbers and cyclones are not considered as effective as fabric filters or baghouses for controlling particulate emissions from silicon production operations.

Step 5 -Select BACT

BACT for the silica fume silos (AA-404) is proposed as the following:

- Bin vent filter for PM control; and
- A $PM_{10}/PM_{2.5}$ limitation of 0.01 gr/dscf.

4.3.7 BACT Analysis for $PM_{10}/PM_{2.5}$ Emissions from Emergency Equipment (AA-501)

The emergency equipment includes the following:

- Diesel-Fired Emergency Generator (1 rated at 670-HP): 0.001 tpy $PM_{10}/PM_{2.5}$.

Step 1 – Identify Control Options

There are no control options identified in the RBLC that are technically feasible to control $PM_{10}/PM_{2.5}$ that is emitted from emergency generators. See below table for summary of PM BACT determinations from the RBLC database.

Step 2 - Technical Feasibility of $PM_{10}/PM_{2.5}$ Control Alternatives

The emergency diesel fired generator associated with the proposed project will be used primarily for emergency situations, if any. However, to maintain the integrity of the equipment, the generator will be operated for 100 hours per year or less. The projected annual $PM_{10}/PM_{2.5}$ emissions rate is 0.001 tpy. Based on a review of similar emission sources, these emission sources typically do not have any add-on controls and should be operated per manufacturer's specifications.

Step 3 - Rank Remaining Alternatives by Control Effectiveness

The most effective method for control of $PM_{10}/PM_{2.5}$ emissions from operation of the emergency fuel combustion devices is the use of fuel specifications that employ clean burning fuels, implementation of good combustion practices and use of combustion controls inherent to the design of the individual combustion devices.

Step 4 - Evaluate Most Effective Controls

Since there are no other feasible technologies to control $PM_{10}/PM_{2.5}$ emissions from the emergency equipment, economic, energy and environmental impact analyses were not performed, nor are required by USEPA's Top-Down approach.

The following table lists the existing $PM_{10}/PM_{2.5}$ BACT determinations for diesel fired emergency equipment. All data in the table is based on the information obtained from the U.S. EPA RACT/BACT/LAER Clearinghouse (RBLC), and electronic versions of permits available at the websites of other permitting agencies.

Facility/ RBLC ID	Permit Date	Process	$PM_{10}/PM_{2.5}$ BACT Limit	Add-On Controls
Southeast Renewable Fuels (FL-0322)	12/23/10	Emergency ULSD Generators (two 2,682 HP)	Total PM: 0.2 g/KW-H	No controls The emergency generators shall comply with the emission limit and demonstrate compliance in accordance with the procedures given in NSPS 40 CFR 60, Subpart IIII.
		Emergency ULSD Fire Pump (One 600 HP)	Total PM: 0.15-g/HP-hr	No controls The fire pumps shall comply with the emission limit and demonstrate compliance in accordance with the procedures given in NSPS 40 CFR 60, Subpart IIII.
Idaho Power Company ID-0018	6/25/10	750 KW Emergency Diesel Generator	PM: 0.2 g/KW-H -H	Tier 2 Engine, Good combustion practices
Consumers Energy (MI-0389	12/29/09	2000 KW Emergency ULSD Generator	Total PM: 0.2 g/KW-H Total PM_{10}: 0.0573 g/KW-H	Engine design and operation, 15 ppm sulfur fuel Operational Limits: 1 hr/day, 500 hrs/yr for $PM_{2.5}$ NAAQS
Verenium (FL-0318)	12/10/09	2000 KW Emergency generators	Total PM: 0.2 g/KW-H	None

Facility/ RBLC ID	Permit Date	Process	$PM_{10}/PM_{2.5}$ BACT Limit	Add-On Controls
		Emergency ULSD Fired Pump	Total PM: 0.15-g/HP-hr	The fire pump engine is an Emergency Stationary Compression Ignition Internal Combustion Engine (Stationary ICE) and shall comply with applicable provisions of 40 CFR 60, Subpart IIII
Lake Charles Cogeneration, LLC (LA-0231)	06/22/09	Emergency Diesel Power Generator Engines (1341 HP)	Total PM_{10} 0.06 lb/h	Comply with 40 CFR 60 Subpart IIII
Southeast Idaho Energy, LLC (ID-0017)	2/10/09	2 MW Emergency Generator	Comply with NSPS IIII	Good combustion practices, EPA certified per NSPS IIII, ULSD fuel, limited to 100 hours of operation per year
		500 KW emergency generator	Comply with NSPS IIII	Good combustion practices, EPA certified per NSPS IIII, ULSD fuel, limited to 100 hours of operation per year
Associated Electric Cooperative Inc (OK-0129)	1/23/09	2200 HP low sulfur diesel emergency generator	Total PM_{10}: 0.2 g/KW-H	None
		267 HP low sulfur diesel emergency fir pump	Total PM_{10}: 0.4 G/HP-H	

As shown in the table above, BACT for the emergency equipment is compliance with NSPS IIII and good combustion/operating practices.

Step 5 – Select BACT for $PM_{10}/PM_{2.5}$ from Emergency Equipment

BACT is proposed as compliance with NSPS IIII and good combustion/operating practices.

4.3.8 BACT analysis for $PM_{10}/PM_{2.5}$ Emissions from Wood Chipper (AA-102b)

The portable electric wood chipper will be used for as needed wood grinding/chipping and will be limited to 2080 hours per year of operation. Fugitive particulate emissions can occur from operation of the wood

chipper (AA-102b). The wood chipper operation design will include an enclosure that will minimize fugitive dust emissions.

Step 1 – Identify Control Options

Due to the limited hours of operation and the fugitive nature of the operation, there are no control options that are technically feasible to control $PM_{10}/PM_{2.5}$ that is emitted from wood chippers.

Step 2 - Technical Feasibility of $PM_{10}/PM_{2.5}$ Control Alternatives

No wood chippers were identified in the RBLC database. Based on a review of similar emission sources, these emission sources typically do not have any add-on controls and should be operated per manufacturer's specifications.

Step 3 - Rank the Remaining Control Technologies

The only remaining technically feasible method for control of particulate emissions resulting from operation of the wood chipper is an enclosure that will minimize fugitive dust emissions and limited hours of operation. The combination of these control methods represents the Top-Rated control.

Step 4- Evaluate the Most Effective Control

Since there are no other feasible technologies available that could achieve the same level of PM control as that being proposed for the wood chipper, equipment, economic, energy, and environmental impact analyses were not performed, nor are required by USEPA's Top-Down approach.

Step 5 - Select BACT

The following has been proposed as BACT for controlling PM emissions from the wood chipper:

- Operation of the wood chipper with an enclosure or similar that will minimize fugitive dust emissions;
- Limited hours of operation for the wood chipper; and
- No emission limit is being proposed for this operation since there are no available test methods to determine the $PM/PM_{10}/PM_{2.5}$ emission rate.

4.3.9 BACT analysis for $PM_{10}/PM_{2.5}$ Emissions from Bulldozer Storage Pile Processing (AA-105)

Bulldozers will be used to groom and maintain the storage piles. The emissions from these operations are fugitive in nature.

Step 1 – Identify Control Options

Due to the fugitive nature of the operation, there are no add-on control options that are technically feasible to control $PM_{10}/PM_{2.5}$ that is emitted from bulldozing the storage piles. Review of the RBLC database and other silicon plant permits did not identify similar operations.

Step 2 - Technical Feasibility of $PM_{10}/PM_{2.5}$ Control Alternatives

Based on the nature of the operation, the only viable controls are the use of best management practices (i.e., dust minimization techniques including as needed water spray application and wind screens).

Step 3 - Rank the Remaining Control Technologies

The only remaining technically feasible method for control of particulate emissions resulting from bulldozing operations on the storage piles is the use of best management practices (i.e., dust minimization techniques including as needed water spray application and wind screens). The combination of these control methods represents the Top-Rated control.

Step 4- Evaluate the Most Effective Control

Since there are no other feasible technologies available that could achieve the same level of PM control as that being proposed for the storage pile processing operations, equipment, economic, energy, and environmental impact analyses were not performed, nor are required by USEPA's Top-Down approach.

Step 5 - Select BACT

The following has been proposed as BACT for controlling PM emissions from the storage pile processing (AA-105):

The proposed BACT for storage pile processing (bulldozing) associated with this project is:

- The development of a dust control plan including the use of measures designed to eliminate dust such as application of wet suppressants, watering, wind screens and speed reduction, as required; and
- No emission limit is being proposed for this operation since there are no available test methods to determine the $PM/PM_{10}/PM_{2.5}$ emission rate.

4.3.10 BACT Analysis for $PM_{10}/PM_{2.5}$ Emissions from Storage Pile Wind Erosion (AA-106)

PM emissions may be generated by wind erosion from the storage piles. Because the material stored will be fairly heavy and will not consist of a fine dust-like material, potential emissions should be minimal.

Step 1 - Identification of Available $PM/PM_{10}/PM_{2.5}$ Controls

- Add on control devices such as a fabric filter and enclosed conveyance can be used to minimize particulate emission rates from material storage and handling operations. A baghouse is an air

pollution abatement device used to trap particulates by filtering gas streams through large fabric bags. Fabric filters typically achieve PM control efficiencies of greater than 99%.

- Wet suppression systems use liquid sprays or foam to suppress the formation of airborne dust. The primary control mechanisms are those that prevent emissions through agglomerate formation by combining small dust particles with larger aggregate or with liquid droplets. The key factors that affect the degree of agglomeration and, hence, the performance of the system are the coverage of the material by the liquid and the ability of the liquid to wet small particles. There are two types of wet suppression systems: liquid sprays which use water or water/surfactant mixtures as the wetting agent and systems which supply foams as the wetting agent. Wet suppression systems typically achieve PM control efficiencies of 50 to >90%.
- Best management plan (fugitive dust control plans) can provide for additional control of PM through managing the operations/equipment that generates the fugitive PM emissions. Implementation of these plans can reduce PM fugitive emissions by more than 50%.

Step 2 - Elimination of Technically Infeasible $PM/PM_{10}/PM_{2.5}$ Control Alternatives

The above technologies are technically feasible and will be ranked for evaluation as part of the BACT evaluation for controlling particulate emissions from this operation.

- Fabric Filter control devices: 99% control efficiency – The emissions from this source are fugitive in nature and thus cannot be effectively captured and controlled.

- Wet Suppression: 50 to > 90% control efficiency - The use of wet suppression systems for this source is feasible.

- Implementation of fugitive dust control plan: >50% control efficiency

Step 3 - Rank the Remaining Control Technologies by Control Effectiveness

The top ranked control option is fugitive dust control plan including the use of wet suppression on an as needed basis and the implementation of a fugitive dust control plan.

Step 4 - Evaluate the Most Effective Controls and Document the Results

The following table lists existing particulate BACT determinations, for material storage pile operations. All data in the table is based on the information obtained from the U.S. EPA RACT/BACT/LAER Clearinghouse (RBLC), and electronic versions of permits available at the websites of other permitting agencies.

Material Storage Areas					
Facility	**Date**	**Basis**	**Source**	**$PM/PM_{10}/PM_{2.5}$ BACT Limit**	**BACT Control Method**
Nucor Steel OH-0341	12/23/10	BACT-PSD	Scrap steel storage piles	Fugitive PM - 0.43 ton/yr Fugitive PM_{10} - 0.22 ton/yr Fugitive $PM_{2.5}$ - 0.06 ton/yr	Minimize drop height
Consolidated Environmental Management – Nucor Steel LA-0239	5/24/10	BACT-PSD	Coal Storage Pile	Total PM - 3.99 ton/yr	BACT is selected to be implementation of wet suppression of dust generating sources by water sprays at each storage pile site
			Slag processing storage piles	Total PM - 1.19 ton/yr	BACT is selected to be wet suppression of dust generating sources by water sprays
			Iron Ore Pellet storage piles	Filterable PM - 13.88 ton/yr	BACT is selected to be implementation of wet suppression of dust generating sources by water sprays at each storage pile site
			Flux storage piles	Filterable PM - 2.18 ton/yr	BACT is selected to be implementation of wet suppression of dust generating sources by water sprays at each storage pile site
			Granulated slag storage piles	Filterable PM - 2.18 ton/yr	BACT is selected to be implementation of wet suppression of dust generating sources by water sprays at each storage pile site
Osceola Steel Company, Georgia	3/15/10	BACT-PSD	Slag storage piles	No Emission limit	The control method is source control, either through minimizing drop height or wet suppression of the material. In addition, roadways and stockpiles of slag to be processed will also be treated by wet suppression

Material Storage Areas					
Facility	**Date**	**Basis**	**Source**	**$PM/PM_{10}/PM_{2.5}$ BACT Limit**	**BACT Control Method**
Ohio River Clean Fuels, LLC OH-0317	11/20/08	BACT-PSD	Coal Storage Piles	Fugitive PM - 12.3 tpy PM_{10}	3-sided windscreen barrier, reduced drop heights, use of chemical stabilization dust suppressants and/or watering to reduce any visible emissions
			Biomass Storage Piles	Fugitive PM - 2.7 tpy PM_{10}	3-sided windscreen barrier, reduced drop heights, use of chemical stabilization dust suppressants and/or watering to reduce any visible emissions
			Slag storage piles	Fugitive PM 1.6 ton/yr from wind 11.7 ton/yr load out	Use of water trucks or fire hoses to maintain high moisture content. Water applied for load out. Minimize free fall distances. Haul trucks covered.
Nucor Steel, Indiana	6/1/12	BACT-PSD	Slag Storage	Opacity limits: Stockpiling of slag adjacent to the grizzly feeder = 3 % Wind erosion of stockpiles = 3% Continuous stacking of processed slag to stockpiles = 3%	Fugitive Dust Control Plan

Step 5 -Select BACT

Proposed BACT for Material Storage Pile Operations (AA-106):

- Implementation of a fugitive dust control plan. Visible emissions from the storage piles shall be controlled by the application of water, other dust suppressants or the use of wind screens, as needed.

- No emission limit is being proposed for these operations since there is no available test method to determine the $PM/PM_{10}/PM_{2.5}$ emission rate.

4.3.11 BACT Analysis for $PM_{10}/PM_{2.5}$ Emissions from Paved and Unpaved Roads

Fugitive particulate emissions can occur from paved and unpaved surfaces.

Step 1: Identify all control technologies

The RACT/BACT/LAER (RBLC) Clearinghouse and review of other permits reveal that the PM control for paved and unpaved roads includes the use dust suppressants, roadway sweeping, covering of transport vehicles, and speed limits.

Add-on Control Technology:

Watering and the use of chemical wetting agents are the principal means for control of emissions from materials handling operations involving transfer of bulk minerals in aggregate form. Dust control can be achieved by: (a) source extent reduction (e.g., mass transfer reduction), (b) source improvement related to work practices and transfer equipment such as load in and load out operations (e.g., drop height reduction, wind sheltering, moisture retention), and (c) surface treatment (e.g., wet suppression).

In most cases, good work practices provide substantial opportunities for emission reduction without the need for investment in a control application program. In particular, spillage of material caused by pile lead-out and maintenance equipment can add a large source component associated with traffic entrained dust. The traffic dust component may easily dominate over emissions from transfer of material and wind erosion. The prevention of spillage and subsequent spreading of material by vehicles traversing the area is essential to cost-effective emission control. If spillage cannot be prevented because of the need for intense use of mobile equipment in the storage pile area, then regular cleanup should be employed as a necessary mitigative measure.

Fugitive emissions from paved roadways can also be controlled by wet suppression systems. These systems use liquid sprays or foam to suppress the formation of airborne dust. The primary control mechanisms are those that prevent emissions through agglomerate formation by combining small dust particles with larger aggregate or with liquid droplets. The key factors that affect the degree of agglomeration and, hence, the performance of the system are the coverage of the material by the liquid and the ability of the liquid to wet small particles. There are two types of wet suppression systems—liquid sprays which use water or water/surfactant mixtures as the wetting agent and systems which supply foams as the wetting agent. The wetting agent can be water or a combination of water and a chemical surfactant. This surfactant, or surface active agent, reduces the surface tension of the water. As a result, the quantity of liquid needed to achieve good control is reduced.

Step 2: Eliminate Technically Infeasible Options

The PM control options noted above are feasible control alternatives. Therefore, there is no elimination of technically infeasible fugitive PM control alternatives. There are no other known control alternatives (per review of the BACT/LAER clearinghouse) that have been utilized on roads.

Step 3: Rank Remaining Technically Feasible Control Options

Development of a fugitive dust control plan which includes removal of deposits on roadways, speed limitation on vehicle traffic and wet suppression techniques as needed will be employed as BACT for paved and unpaved roads.

Step 4: Evaluate the Most Effective Controls and Document the Results

The following table lists the proposed particulate BACT determination along with the existing particulate BACT determinations for the paved and unpaved roads. All data in the table is based on the information obtained from the U.S. EPA RACT/BACT/LAER Clearinghouse (RBLC), and electronic versions of permits available at the websites of other permitting agencies.

Step 5 – Select BACT

A review of USEPA's RACT/BACT/LAER Clearinghouse identified the following with respect to paved roads:

Facility/ RBLC ID	Permit Date	Basis	Process	PM BACT Limit	Add-On Controls
V&M Star OH-0344	1/27/11	BACT-PSD	Paved and unpaved roadways and parking areas	Fugitive PM10: 7.7 tpy	Employ best available control measures: watering, sweeping, chemical stabilization, or suppressants applied at sufficient frequencies
Nucor Steel OH-0341	12/23/10	BACT-PSD	Roadways	Fugitive PM10: 5.93 tpy	Best available control measures to include watering, resurfacing, chemical stabilization, and/or speed reduction at sufficient frequency to ensure compliance
Flopam, Inc. LA-0240	06/14/10	BACT-PSD	Roadway Fugitives	Total PM10: 0.04 lb/hr	Main roadway shall be paved where practical. Precautions shall be taken to prevent dust from becoming airborne

Facility/ RBLC ID	Permit Date	Basis	Process	PM BACT Limit	Add-On Controls
Consolidated Environmental Management, Inc LA-0239	05/24/10	BACT-PSD	Unpaved Road Fugitive Dust	18.69 lb/hr 81.85 tpy	BACT for road dust is to pave roadways where practicable including areas where the extra heavy vehicles (greater than 50 tons in weight) will not cause damage to paving. Unpaved roads shall utilize water spray or dust suppression chemicals to reduce emissions. Additionally, reduced speed limits of less than or equal to 15 mph will be enforced on all unpaved roadways
V&M Star OH-0328	04/10/09	BACT-PSD	Roadways and parking areas	Filterable PM_{10}: 12.4 tpy using AP-42 emission factors	Control measures sufficient to minimize or eliminate emissions
Rumke Sanitary Landfill OH-0330	12/23/08	BACT-PSD	Paved roadways and parking areas	Filterable PM_{10}: 15.1 tpy	Best available control measures to minimize or prevent emissions, including water flushing and sweeping of paved roads/parking areas; and applying water or other dust suppressant to unpaved roads..
Southwest Electric Power Company AR-0094	11/05/08	BACT-PSD	Roads	PM: 1.1 lb/hr	Watering/dust suppression chemicals
New Steel International, Inc. OH-0315	05/06/08	BACT-PSD	Paved roadways and parking areas	PM: 153.4 tpy fugitive dust	Control measures include application of wet suppressants, watering, speed reduction and vacuuming or sweeping

Based on information presented reviewed for this BACT analysis, the $PM_{10}/PM_{2.5}$ control measures presented above focus solely on measures designed to eliminate dust such as application of wet suppressants, watering, speed reduction and vacuuming or sweeping. No other applicable $PM_{10}/PM_{2.5}$ control measures were identified in this review.

BACT for paved and unpaved roads associated with this project is proposed as:

- The development of a dust control plan including the use of measures designed to eliminate dust such as application of wet suppressants, watering, speed reduction and vacuuming or sweeping, as required; and
- No emission limit is being proposed for emissions from paved and unpaved roads since there are no available test methods to determine the $PM/PM_{10}/PM_{2.5}$ emission rate.

4.4 Best Available Control Technology (BACT) Analysis - Emissions of NO_x

The BACT evaluation focuses on the control technologies that have been demonstrated and commercially available for control of NO_x emissions. Because of the importance of controlling these emissions, MS Silicon evaluated technologies that have been demonstrated on similar processes so that emissions of NO_x will be controlled to the levels specified.

Nitrogen oxides formation occurs by three fundamentally different mechanisms. The principal mechanism of NO_x formation in natural gas combustion is thermal NO_x. The thermal NO_x mechanism occurs through the thermal dissociation and subsequent reaction of nitrogen (N_2) and oxygen (O_2) molecules in the combustion air. Most NO_x formed through the thermal NO_x mechanism occurs in the high temperature flame zone near the burners. The formation of thermal NO_x is affected by three furnace-zone factors: (1) oxygen concentration, (2) peak temperature, and (3) time of exposure at peak temperature. As these three factors increase, NO_x emission levels increase. The emission trends due to changes in these factors are fairly consistent for all types of natural gas-fired boilers and furnaces. Emission levels vary considerably with the type and size of combustor and with operating conditions (e.g., combustion air temperature, volumetric heat release rate, load, and excess oxygen level). The second mechanism of NO_x formation, called prompt NO_x, occurs through early reactions of nitrogen molecules in the combustion air and hydrocarbon radicals from the fuel. Prompt NO_x reactions occur within the flame and are usually negligible when compared to the amount of NO_x formed through the thermal NO_x mechanism. However, prompt NO_x levels may become significant with ultra-low-NO_x burners. The third mechanism of NO_x formation, called fuel NO_x, stems from the evolution and reaction of fuel-bound nitrogen compounds with oxygen. Due to the characteristically low fuel nitrogen content of natural gas, NO_x formation through the fuel NO_x mechanism is insignificant. [6]

4.4.1 NO_x Emission Sources Subject to Control Technology Evaluation

The NO_x emission sources associated with the proposed plant that are included in this NO_x BACT evaluation are as follows:

- Semi-Enclosed Submerged Arc Furnaces (SAFs);
- Natural gas fired combustion equipment; and
- Emergency equipment.

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[6] AP 42, Fifth Edition, Volume I, Chapter 1.4: External Combustion Sources Natural Gas Combustion, July 1998

For a summary of the estimated NO_x emission rates for the sources identified above, please refer to the following table:

NO_x Emission Rates for Sources Evaluated for BACT

Equipment Description	NO_x Emission Rate (tons/year)
Semi-Enclosed Submerged Arc Furnace (SAFs)	1892.2
Natural Gas Combustion Equipment • Ladle preheaters	14.0
Emergency Equipment: • Emergency Generators	0.02
Total	**1906.2**

4.4.2 BACT Analysis for NO_x Emissions from Submerged Arc Furnaces (AA-201)

Step 1 – Identify Control Options

The first step of the Top-Down BACT analysis is to assess the proposed emission reduction options. The sources of information on emission reduction options vary for the air emission sources being analyzed. The following information resources were consulted in searching for the alternatives available for controlling NO_x emissions from plant operations:

1. On-line USEPA Control Technology Database;
2. State Air Quality Permits; and
3. Control Technology Vendors.

The following control technologies were identified and evaluated to control NO_x emissions from the semi-enclosed submerged arc furnace (SAF):

(a) Combustion Controls;

(b) Selective Catalytic Reduction (SCR);

(c) Non-Selective Catalytic Reduction (NSCR);

(d) SCONO$_x$ Catalytic Oxidation/Absorption; and

(e) Shell DeNO$_x$ System (modified SCR);

(1) Selective Non-Catalytic Reduction (SNCR) options -

(2) Exxon's Thermal DeNO$_x$ ®

(3) Nalco Fuel Tech's NO$_x$OUT®

(4) Low Temperature Oxidation (LTO).

Step 2 – Eliminate Technically Infeasible Control Options

The test for technical feasibility of any control option is whether it is both available and applicable to reducing NO$_x$ emissions from the SAF. The previously listed information resources were consulted to determine the extent of applicability of each identified control alternative.

(a) Combustion Controls - There is an entire group of combustion controls for NO$_x$ reduction from various combustion units as follows:

1. Low Excess Air (LEA) - This control option is typically used in conjunction with some of the other options. The use of this option will result in the generation of additional CO emissions, which is another pollutant under review in this BACT analysis. In addition, LEA is not very effective for implementation in electric arc furnaces that do not operate with combustion air feeds, since the combustion option is considered technically infeasible for this application and will not be considered any further in this BACT analysis.
2. Oxyfuel Burner - The SAF system does not employ natural gas-fired oxyfuel burners, thus, this option will be excluded for further consideration in this BACT analysis.
3. Overfire Air (OFA) - This control option is geared primarily for fuel NO$_x$ reduction, which is not the major NO$_x$ formation mechanism from SAFs. Further, this option is associated with potential operational problems due to low primary air, creating incomplete combustion conditions. Such conditions can result in inefficient processing and unacceptable increases in tap-to-tap times. Thus, this option is considered technically infeasible for this application and will not be considered any further in this BACT analysis.
4. Burners Out Of Service (BOOS) - BOOS and Load Reduction (or Deration) options - incorporate a reduction in furnace load, thereby, potentially reducing NO$_x$ formation. This reduction must be balanced, however, against a longer period of NO$_x$ generation resulting from the furnace's inability to efficiently melt material. Furthermore, both BOOS and Load Reduction are fundamentally inconsistent with the design criterion for the furnace, which is to increase furnace loadings to achieve enhanced production. Therefore, these control options are not technically feasible for this particular application and will not be considered any further in this BACT analysis.

5. Reduced Combustion Air Temperature - This control option inhibits thermal NO_x production. However, the option is limited to equipment with combustion air preheaters which are not applicable to the silicon production operations. Thus, this option is considered technically infeasible for this application and will not be considered any further in this BACT analysis.

6. Flue Gas Recirculation (FGR) - FGR option involves recycling a portion of the cooled exit flue gas back into the primary combustion zone. Typically, FGR is useful in reducing thermal NO_x formation by lowering the oxygen concentration in the combustion zone. The primary limitation of FGR is that it alters the distribution of heat (resulting in cold spots) and lowers the efficiency of the furnace. Since it may be necessary to add additional burners (hence, increasing emissions of other pollutants) to the SAF to reduce the formation of cold spots, FGR technology to reduce SAF NO_x emissions is not considered feasible. Since the SAF does not operate on burner combustion, but relies upon the electric arc and chemical energy for oxidation, neither pathway is amenable to FGR application. Thus, this option is considered technically infeasible for this application and will not be considered any further in this BACT analysis.

(b) Selective Catalytic Reduction (SCR) -- In this process, ammonia (NH_3), usually diluted with air or steam, is injected through a grid system into the exhaust gas stream upstream of a catalyst bed. On the catalyst surface the NH_3 reacts with NO_x to form molecular nitrogen and water. The basic reactions are as follows:

$$4NH_3 + 4NO + O_2 \rightarrow 4N_2 + 6H_2O \text{ (i)}$$

$$8NH_3 + 6NO_2 \rightarrow 7N_2 + 12H_2O \text{ (ii)}$$

The reactions take place on the surface of the catalyst. Usually, a fixed bed catalytic reactor is used for SCR systems. The function of the catalyst is to effectively lower the technology include the catalyst reactor design, optimum operating temperature, sulfur content of the charge, catalyst deactivation due to aging, ammonia slip emissions and design of the ammonia injection system.

Depending on system design, NO_x removal of 80 - 90 percent may be achievable under optimum conditions (refer, USEPA "ACT Document - NO_x Emissions from Iron and Silicon productions", Sept., 1994). The reaction of NH_3 and NO_x is favored by the presence of excess oxygen. Another variable affecting NO_x reduction is exhaust gas temperature. The greatest NO_x reduction occurs within a reaction window at catalyst bed temperatures between 600 °F – 750 °F for conventional (vanadium or titanium-based) catalyst types, and 470 °F – 510 °F for platinum-based catalysts. Performance for a given catalyst depends largely on the temperature of the exhaust gas stream being treated. A given catalyst exhibits optimum performance when the temperature of the exhaust gas stream is at the midpoint of the reaction temperature window for applications where exhaust gas oxygen concentrations are greater than 1 percent. Below the optimum temperature range, the catalyst activity is greatly reduced, potentially allowing unreacted ammonia (referred to as "ammonia slip") to be emitted directly to the atmosphere.

The SCR system may also be subject to catalyst deactivation over time. Catalyst deactivation occurs through two primary mechanisms – physical deactivation and chemical poisoning. Physical deactivation is generally the result of either continual exposure to thermal cycling or masking of the catalyst due to entrainment of particulates or internal contaminants. Catalytic poisoning is caused by the irreversible reaction of the catalyst with a contaminant in the gas stream. Catalyst suppliers typically guarantee a 3-year catalyst lifetime for a sustainable emission limit.

In order for an SCR system to effectively reduce NO_x emissions, the exhaust gas stream should have relatively stable gas flow rates, NO_x concentrations, and temperature. In addition, certain elements such as iron, nickel, chrome, and zinc can react with platinum catalysts to form compounds or alloys which are not catalytically active. These reactions are termed "catalytic poisoning", and can result in premature replacement of the catalyst. An SAF flue gas may contain a number of these catalytic poisons. In addition, any solid material in the gas stream can form deposits and result in fouling or masking of the catalytic surface. Fouling occurs when solids obstruct the cell openings within the catalyst. Masking occurs when a film forms on the surface of catalyst over time. The film prevents contact between the catalytic surface and the flue gas. Both of these conditions can result in frequent cleaning and/or replacement requirements. Due to the above effective technical applicability constraints, SCR technology has never been applied to silicon production operations, and will be eliminated for further evaluation in this BACT analysis.

(c) Non-Selective Catalytic Reduction (NSCR) - The NSCR system is a post-combustion add-on exhaust gas treatment system. It is often referred to as a "three-way conversion" catalyst since it reduces NO_x, unburned hydrocarbons (UBH), and CO simultaneously. In order to operate properly, the combustion process must be stoichiometric or near stoichiometric which is not maintained in an SAF and varies widely under regular operation. Under stoichiometric conditions, in the presence of the catalyst, NO_x is reduced by CO, resulting in nitrogen and carbon dioxide. Currently, NSCR systems are limited to rich-burn IC engines with fuel rich ignition system applications. In view of the above limitations, the NSCR option is considered technically infeasible for this application and will not be considered any further in this BACT analysis.

(d) $SCONO_x$-Catalytic Oxidation/Absorption -- This is a catalytic oxidation/absorption technology that has been applied for reductions of NO_x, CO and VOC from an assortment of combustion applications that mostly include – small turbines, boilers and lean-burn engines. However, this technology has never been applied to silicon production operations.

An effective $SCONO_x$ application to a SAF has the following reservations:

(1) The technology is not readily adaptable to high-temperature applications outside the 300-700 °F range and is susceptible to thermal cycling that will be experienced in the MS Silicon application;

(2) Scale-up is still an issue. The technology has not been demonstrated for larger applications;

(3) Optimum $SCONO_x$ operation is predicated by stable gas flow rates, NO_x concentrations and temperature. As discussed earlier, the nature of SAF operations does not afford any of these conditions which will significantly impair the effective control efficiency of the $SCONO_x$ system;

(4) The catalyst is susceptible to moisture interference and the vendor indicates negation of its warranties and performance guarantees if the catalyst is exposed to any quantity of liquid water. However, during certain atmospheric conditions, the catalyst could be potentially exposed to moisture following a unit shutdown;

(5) The prospect of moving louvers that effect the isolation of the saturated catalyst readily lends itself to the possibility of thermal warp and in-duct malfunctions in general. The process is dependent on numerous hot-side dampers that must cycle every 10-15 minutes. Directional flow solutions are not yet known to have been implemented for this technology;

(6) The K_2CO_3 coating on the catalyst surface is an active chemical reaction and reformulation site which makes it particularly vulnerable to fouling. On some field installations, the coating has been found to be friable and tends to foul in the harsh in-duct environment;

(7) During the regeneration step, the addition of the flammable reducing gas (natural gas which contains 85% methane) into the hot flue gas generates the possibility of LEL exceedances and subsequently catastrophic failure in the event the catalyst isolation is not hermetic or there is a failure in the carrier steam flow; and

(8) There is a possibility of some additional SO_2 emissions if the dry scrubber with the tandem "guard-bed" $SCOSO_x$ unit experiences a malfunction. Thus, there are significant reservations regarding effective technical applicability of this control alternative for a silicon production SAF application. Moreover $SCONO_x$ technology has never been proposed nor successfully implemented for similar industry applications. In view of the above limitations, $SCONO_x$ is considered technically infeasible for the present application and will not be considered any further in this BACT analysis.

(e) Shell $DeNO_x$ System (modified SCR) - The Shell $DeNO_x$ system is a variant of traditional SCR technology which utilizes a high activity dedicated ammonia oxidation catalyst based on a combination of metal oxides. The system is comprised of a catalyst contained in a modular reactor housing where in the presence of ammonia NO_x in the exhaust gas is converted to nitrogen and water. The catalyst is contained in a low-pressure drop lateral flow reactor (LFR), which makes best use of the plot space available. Due to the intrinsically high activity of the catalyst, the technology is suited for NO_x conversions at lower temperatures with a typical operating range of 250-660 °F.

The low temperature operation is the only aspect of the Shell $DeNO_x$ technology that marks its variance from traditional SCR technology. From an SAF application standpoint, there are no additional differences between this technology and SCR technology.

In summary, an effective Shell $DeNO_x$ application to the SAF application has the following reservations:

(1) The Shell $DeNO_x$ system does not suffer from similar placement limitation considerations discussed earlier for SCRs. However, even a downstream of the SAF baghouse placement of the system does not render it completely safe from the prospect of particulate fouling. The catalyst will still be exposed to particulates, which can inflict a masking effect impairing the effective control efficiency of the system;

(2) Optimum Shell $DeNO_x$ operation is predicated by stable gas flow rates, NO_x concentrations and temperature. The nature of silicon production operations does not afford any of these conditions which will significantly impair the effective control efficiency of the Shell $DeNO_x$ system;

(3) The catalyst is particularly susceptible to thermal fluctuations;

(4) The use of relatively large amounts of ammonia - a regulated toxic chemical – will have accidental release and hazardous impact implications; and

(5) Even a 7 parts per million by volume (ppmv) ammonia slip from a 500,000 acfm exhaust gas flow can result in a significant increase of emissions of ammonia which is a regulated hazardous air pollutant with well documented health impacts.

Thus, there are significant reservations regarding effective technical applicability of this control alternative for an SAF application. Moreover Shell $DeNO_x$ has never been proposed nor successfully implemented for similar applications. Therefore, the Shell $DeNO_x$ option is considered technically infeasible and will not be considered any further in this BACT analysis.

(f) Selective Non-Catalytic Reduction (SNCR) - The three commercially available SNCR systems are Exxon's Thermal $DeNO_x$ ® system, Nalco Fuel Tech's NO_xOUT® system and Low Temperature Oxidation (LTO). These technologies are reviewed below for technical feasibility in controlling SAF NO_x emissions.

(1) Exxon's Thermal $DeNO_x$ ® - Exxon's Thermal $DeNO_x$ ® system is a non-catalytic process for NOx reduction. The process involves the injection of gas-phase ammonia (NH_3) into the exhaust gas stream to react with NO_x. The ammonia and NO_x react according to the following competing reactions:

$$2NO + 4NH_3 + 2O_2 \rightarrow 3N_2 + 6H_2O \text{ (i)}$$

$$4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O \text{ (ii)}$$

The temperature of the exhaust gas stream is the primary criterion controlling the above selective reaction. Reaction (i) dominates in the temperature window of 1,600 °F - 2,200 °F resulting in a reduction of NO_x. However above 2,200 °F, reaction (ii) begins to dominate, resulting in enhanced NO_x production. Below 1,600 °F, neither reaction has sufficient activity to produce or destroy NOx. Thus, the optimum temperature window for the Thermal $DeNO_x$® process is approximately 1,600 °F - 1,900 °F. The above reaction temperature window can be shifted down to approximately 1,300 °F - 1,500 °F with the introduction of readily oxidizable hydrogen gas. In addition, the process also requires a minimum of 1.0 second residence time in the desired temperature window for any significant NO_x reduction.

In order for the Thermal $DeNO_x$ ® system to effectively reduce NO_x emissions, the exhaust gas stream should have relatively stable gas flow rates; ensuring the required residence time and be within the prescribed temperature range. Based on review of readily available information, application of Thermal $DeNO_x$® technology to control NO_x emissions from silicon production operations are not

known. Therefore, this option is considered technically infeasible and will not be considered any further in this BACT analysis.

In summary, an effective Thermal $DeNO_x$ ® application to the SAF application has the following reservations:

(A) The placement of the Thermal $DeNO_x$ ® system in an adequate temperature regime. In order to achieve optimum operational efficiency the system should be located in a temperature region of at least 1,300 °F and preferably between 1,600 °F - 1,900 °F which would put it upstream of the SAF baghouse. Such a placement configuration would not afford the desired temperature range, which would be typically in the region of 300 °F - 400 °F with an entry temperature of 250 °F at the inlet to the SAF baghouse. The system cannot be placed further upstream for operational hazard reasons. Also any injection mechanism upstream of the baghouse will be susceptible to prompt particulate fouling;

(B) Optimum Thermal $DeNO_x$ ® operation is predicated by stable gas flow rates, NO_x concentrations and temperature. The nature of silicon production operations does not afford any of these conditions which will significantly impair the effective control efficiency of the Thermal $DeNO_x$ ® system; and

(C) The use of relatively large amounts of ammonia - a regulated toxic chemical - will have accidental release and hazardous impact implications.

(2) Nalco Fuel Tech's NO_xOUT® - The NO_xOUT® process is very similar in principle to the Thermal $DeNO_x$ ® process, except that it involves the injection of a liquid urea (NH_2CONH_2) compound (as opposed to NH_3) into the high temperature combustion zone to promote NO_x reduction. The chemical reaction proceeds as follows:

$$NH_2 + NO \rightarrow N_2 + H_2O \text{ (i)}$$

The reaction involves the decomposition of urea at temperatures of approximately 1,700 °F - 3,000 °F. Certain proprietary additive developments have allowed the operational temperature window to shift to approximately 1,400 °F - 2,000 °F. However, the process still has similar constraints as the Thermal $DeNO_x$ ® system. The limitations are dictated by the reaction-controlling variables such as stable gas flow rates for a minimum residence time of 1.0 second in the desired temperature window to ensure proper mixing.

As with the Thermal $DeNO_x$ ® system, the NO_xOUT® system suffers from essentially similar limitations to effectively reduce NOx emissions from SAF operations. Moreover, applications of the NO_xOUT® technology to control NOx emissions from silicon production operations are not known. Therefore, this option is considered technically infeasible and will not be considered any further in this BACT analysis.

Similar to the Thermal DeNO$_x$® application, an effective NO$_x$OUT® application to the SAF application has the following reservations:

(A) The placement of the NO$_x$OUT® system in an adequate temperature regime. In order to achieve optimum operational efficiency the system should be located in a temperature region preferably between 1,400 °F - 2,000 °F which would put it upstream of the SAF baghouse. Firstly, such a placement configuration would not afford the desired temperature range, which would be typically in the region of 300 °F -400 °F with an entry temperature of 250 °F at the inlet to the SAF baghouse. Also any injection mechanism upstream of the baghouse will be susceptible to prompt particulate fouling;

There are significant reservations regarding effective technical applicability of this control alternative for an SAF application. In order for the NO$_x$OUT® system to effectively reduce NO$_x$ emissions, the exhaust gas stream should have relatively stable gas flow rates, ensuring the requisite residence time requirements and temperature. The temperature of the SAF exhaust gas will vary widely over the melt cycle, and will not remain in the desired temperature window during all phases of operation. Similarly, the gas flow rates will not remain stable during furnace operation, precluding the possibility of adequate residence time. Moreover, NO$_x$OUT® technology has never been proposed nor successfully implemented to control NO$_x$ emissions from SAFs.

(3) Low Temperature Oxidation (LTO) - LTO technology has never been utilized for any silicon production application. The technology is a variant of SNCR technology using ozone. The ozone is injected into the gas stream and the NO$_x$ in the gas stream is oxidized to nitrogen pentoxide (N_2O_5) vapor, which is absorbed in the scrubber as dilute nitric acid (HNO_3). The nitric acid is then neutralized with caustic (NaOH) in the scrubber water forming sodium nitrate ($NaNO_3$). The overall chemical reaction can be summarized as follows:

$$NO_2 + NO + 2O_3 + NaOH \rightarrow HNO_3 + NaNO_3 + 2O_2 \text{ (i)}$$

For optimal performance, the technology requires stable gas flows, lack of thermal cycling, invariant pollutant concentrations and residence times on the order of 1 - 1.5 seconds. In addition, LTO technology requires frequent calibration of analytical instruments, which sense the NO$_x$ concentrations for proper adjustment of ozone injection. Since LTO uses ozone injection, it has a potential for ozone slip, which can vary between 5 - 10 ppmv. Also, the technology requires a cooler flue gas of less than 300 °F at the point of ozone injection; otherwise the reactive gas is rendered redundant. The technology also suffers from low NO$_x$ conversion rates (40% - 60%), potential for nitric acid vapor release (in the event of a scrubber malfunction) with subsequent regional haze impacts and the handling, treatment and disposal issues for the spent scrubber effluent.

The technology is neither applicable nor proven for silicon production SAF applications and attendant limitations render it technically infeasible in its current manifestation. In view of the above, the LTO control option is considered technically infeasible for this application and will not be considered any further in this BACT analysis.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

All control alternatives identified in Step 2 were eliminated as not technically feasible for controlling NO_x emissions from the silicon production operations, with the exception of good operating combustion practices.

Step 4 – Evaluate the Most Effective Controls and Document Results

Good operating and combustion practices were the only technically feasible control option in controlling NO_x emissions from the SAF.

Step 5 – Select BACT

A review of USEPA's RACT/BACT/LAER Clearinghouse did not identify any BACT determinations for SAFs or any other sources associated with the silicon production operations. Review of state permit information identified the following with respect to SAFs at silicon production plants:

Facility/ RBLC ID	Permit Date	Process	NO_x Limit	Add-On Controls
Globe Metallurgical Inc Niagara Falls, NY Permit#: 9-2911-00078/00009	11/26/10	Two submerged-arc semi-enclosed-type electric furnaces (22 MW/hr)	NOx: 87.6 lb/hr Capacity: 22 MW/hr NOx: 4.0 lbs/MW	No control
Globe Metallurgical Selma, AL 104-0001	9/10/10	20 MW Electric Arc Furnaces (2) producing silicon metal	NOx: 66.0 lb/hr Capacity: 20 MW/hr NOx: 3.3 lbs/MW	No control
West Virginia Alloy, Inc. Alloy, West Virgina R30-01900001-2006	01/18/06	Electric submerged arc furnace No. 15 for the production of silicon metal and ferroalloys	NOx: 462 tpy NOx: 110 lb/hr Nominal Capacity: 18,000 tons/yr NOx: 51.3 lbs/ton silicon	No controls
Globe Metallurgical Inc Waterford, OH ID: 06-84-00-0105	10/24/01	Electric Arc Furnaces (Ferrosilicon and Silicon metal production furnaces)	None	No controls

As shown in the above table, NO_x emissions from SAFs are uncontrolled. None of the sources as reflected in the above table have proposed or successfully implemented any add-on control devices to control NO_x emissions from SAFs operation.

MS Silicon is proposing the NO_x BACT for the SAFs (AA-201) as follows:

- **NO_x emissions from each of the SAFs shall be limited to 45 lbs/ton (averaged over a 30-day period) of silicon produced.**

4.4.3 BACT Analysis for NO_x Emissions from Natural Gas Combustion

Natural Gas Combustion Sources – Includes the following:

- Ladle Pre-Heaters (4 – 10.0 MMBtu/hr): 14 tpy NO_x;

Step 1 – Identify Control Options, Step 2 – Eliminate Technically Infeasible Control Options, Step 3 – Rank Remaining Control Technologies by Control Effectiveness and Step 4 – Evaluate the Most Effective Controls and Document Results

There are no control options identified in the RBLC that are technically feasible to control NO_x that is emitted at from each combustion unit. See below table for summary of NO_x BACT determinations from the RBLC database:

Facility/ RBLC ID	Permit Date	Basis	Process	NO_x BACT Limit	Controls
SeverCorr LLC Columbus, Mississippi	07/15/11	BACT-PSD	Ladle preheaters, ladle dry-out heaters, Tundish preheaters, Tundish dry-out heaters, vertical ladle holding station	0.08 to 0.1 lb/MMBtu	Combustion of natural gas only
Nucor Steel, Marion, Inc. OH-0341	12/23/10	BACT-PSD	Ladle preheaters, tundish preheaters	Mass emission rate of 27.60 lb/hr	Use of natural gas low NO_x burners.
Osceola Steel Co., Adel, Georgia	3/15/10	BACT-PSD	Preheaters	0.1 lb/MMBtu	Combustion of natural gas, good combustion practices

Facility/ RBLC ID	Permit Date	Basis	Process	NO_x BACT Limit	Controls
Mid-American Steel and Wire Company OK-0128	09/08/08	BACT-PSD	3 Ladle Preheater and 2 refractory drying	0.10 lb/MMBtu	Combustion of natural gas
Minnesota Steel Industries, LLC MN-0070	09/07/07	BACT-PSD	Ladle/Tundish Preheater	No limit	Natural gas combustion and low NO_x burners
Gerdau Ameristeel Wilton IA-0087	05/29/07	BACT-PSD	North Ladle Dryer, South Ladle Dryer and Preheaters, Northwest Ladle Dryers	100 lb/mmscf	Good combustion practices
Nucor Steel AR-0090	04/03/06	BACT-PSD	Ladle Dryer	0.1000 lb/MMBtu	Low NO_x burners
Republic Engineered Products, Inc. OH-0303	08/30/05	LAER	Ladle Dryers/Preheaters	0.1000 lb/MMBtu	Low NO_x burners
Charter Manufacturing Co. Inc. Charter Steel OH-0276	06/10/04	BACT-PSD	Ladle Preheater and Dryers	0.98 lb/hr 4.29 ton/yr Limits are for each preheater	None
Nucor Corp TX-0417	1/15/03	BACT-PSD	Process heaters, ladle and tundish	0.100 lb/MMBtu	Low NO_x burners and clean fuel
Nucor Steel IN-0090	01/19/01		6 Ladle Preheaters	0.100 lb/MMBtu, 6.0 lb/hr total	Low NO_x burners

As shown in the above table, no controls other than low NO_x burners, good combustion practices and combustion of clean fuel are used for NO_x emissions from the natural gas combustion equipment.

Step 5 - Select BACT

The RACT/BACT/LAER Clearinghouse (RBLC) and review of other permits reveal that similar natural gas combustion devices use fuel specifications and good combustion practices for controlling NO_x emissions. No similar sized natural gas combustion devices were identified using add-on NO_x controls as BACT.

Thus, BACT is defined as combustion of clean fuel, low NO_X burners, and good combustion practices. For the natural gas combustion sources associated with the proposed Plant, combustion of natural gas and good combustion controls were the only control methods evaluated. Since the highest level of NO_x control as noted above will be implemented by MS Silicon, an analysis of economic, energy and environmental impacts was not performed.

Thus, BACT is defined as:

- **NO_x emission rate of 0.08 lbs/MMBtu;**
- **Low NO_x or equivalent burners/technology;**
- **Combustion of clean fuel; and**
- **Good combustion practices.**

4.4.4 BACT Analysis for NO_x Emissions from Emergency Equipment (AA-501)

Emergency Equipment – Includes the following:

- Diesel-Fired Emergency Generator (1 rated at 670-HP):0.02 tpy NO_x;

Step 1 – Identify Control Options

There are no control options identified in the RBLC that are technically feasible to control NO_x that is emitted from emergency generators. See below table for summary of NO_x BACT determinations from the RBLC database:

Step 2 - Technical Feasibility of NO_x Control Alternatives

The emergency distillate generator will be used primarily for emergency situations, if any. However, to maintain the integrity of the equipment, the generator will be operated for 100 hours per year or less. The projected annual NOx emissions rate is 0.02 tpy. Based on a review of similar emission sources, these emission sources typically do not have any add-on controls and should be operated per manufacturer's specifications.

Step 3 - Rank Remaining Alternatives by Control Effectiveness

The most effective method for control of NO_x emissions from operation of the emergency fuel combustion devices is the use of fuel specifications that employ clean burning fuels, implementation of good combustion practices and use of combustion controls inherent to the design of the individual combustion devices.

Step 4 - Evaluate Most Effective Controls

Since there are no other feasible technologies to control NO_x emissions from the emergency generator, economic, energy and environmental impact analyses were not performed, nor are required by USEPA's Top-Down approach.

The following table lists the existing NO_x BACT determinations for diesel fired emergency generators. All data in the table is based on the information obtained from the U.S. EPA RACT/BACT/LAER Clearinghouse (RBLC), and electronic versions of permits available at the websites of other permitting agencies.

Facility/ RBLC ID	Permit Date	Process	NO_x BACT Limit	Add-On Controls
Southeast Renewable Fuels (FL-0322)	12/23/10	Emergency ULSD Generators (two 2,682 HP)	6.4 G/KW-H NOX+NMHC	No controls The emergency generators shall comply with the emission limit and demonstrate compliance in accordance with the procedures given in NSPS 40 CFR 60, Subpart IIII.
Idaho Power Company (ID-0018)	6/25/10	Emergency Diesel Generator	6.4 G/KW-H NOx+NMHC	Tier 2 Engine, Good combustion practices
Consumers Energy (MI-0389	12/29/09	Emergency ULSD Generator	6.4 G/KW-H NOx+NMHC	Engine design and operation
Verenium (FL-0318)	12/10/09	Emergency generators	6.4 G/KW-H NOx+NMHC	None
Lake Charles Cogeneration, LLC (LA-0231)	06/22/09	Emergency Diesel Power Generator Engines (1341 HP)	17.09 lb/h	Comply with 40 CFR 60 Subpart IIII
Southeast Idaho Energy, LLC (ID-0017)	2/10/09	2 MW Emergency Generator	Comply with NSPS IIII	Good combustion practices, EPA certified per NSPS IIII
		500 KW emergency generator	Comply with NSPS IIII	Good combustion practices, EPA certified per NSPS IIII
Associated Electric Cooperative Inc (OK-0129)	1/23/09	2200 HP low sulfur diesel emergency generator	6.4 G/KW-H NOx+NMHC	None

As shown in the table above, BACT for the emergency equipment is compliance with NSPS IIII; good combustion/operating practices, and the use of ultra-low sulfur diesel (ULSD) fuel.

Step 5 – Select BACT for NO_x from Emergency Equipment (AA-501)

BACT is proposed as:

- **Compliance with NSPS IIII;**
- **Good combustion/operating practices, and**
- **Use of ULSD.**

4.5 Best Available Control Technology (BACT) Analysis - Emissions of CO

The BACT evaluation focuses on the control technologies that have been demonstrated and commercially available for control of CO emissions. Because of the importance of controlling these emissions, MS Silicon evaluated technologies that have been demonstrated on similar processes so that emissions of CO will be controlled to the levels specified.

Large amounts of carbon monoxide and organic materials are emitted by submerged electric arc furnaces. Carbon monoxide is formed as a byproduct of the chemical reaction between oxygen in the metal oxides of the charge and carbon contained in the reducing agent (coke, coal, etc.). Reduction gases containing organic compounds and carbon monoxide continuously rise from the high-temperature reaction zone, entraining fine particles and fume precursors. The mass weight of carbon monoxide produced sometimes exceeds that of the metallic product.[7]

4.5.1 CO Emission Sources Subject to Control Technology Evaluation

The CO emission sources associated with the proposed plant that are included in this CO BACT evaluation are as follows:

- Semi-Enclosed Submerged Arc Furnaces;
- Natural gas fired combustion equipment; and
- Emergency equipment.

For a summary of the estimated CO emission rates for the sources identified above, please refer to the following table:

CO Emission Rates for Sources Evaluated for BACT

Equipment Description	CO Emission Rate (tons/year)
Semi-Enclosed Submerged Arc Furnace	1429.6
Natural Gas Combustion Equipment • Ladle preheaters	14.4

[7] AP-42 Chapter 12.4 Ferroalloy Production, 10/86

Equipment Description	CO Emission Rate (tons/year)
Emergency Equipment: • Emergency Generator	0.19
Total	1444.3

A summary of the BACT determinations for CO is presented in Table 4-4.

4.5.2 BACT Analysis for CO Emissions from Semi-Enclosed Submerged Arc Furnaces (AA-201)

Step 1 – Identify Control Options

The first step of the Top-Down BACT analysis is to assess the proposed emission reduction options. The sources of information on emission reduction options vary for the air emission sources being analyzed. The following information resources were consulted in searching for the alternatives available for controlling emissions from the semi-enclosed submerged electric arc furnaces:

1. On-line USEPA Control Technology Database; and
2. State Air Quality Permits

The following control technologies were identified and evaluated to control CO emissions from the SAFs:

(a) Operating Practice Modifications;

(b) Flaring of CO Emissions;

(c) CO Oxidation Catalysts;

(d) Post-Combustion Reaction Chamber;

(e) Catalytic Incineration; and

(f) Oxygen Injection.

Step 2 – Eliminate Technically Infeasible Control Options

The test for technical feasibility of any control option is whether it is both available and applicable to reducing CO emissions from the SAF. The previously listed information resources were consulted to determine the extent of applicability of each identified control alternative.

(a) Operating Practice Modifications -- Due to marketplace demands on the type of products to be manufactured and the required product quality, MS Silicon does not propose any additional operating practice modifications that will alter CO emissions from the existing semi-enclosed SAF. Therefore, this control option will be eliminated for further evaluation in this BACT analysis.

(b) Flaring of CO Emissions -- Based upon a review of the previously listed information resources, there is no known application of flaring SAF exhaust gases. Flaring of emissions for CO destruction would require raising the exhaust gas temperature. Thus, based on the relatively large gas volumetric flow at a substantial temperature differential, the auxiliary fuel requirements needed to operate the flare would be overwhelmingly large. Additionally, it can be speculated as to whether the flare would actually result in a decrease of CO emissions or increase thereof from supplemental fuel combustion, which would also result in an increase of NO_x emissions. Consequently, this control alternative is considered technically infeasible for SAF exhausts and thus, will not be considered any further in this BACT analysis.

(c) CO Oxidation Catalysts -- Based upon a review of the previously listed information resources, there is no known application of CO oxidation catalysts to control CO emissions from a SAF. The optimal working temperature range for CO oxidation catalysts is approximately 850 °F - 1,100 °F with a minimum exhaust gas stream temperature of 500 °F for minimally acceptable CO control. Exhaust gases from the SAF will undergo rapid cooling as they are ducted from the furnace. Thus, the temperature will be far below the minimum 500 °F threshold for effective operation of CO oxidation catalysts. Additionally, the particulate loading in the exhaust gas stream is anticipated to be too high for efficient operation of a CO oxidation catalyst. Masking effects such as plugging and coating of the catalyst surface would almost certainly result in impractical maintenance requirements, and would significantly degrade the performance of the catalyst. Consequently, this control alternative is considered technically infeasible for this application and will not be considered any further in this BACT analysis.

(d) Post-Combustion Reaction Chambers -- Based upon a review of the previously listed information resources, there is no known successful application of duct burners or thermal incinerators to control CO emissions from silicon production operations. The feasibility of these units to effectively reduce CO emissions, without resulting in severe operational problems, is unknown. Further, such units are expected to consume large quantities of natural gas and oxygen; resulting in excessive annual operating costs.

The principle of destruction within post combustion chambers is to raise the SAF exhaust gases to a sufficiently high temperature and for a minimum amount of time to facilitate oxidation. The combustion chamber configuration must provide effective mixing within the chamber with an acceptable residence time. Recuperative heat exchangers can be used with these systems to recover a portion of the exiting exhaust gas heat and reduce the auxiliary fuel consumption.

The amount of CO which could be oxidized with post combustion systems is uncertain, and precise performance guarantees are expected to be difficult to obtain from equipment manufacturers

because of the lack of operating experience. In addition, there is the potential for additional emissions of CO from auxiliary fuel combustion. Further, due to the heat and particulate loading, the burners would have a short life expectancy, and may sustain severe maintenance and reliability problems. Additionally, a single or multiple duct burner system would not be able to heat the relatively cool gases from the SAF during cold cycling. Potentially, there are two locations where post combustion chambers can be installed, i.e., upstream or downstream of an SAF baghouse. Locating upstream of the baghouse would take advantage of slightly elevated temperatures in the exhaust gas stream. However, at this location, the post combustion chamber would be subject to high particulate loading. The units would be expected to foul frequently from the particulate accumulation, and the burners would have severe maintenance and reliability problems. Thus, the installation of the post combustion chamber upstream of the baghouse is considered technically infeasible. Alternatively, the post combustion chamber could be installed downstream of the SAF baghouse. However, even at this location, fouling due to particulate matter can occur and more importantly, even cooler exhaust temperatures would be encountered. These cooler temperatures would greatly increase the auxiliary fuel requirements. Further, the combustion of additional fuel will result in increases in emissions to the atmosphere.

Based upon the above discussions, the use of a post combustion chamber is considered technically infeasible for the silicon production operations and will not be considered any further in this BACT analysis.

(e) Catalytic Incineration -- Based upon a review of the previously listed information resources, there is no known application of catalytic incineration to control CO emissions from silicon production operations. Catalytic incinerators use a bed of catalyst that facilitates the overall combustion of combustible gases. The catalyst increases the reaction rate and allows the conversion of CO to CO_2 at lower temperatures than a thermal incinerator. The catalyst is typically a porous noble metal material which is supported in individual compartments within the unit. An auxiliary fuel-fired burner ahead of the bed heats the entering exhaust gases to 500 °F – 600 °F to maintain proper bed temperature. Recuperative heat exchangers are used to recover the exiting exhaust gas heat and reduce the auxiliary fuel consumption. Secondary energy recovery is typically 70 percent.

Catalytic incineration systems are limited in application due to potential poisoning, deactivation, and/or blinding of the catalyst. Lead, arsenic, vanadium, and phosphorus are generally considered poisons to catalysts and deactivate the available reaction sites on the catalyst surface. Particulate can also build up on the catalyst, effectively blocking the porous catalyst matrix and rendering the catalyst inactive. In cases of significant levels of poisoning compounds and particulate loading, catalyst replacement costs are significant.

As in the thermal incineration discussion, potentially, there are two locations where the incinerator can be installed, i.e., upstream or downstream of the SAF baghouse. For the same reasons discussed earlier (e.g., fouling due to particulate matter), the upstream location is considered technically infeasible. Alternatively, the incinerator can be installed downstream of the meltshop

baghouse. However, even at this location, fouling due to particulate matter can occur, and further, the exhaust will be at a lower temperature. These cooler temperatures would greatly increase the auxiliary fuel requirements. The associated combustion of additional auxiliary fuel will result in an unacceptable increase in operating costs. Further, the combustion of additional fuel will result in increases in emissions to the atmosphere.

Due to the lack of application of catalytic incineration for SAFs and potentially adverse technology applicability issues, this control alternative is considered technically infeasible and will not be considered any further in this BACT analysis.

(f) Oxygen Injection -- Based upon a review of the previously-listed information resources, there is no known application of oxygen injection for controlling CO emissions from SAFs.

A theoretical means of reducing CO would be oxygen injection at the entrance of the ductwork to increase oxidation of the available CO to CO_2. The increase in CO oxidation which could be achieved, however, is unknown. This approach would be purely experimental and is a procedure that is currently not conducted in silicon production operations in silicon productions in the United States. Consequently, this control alternative is considered technically infeasible for this application and will not be considered any further in this BACT analysis.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

All control alternatives identified in Step 2 were eliminated as not technically feasible for controlling CO emissions from the SAF.

Step 4 – Evaluate the Most Effective Controls and Document Results

Good operating practices are only technically feasible control option in controlling CO emissions from the SAF.

Step 5 – Select BACT

A review of USEPA's RACT/BACT/LAER Clearinghouse did not identify any BACT determinations for submerged arc furnaces or any other sources associated with the silicon production operations. Review of state permit information identified the following with respect to submerged electric arc furnaces at silicon production plants:

Facility/ RBLC ID	Permit Date	Process	CO Limit	Add-On Controls
Globe Metallurgical Inc Niagara Falls, NY Permit#: 9-2911-00078/00009	11/26/10	Two submerged-arc semi-enclosed-type electric furnaces (22 MW/hr)	No limit	No control
Globe Metallurgical Selma, AL 104-0001	9/10/10	20 MW Electric Arc Furnaces (2) producing silicon metal	CO: 88.9 lb/hr Capacity: 20 MW/hr CO: 4.4 lbs/MW	No control
West Virginia Alloy, Inc. Alloy, West Virgina R30-01900001-2006	01/18/06	Electric submerged arc furnace No. 15 for the production of silicon metal and ferroalloys	CO: 54.0 lb/hr Nominal Capacity: 2 tons/hr CO: 27 lbs/ton silicon	No controls
Globe Metallurgical Inc Waterford, OH ID: 06-84-00-0105	10/24/01	Electric Arc Furnaces (Ferrosilicon and Silicon metal production furnaces)	None	No controls

As shown in the above table, CO emissions from submerged electric arc furnaces are uncontrolled. None of the sources as reflected in the above table have proposed or successfully implemented any add-on control devices to control CO emissions from SAF operation.

MS Silicon is proposing the BACT for CO as follows:

- **Total CO emissions from the SAF shall be limited to 34 lbs/ton (averaged over a 30-day period) of silicon produced;**
- **Good combustion and operating practices; and**
- **Utilization of a semi-enclosed SAF design.**

4.5.3 BACT Analysis for CO Emissions from Natural Gas Combustion (AA-202)

Natural Gas Combustion Sources – Includes the following:

- Ladle Pre-Heaters (4 – 10.0 MMBtu/hr): 14.4 tpy CO.

Step 1 – Identify Control Options,

According to information available in the RBLC, EPA's Compilation of Air Pollutant Emission Factors and the EPA's CATC Technical Bulletins and Air Pollution Control Technology Fact Sheets, there are no reasonably available add-on control options to control CO emissions from natural gas combustion units. This review did not identify natural gas combustion equipment associated with silicon production employing add-on controls to control combustion related emissions from natural gas combustion sources.

Step 2 – Eliminate Technically Infeasible Control Options

No technically feasible control options were identified to control the small quantities of CO from similar sized natural gas combustion equipment.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness and Step 4 – Evaluate the Most Effective Controls and Document Results

No technically feasible control options were identified.

Step 5 - Select BACT

The RACT/BACT/LAER Clearinghouse (RBLC) and review of other permits reveal that similar natural gas combustion devices use fuel specifications and good combustion practices for controlling CO emissions. No similar sized natural gas combustion devices were identified add-on CO controls as BACT.

Facility/RBLC ID	Permit Date	Basis	Process	CO BACT Limit	Add-On Controls
Mid-American Steel and Wire Company OK-0128	09/08/08	BACT-PSD	Ladle Preheater and refractory drying	0.0840 lb/MMBtu	Combustion of natural gas
New Steel International, Inc OH—0315	5/6/08	BACT-PSD	Tundish Preheaters	0.0840 lb/MMBtu	Natural gas combustion
Gerdau Ameristeel Wilton IA-0087	05/29/07	BACT-PSD	North Ladle Dryer, South Ladle Dryer and Preheaters, Northwest Ladle Dryers	84 lb/mmscf	Good combustion practices

Facility/RBLC ID	Permit Date	Basis	Process	CO BACT Limit	Add-On Controls
Nucor Steel AR-0090	04/03/06	BACT-PSD	Ladle Dryer	0.0840 lb/MMBtu	Good combustion practice
Republic Engineered Products, Inc OH-0303	08/30/05	LAER	Ladle Dryers/Preheaters	84.0 lb/Mmscf	Best operational and engineering practices
Charter Manufacturing Co. Inc. Charter Steel OH-0276	06/10/04	BACT-PSD	Tundish Preheaters	0.0820 lb/MMBtu each preheater	None
Charter Manufacturing Co. Inc. Charter Steel OH-0276	06/10/04	BACT-PSD	Ladle Preheater and Dryers	0.0820 lb/MMBtu each preheater	None
Nucor Steel IN-0090	01/19/01	BACT-PSD	Tundish Preheaters	No limit	Use of natural gas
Nucor Steel IN-0090	01/19/01	BACT-PSD	Ladle Preheaters	No limit	Natural gas or propane combustion

As shown in the above table, no controls other than good combustion practices and combustion of clean fuel are used for CO emissions from the natural gas combustion equipment. The variation of 0.0820 to 0.0840 lb/MMBtu is based on different heating values for natural gas.

Thus, BACT for CO emissions from equipment combusting natural gas is defined as:

- **CO emission rate of 0.0840 lbs/MMBtu;**
- **Combustion of natural gas; and**
- **Good combustion practices.**

4.5.4 BACT Analysis for CO Emissions from Emergency Equipment (AA-501)

Emergency Equipment – Includes the following:

- Diesel-Fired Emergency Generator (1 rated at 670-HP): 0.7 tpy CO.

Step 1 – Identify Control Options

There are no control options identified in the RBLC that are technically feasible to control CO that is emitted from emergency equipment. See below table for summary of CO BACT determinations from the RBLC database:

Step 2 - Technical Feasibility of CO Control Alternatives

The emergency diesel fired generator will be used primarily for emergency situations, if any. However, to maintain the integrity of the equipment, the generator will be operated for less than 100 hours per year. Based on a review of similar emission sources, these emission sources typically do not have any add-on controls and should be operated per manufacturer's specifications.

Step 3 - Rank Remaining Alternatives by Control Effectiveness

The most effective method for control of CO emissions from operation of the emergency fuel combustion devices is the use of fuel specifications that employ clean burning fuels, implementation of good combustion practices and use of combustion controls inherent to the design of the individual combustion devices.

Step 4 - Evaluate Most Effective Controls

Since there are no other feasible technologies to control CO emissions from the emergency generator, economic, energy and environmental impact analyses were not performed, nor are required by USEPA's Top-Down approach.

The following table lists the existing CO BACT determinations for diesel fired emergency generators. All data in the table is based on the information obtained from the U.S. EPA RACT/BACT/LAER Clearinghouse (RBLC), and electronic versions of permits available at the websites of other permitting agencies.

Facility/ RBLC ID	Permit Date	Process	CO BACT Limit	Add-On Controls
Southeast Renewable Fuels (FL-0322)	12/23/10	Emergency ULSD Generators (two 2,682 HP)	3.5 G/KW-H	No controls The emergency generators shall comply with the emission limit and demonstrate compliance in accordance with the procedures given in NSPS 40 CFR 60, Subpart IIII.
Idaho Power Company ID-0018	6/25/10	750 KW Emergency Diesel Generator	3.5 G/KW-H	Tier 2 Engine, Good combustion practices

Facility/ RBLC ID	Permit Date	Process	CO BACT Limit	Add-On Controls
Consumers Energy (MI-0389	12/29/09	2000 KW Emergency ULSD Generator	3.5 G/KW-H	Engine design and operation
Verenium (FL-0318)	12/10/09	2000 KW Emergency generators	3.5 G/KW-H	None
Lake Charles Cogeneration, LLC (LA-0231)	06/22/09	Emergency Diesel Power Generator Engines (1341 HP)	0.62 lb/h	Comply with 40 CFR 60 Subpart IIII
Southeast Idaho Energy, LLC (ID-0017)	2/10/09	2 MW Emergency Generator	Comply with NSPS IIII	Good combustion practices, EPA certified per NSPS IIII, limited to 100 hours of operation per year
		500 KW emergency generator	Comply with NSPS IIII	Good combustion practices, EPA certified per NSPS IIII, limited to 100 hours of operation per year
Associated Electric Cooperative Inc (OK-0129)	1/23/09	2200 HP low sulfur diesel emergency generator	3.5 G/KW-H	None

As shown in the table above, BACT for the emergency equipment has been determined to be compliance with NSPS IIII and good combustion/operating practices

Step 5 – Select BACT for CO from Emergency Equipment

BACT for CO emissions from the emergency equipment is proposed as:

- **Compliance with NSPS IIII; and**
- **Good combustion/operating practices.**

4.6 Best Available Control Technology (BACT) Analysis - Emissions of SO_2

The BACT evaluation focuses on the control technologies that have been demonstrated and commercially available for control of SO_2 emissions. Because of the importance of controlling these emissions, MS Silicon evaluated technologies that have been demonstrated on similar processes.

The source of SO_2 emissions is attributable to the sulfur content of the raw materials charged in the SAFs and from the sulfur content of the fuels to be combusted in supporting operations to be performed at the plant.

4.6.1 SO2 Emission Sources Subject to Control Technology Evaluation

The SO_2 emission sources associated with the proposed plant that are included in this SO_2 BACT evaluation are as follows:

- Semi-Enclosed Submerged Arc Furnaces;
- Natural gas fired combustion equipment; and
- Emergency equipment.

For a summary of the estimated SO_2 emission rates for the sources identified above, please refer to the following table:

SO_2 Emission Rates for Sources Evaluated for BACT

Equipment Description	SO_2 Emission Rate (tons/year)
Semi-Enclosed Submerged Arc Furnace	2169.7
Natural Gas Combustion Equipment • Ladle preheaters	0.10
Emergency Equipment: • Emergency Generator	0.27
Total	2170.0

4.6.2 BACT Analysis for SO_2 Emissions from Semi-Enclosed Submerged Arc Furnaces (AA-201)

Step 1 – Identify Control Options

The first step of the Top-Down BACT analysis is to assess the proposed emission reduction options. The sources of information on emission reduction options vary for the air emission sources being analyzed. The following information resources were consulted in searching for the alternatives available for controlling SO_2 emissions from plant operations:

1. On-line USEPA Control Technology Database;
2. State Air Quality Permits; and
3. Control Technology Vendors.

The following control technologies were identified and evaluated to control SO_2 emissions from the SAFs:

(a) Lower-Sulfur Charge Substitution; and

(b) Flue Gas Desulfurization (FGD) options:

(1) Wet Scrubbing;

(2) Spray Dryer Absorption (SDA); and

(3) Dry Sorbent Injection (DSI).

Step 2 – Eliminate Technically Infeasible Control Options

The test for technical feasibility of any control option is whether it is both available and applicable to reducing SO_2 emissions from the SAFs. The previously listed information resources were consulted to determine the extent of applicability of each identified control alternative.

(a) Lower-Sulfur Charge Materials - Substitution with lower sulfur-bearing raw materials is technically feasible and will be included in this analysis. A summary of the charge materials and sulfur content of the materials, are described below.

Coal - The Department of Energy estimates that the use of the lowest sulfur coal can result in up to 85 percent lower SO_2 emissions than the use of many types of higher sulfur coal[8]. In the U.S., coal from eastern states including Ohio, Pennsylvania, and West Virginia has higher sulfur content, accounting for 3 to 10 percent of the coal's weight; coal from western states such as Wyoming, Montana, Utah, and Colorado can have sulfur contents that make up less than 1 percent of its weight[9]. However, low-sulfur coal is significantly more expensive

[8] ↑ Annual Energy Outlook 2002 with Projections to 2020, US Department of Energy, January 2002

[9] Cleaning up Coal, U.S. Department of Energy

than higher sulfur coal, and often incurs additional transportation costs. MS Silicon will work to utilize the lowest cost effective, available coal source. The success of the plant is to produce a high quality silicon product that is cost competitive within the industry. MS Silicon will be utilizing a best available SAF and supporting equipment to:

1) Produce a cost competitive product;

2) Minimizes emissions of regulated air pollutants; and

3) Utilize good combustion practices and operating equipment to minimize the plant's energy/GHG footprint.

Wood - The low sulfur content of wood (0.007 to 0.08% by weight sulfur) minimizes SO_2 emissions

(b) Flue Gas Desulfurization –

FGD systems currently in use for SO_2 abatement can be classified as wet and dry systems. Based on a review of the RBLC database and state permits, it was revealed that control technologies for SO_2 abatement have not been implemented for SAFs. However, FGD options which have been traditionally applied to utility boilers may be available to control SO_2 from the SAFs. Therefore, the application of these technologies to the SAFs will be examined further.

The suitability of gas absorption as a pollution control method is generally dependent on the following factors:

1) Availability of suitable solvent;

2) Required removal efficiency;

3) Pollutant concentration in the inlet vapor;

4) Capacity required for handling waste gas; and,

5) Recovery value of the pollutant(s) or the disposal cost of the spent solvent.

Gas absorbers are most widely used to remove water soluble inorganic contaminants from air streams with typical pollutant concentrations ranging from 250 to 10,000 ppmv.[10] The SO_2 concentration from the proposed SAFs has been estimated at 8 ppm. For FGD controls in general, the expected variability and low SO_2 concentrations in the gas stream are not amenable to FGD which is typically geared for high sulfur fuel combustion systems.

(1) Wet Scrubbing -- Wet scrubbers are regenerative processes which are designed to maximize contact between the exhaust gas and an absorbing liquid. The exhaust gas is

[10] SO_2 and Acid Gas Controls, Sixth Edition, EPA/452/B-02-001

scrubbed with a 5 - 15 percent slurry, comprised of lime (CaO) or limestone ($CaCO_3$) in suspension. The SO_2 in the exhaust gas reacts with the CaO or $CaCO_3$ to form calcium sulfite ($CaSO_3.2H_2O$) and calcium sulfate ($CaSO_4$). The scrubbing liquor is continuously recycled to the scrubbing tower after fresh lime or limestone has been added.

The types of scrubbers which can adequately disperse the scrubbing liquid include packed towers, plate or tray towers, spray chambers, and venturi scrubbers. In addition to calcium sulfite/sulfate, numerous other absorbents are available including sodium solutions and ammonia-based solutions[11].

There are various potential operating problems associated with the use of wet scrubbers. First, particulates are not acceptable in the operation of wet scrubbers because they would plug spray nozzles, packing, plates and trays. Thus, the scrubber would have to be located downstream of the SAFs baghouses. This would substantially increase the capital cost of the wet scrubber, which is typically two to three times more expensive than the capital cost for a dry scrubber. Wet scrubbers also require handling, treatment, and disposal of a sludge by-product. In this case, air emissions would be exchanged for a large-scale water pollution problem. Treatment of wet scrubber wastes requires advanced wastewater treatment including frequent maintenance by an experienced operator. The SO_2 concentration will vary widely over the SAFs cycle which operates as a batch process. This will preclude efficient application of wet scrubbing. Thus, the wet scrubber option is considered technically infeasible for this application and will not be considered any further in this BACT analysis.

(2) Spray Dryer Absorption (SDA) -- An alternative to wet scrubbing is a process known as dry scrubbing, or spray-dryer absorption (SDA). As in wet scrubbing, the gas-phase SO_2 is removed by intimate contact with a suitable absorbing solution. Typically, this may be a solution of sodium carbonate (Na_2CO_3) or slaked lime [$Ca(OH)_2$]. In SDA systems the solution is pumped to rotary atomizers, which create a spray of very fine droplets. The droplets mix with the incoming SO_2-laden exhaust gas in a very large chamber and subsequent absorption leads to the formation of sulfites and sulfates within the droplets. Almost simultaneously, the sensible heat of the exhaust gas which enters the chamber evaporates the water in the droplets, forming a dry powder before the gas leaves the spray dryer. The temperature of the desulfurized gas stream leaving the spray dryer is now approximately 30 - 50 °F above its dew point.

The exhaust gas from the SDA system contains a particulate mixture which includes reacted products. Typically, baghouses employing Teflon-coated fiberglass bags (to minimize bag corrosion) are utilized to collect the precipitated particulates.

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[11] SO_2 and Acid Gas Controls, Sixth Edition, EPA/452/B-02-001

The SDA process would not have many of the potential operating problems associated with the wet scrubbing systems. The SO_2 concentration will vary widely over the SAFs cycle. Thus, SDA dry scrubbing option is considered technically infeasible for this application and will be not be considered any further in this BACT analysis.

(3) Dry Sorbent Injection (DSI) -- This control option typically involves the injection of dry powders into either the furnace or post-furnace region of utility-sized boilers. This process was developed as a lower cost option to conventional FGD technology. Since the sorbent is injected directly into the exhaust gas stream, the mixing offered by the dry scrubber tower is not realized.

The dry sorbent injection process would not have many of the potential operating problems associated with the wet scrubbing systems. The SO_2 concentration will vary widely over the SAFs cycle. The injection dose of sorbent materials would be hard to control in order to match variability in SO_2 concentrations. Similar control systems are fraught with chronic operational problems with the sensors requiring frequent maintenance and calibration.

Thus, DSI dry scrubbing option is considered technically infeasible for this application and will be not be considered any further in this BACT analysis.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

All control alternatives identified in Step 2 were eliminated as not technically feasible for controlling SO_2 emissions from the silicon production operations, with the exception of lower sulfur charge and good operating combustion practices.

Step 4 – Evaluate the Most Effective Controls and Document Results

Lower sulfur charge and good operating combustion practices were the only technically feasible control option in controlling SO_2 emissions from the SAF.

Step 5 – Select BACT

A review of USEPA's RACT/BACT/LAER Clearinghouse did not identify any BACT determinations for submerged arc furnaces or any other sources associated with the silicon production operations. Review of state permit information identified the following with respect to submerged electric arc furnaces at silicon production plants:

Facility/	Permit Date	Process	SO_2 Limit	Add-On Controls
Globe Metallurgical Inc Niagara Falls, NY Permit#: 9-2911-00078/00009	11/26/10	Two submerged-arc semi-enclosed-type electric furnaces (22 MW/hr)	Coke which exceeds the 1.7 lb/million Btu maximum and 1.4 lb/million Btu consecutive three month average, sulfur in fuel limits of 6NYCRR, Part 225-1.2 (d) Table 2 for solid fuel, may be used in combination with coal in the furnace charge on a minimum 4:1 coal/coke ratio. Globe is required to demonstrate that when using coke with a sulfur content greater than the allowable limit in combination with coal, the sulfur dioxide emissions will not exceed a maximum 3.4 pounds of sulfur dioxide per million Btu heat input and an average 2.8 pounds of sulfur dioxide per million Btu heat input. No control	
Globe Metallurgical Selma, AL 104-0001	9/10/10	20 MW Electric Arc Furnaces (2) producing silicon metal	SO_2: 94 lb/hr Capacity: 20 MW/hr SO_2: 4.95 lbs/MW	No control
West Virginia Alloy, Inc. Alloy, West Virgina R30-01900001-2006	01/18/06	Electric submerged arc furnace No. 15 for the production of silicon metal and ferroalloys	SO_2: 68.7 lb/hr Nominal Capacity: 2 tons/hr SO_2: 34.35 lbs/ton silicon	No controls
Globe Metallurgical Inc Waterford, OH ID: 06-84-00-0105	10/24/01	Electric Arc Furnaces (Ferrosilicon and Silicon metal production furnaces)	None	No controls

As shown in the above table, SO_2 emissions from SAFs are uncontrolled. None of the sources as reflected in the above table have proposed or successfully implemented any add-on control devices to control SO_2 emissions from SAFs operation.

MS Silicon is proposing the SO_2 BACT for the SAFs as follows:

- **Total SO_2 emissions from the SAF shall be limited to 52 lbs/ton (averaged over a 30-day period) of silicon produced; and**

- **Utilization of low sulfur content material, where technically feasible.**

4.6.3 BACT Analysis for SO_2 Emissions from Natural Gas Combustion (AA-202)

Natural Gas Combustion Sources – Includes the following:

- Ladle Pre-Heaters (4 – 10.0 MMBtu/hr): 0.10 tpy SO_2;

Step 1 – Identify Control Options, Step 2 – Eliminate Technically Infeasible Control Options, Step 3 – Rank Remaining Control Technologies by Control Effectiveness and Step 4 – Evaluate the Most Effective Controls and Document Results

There are no control options identified in the RBLC that are technically feasible to control SO_2 that is emitted at from small natural gas combustion units. See below table for summary of SO_2 BACT determinations from the RBLC database:

Facility/ RBLC ID	Permit Date	Basis	Process	SO_2 BACT Limit	Controls
Lake Charles Cogeneration LLC LA-0231	06/22/09	BACT-PSD	34.20 MMBtu/hr Shift Reactor Startup Heater	0.0006 lb/MMBtu	Combustion of natural gas
Competitive Power Ventures MD-0040	11/12/08	BACT-PSD	1.70 MMBtu/hr Heater	No limit	Exclusive use natural gas with sulfur content not to exceed 2.0 gr/100 scf
Mid-American Steel and Wire Company OK-0128	09/08/08	BACT-PSD	13.30 MMBtu/hr Ladle Preheater and refractory drying	0.0006 lb/MMBtu	Combustion of natural gas
Thysenkrupp Steel and Stainless USA, LLC AL-0230	08/17/07	BACT PSD	33.40 MMBtu/hr Batch Annealing Furnaces	0.0006 lb/MMBtu	No control
Nucor Steel AR-0090	04/03/06	BACT-PSD	Ladle Dryer	0.0006 lb/MMBtu	No control

Facility/ RBLC ID	Permit Date	Basis	Process	SO_2 BACT Limit	Controls
Republic Engineered Products, Inc OH-0303	08/30/05	LAER	14.5 MMBtu/hr Ladle Dryers/Preheaters	0.0006 lb/MMBtu	Use of natural gas with sulfur content less than 0.6 % by weight
Charter Steel OH-0276	06/10/04	BACT-PSD	10 MMBtu/hr Ladle Preheater and Dryer, 4 Units	0.0006 lb/MMBtu	No controls
Nucor Steel IN-0090	01/19/01	BACT-PSD	15 MMBtu/hr Ladle Preheaters	No limit	Combustion of natural gas or propane

As shown in the above table, no add-on controls are used for SO_2 from the small natural gas combustion equipment.

Step 5 - Select BACT

The RACT/BACT/LAER Clearinghouse (RBLC) and review of other permits reveal that similar small natural gas combustion devices use fuel specifications and good combustion practices for controlling SO_2 emissions. No similar sized natural gas combustion devices were identified add-on SO_2 controls as BACT.

Thus, BACT is defined as combustion of clean fuel and good combustion practices. For the natural gas combustion sources associated with the proposed Plant, combustion of natural gas and good combustion controls were the only control methods evaluated. Since the highest level of SO_2 control as noted above will be implemented by MS Silicon, an analysis of economic, energy and environmental impacts was not performed.

Thus, BACT for SO_2 emissions from natural gas combustion equipment to be utilized at the plant is defined as:

- **SO_2 emission rate of 0.0006 lbs/MMBtu;**
- **Combustion of clean fuel; and**
- **Good combustion practices.**

4.6.4 BACT Analysis for SO_2 Emissions from Emergency Equipment (AA-501)

Emergency Equipment – Includes the following:

- Diesel-Fired Emergency Generator (1 rated at 670-HP each): 0.2 tpy SO_2

Step 1 – Identify Control Options

There are no control options identified in the RBLC that are technically feasible to control SO_2 that is emitted at from emergency equipment. See below table for summary of SO_2 BACT determinations from the RBLC database:

Step 2 - Technical Feasibility of SO_2 Control Alternatives

The emergency diesel generator will be used primarily for emergency situations, if any. However, to maintain the integrity of the equipment, the generator will be operated for 100 hours per year or less. Based on a review of similar emission sources, these emission sources typically do not have any add-on controls and should be operated per manufacturer's specifications.

Step 3 - Rank Remaining Alternatives by Control Effectiveness

The most effective method for control of SO_2 emissions from operation of the emergency fuel combustion devices is the use of fuel specifications that employ clean burning fuels, implementation of good combustion practices and use of combustion controls inherent to the design of the individual combustion devices.

Step 4 - Evaluate Most Effective Controls

Since there are no other feasible technologies to control SO_2 emissions from the emergency equipment, economic, energy and environmental impact analyses were not performed, nor are required by USEPA's Top-Down approach.

The following table lists the existing SO_2 BACT determinations for diesel fired emergency equipment. All data in the table is based on the information obtained from the U.S. EPA RACT/BACT/LAER Clearinghouse (RBLC), and electronic versions of permits available at the websites of other permitting agencies.

Facility/ RBLC ID	Permit Date	Process	SO_2 BACT Limit	Controls
Southeast Renewable Fuels (FL-0322)	12/23/10	Emergency ULSD Generators (two 2,682 HP)	No limit	No controls Engines will fire ULSD fuel oil or propane and each will be limited to 500 hours per year of operation during emergencies.

Facility/ RBLC ID	Permit Date	Process	SO_2 BACT Limit	Controls
Idaho Power Company ID-0018	6/25/10	Emergency Diesel Generator	No limit	Tier 2 Engine, Good combustion practices
Consumers Energy (MI-0389	12/29/09	Emergency ULSD Generator	No limit	ULSD combustion, 500 hours of operation per year
Verenium (FL-0318)	12/10/09	Emergency generators	0.0015 % S	Comply with applicable provisions of 40 CFR 60, Subpart IIII
Lake Charles Cogeneration, LLC (LA-0231)	06/22/09	Emergency Diesel Power Generator Engines (1341 HP)	0.0100 lb/hr	Comply with 40 CFR 60 Subpart IIII
Southeast Idaho Energy, LLC (ID-0017)	2/10/09	2 MW Emergency Generator	No limit	100 hours of operation per year, ULSD fuel, good combustion practices, EPA certified per NSPS IIII
		500 KW emergency generator	No limit	100 hours of operation per year, ULSD fuel, good combustion practices, EPA certified per NSPS IIII
Associated Electric Cooperative Inc (OK-0129)	1/23/09	2200 HP low sulfur diesel emergency generator	0.89 lb/hr	Low sulfur diesel fuel < 0.05% S

As shown in the table above, BACT for the emergency equipment is compliance with NSPS IIII; good combustion/operating practices, and the use of ultra-low sulfur diesel (ULSD) fuel.

Step 5 – Select BACT for SO_2 from Emergency Equipment

BACT for SO_2 emissions associated with the emergency equipment is proposed as compliance with NSPS IIII; good combustion/operating practices, and use of ULSD.

4.7 Best Available Control Technology (BACT) Analysis - Emissions of VOC

The BACT evaluation focuses on the control technologies that have been demonstrated and commercially available for control of VOC emissions. Because of the importance of controlling these emissions, MS Silicon evaluated technologies that have been demonstrated on similar processes.

4.7.1 VOC Emission Sources Subject to Control Technology Evaluation

The VOC emission sources associated with the proposed plant that are included in this VOC BACT evaluation are as follows:

- Semi-Enclosed Submerged Arc Furnaces;
- Natural gas fired combustion equipment; and
- Emergency equipment.

For a summary of the estimated VOC emission rates for the sources identified above, please refer to the following table:

VOC Emission Rates for Sources Evaluated for BACT

Equipment Description	VOC Emission Rate (tons/year)
Semi-Enclosed Submerged Arc Furnaces	92.5
Natural Gas Combustion Equipment • Ladle preheaters	0.9
Emergency Equipment: • Emergency Generator	0.08
Total	93.5

4.7.2 BACT Analysis for VOC Emissions from Semi-Enclosed Submerged Arc Furnaces (AA-201)

Step 1 – Identify Control Options

The first step of the Top-Down BACT analysis is to assess the proposed emission reduction options. The sources of information on emission reduction options vary for the air emission sources being analyzed. The following information resources were consulted in searching for the alternatives available for controlling emissions from the semi-enclosed submerged electric arc furnaces:

1. On-line USEPA Control Technology Database; and
2. State Air Quality Permits

The following control technologies were identified and evaluated to control VOC emissions from the SAFs:

(a) Operating Practice Modifications;

(b) Flaring of VOC Emissions;

(c) VOC Oxidation Catalysts;

(d) Post-Combustion Reaction Chamber;

(e) Catalytic Incineration; and

(f) Oxygen Injection.

Step 2 – Eliminate Technically Infeasible Control Options

The test for technical feasibility of any control option is whether it is both available and applicable to reducing VOC emissions from the SAF. The previously listed information resources were consulted to determine the extent of applicability of each identified control alternative. MS Silicon is also proposing to utilize a semi-enclosed SAF design that will reduce the quantity of VOC generated during the furnace conversion process. Because of the nature of the furnace process and temperatures that will be achieved during the process, engineering literature suggests VOC emissions will be minimal. For purposes of this application we have conservatively assumed VOCs will be generated and have assigned an emission factor expressed in lbs/ton.

(a) Operating Practice Modifications -- Due to marketplace demands on the type of products to be manufactured and the required product quality, MS Silicon does not propose any additional operating practice modifications that will alter VOC emissions from the existing SAF. Therefore, this control option will be eliminated for further evaluation in this BACT analysis.

(b) Flaring of VOC Emissions -- Based upon a review of the previously listed information resources, there is no known application of flaring SAF exhaust gases. Flaring of emissions for VOC destruction would require raising the exhaust gas temperature. Thus, based on the relatively large gas volumetric flow at a substantial temperature differential, the auxiliary fuel requirements needed to operate the flare would be overwhelmingly large. Additionally, it can be speculated as to whether the flare would actually result in a decrease of VOC emissions or increase thereof from supplemental fuel combustion, which would also result in an increase of NO_x emissions and potential CO_2 emissions. Consequently, this control alternative is considered technically infeasible for SAF exhausts and thus, will not be considered any further in this BACT analysis.

(c) VOC Oxidation Catalysts -- Based upon a review of the previously listed information resources, there is no known application of VOC oxidation catalysts to control VOC emissions from a SAF. The optimal working temperature range for VOC oxidation catalysts is approximately 850 °F - 1,100 °F with a minimum exhaust gas stream temperature of 500 °F for minimally acceptable VOC control. Exhaust gases from the SAF will undergo rapid cooling as they are ducted from the furnace. Thus, the temperature will be far below the minimum 500 °F threshold for effective

operation of VOC oxidation catalysts. Additionally, the particulate loading in the exhaust gas stream is anticipated to be too high for efficient operation of a VOC oxidation catalyst. Masking effects such as plugging and coating of the catalyst surface would almost certainly result in impractical maintenance requirements, and would significantly degrade the performance of the catalyst. Consequently, this control alternative is considered technically infeasible for this application and will not be considered any further in this BACT analysis.

(d) Post-Combustion Reaction Chambers -- Based upon a review of the previously listed information resources, there is no known successful application of duct burners or thermal incinerators to control VOC emissions from silicon production operations. The feasibility of these units to effectively reduce VOC emissions, without resulting in severe operational problems, is unknown. Further, such units are expected to consume large quantities of natural gas and oxygen; resulting in excessive annual operating costs.

The principle of destruction within post combustion chambers is to raise the SAF exhaust gases to a sufficiently high temperature and for a minimum amount of time to facilitate oxidation. The combustion chamber configuration must provide effective mixing within the chamber with an acceptable residence time. Recuperative heat exchangers can be used with these systems to recover a portion of the exiting exhaust gas heat and reduce the auxiliary fuel consumption.

The amount of VOC which could be oxidized with post combustion systems is uncertain, and precise performance guarantees are expected to be difficult to obtain from equipment manufacturers because of the lack of operating experience. In addition, there is the potential for additional emissions of NO_x and CO_2 from auxiliary fuel combustion. Further, due to the heat and particulate loading, the burners would have a short life expectancy, and may sustain severe maintenance and reliability problems. Additionally, a single or multiple duct burner system would not be able to heat the relatively cool gases from the SAF during cold cycling. Potentially, there are two locations where post combustion chambers can be installed, i.e., upstream or downstream of an SAF baghouse. Locating upstream of the baghouse would take advantage of slightly elevated temperatures in the exhaust gas stream. However, at this location, the post combustion chamber would be subject to high particulate loading. The units would be expected to foul frequently from the particulate accumulation, and the burners would have severe maintenance and reliability problems. Thus, the installation of the post combustion chamber upstream of the baghouse is considered technically infeasible. Alternatively, the post combustion chamber could be installed downstream of the SAF baghouse. However, even at this location, fouling due to particulate matter can occur and more importantly, even cooler exhaust temperatures would be encountered. These cooler temperatures would greatly increase the auxiliary fuel requirements. Further, the combustion of additional fuel will result in increases in emissions to the atmosphere.

Based upon the above discussions, the use of a post combustion chamber is considered technically infeasible for the silicon production operations and will not be considered any further in this BACT analysis.

(e) Catalytic Incineration -- Based upon a review of the previously listed information resources, there is no known application of catalytic incineration to control VOC emissions from silicon production operations. Catalytic incinerators use a bed of catalyst that facilitates the overall combustion of combustible gases. The catalyst increases the reaction rate and allows the conversion of CO to CO_2 at lower temperatures than a thermal incinerator. The catalyst is typically a porous noble metal material which is supported in individual compartments within the unit. An auxiliary fuel-fired burner ahead of the bed heats the entering exhaust gases to 500 °F – 600 °F to maintain proper bed temperature. Recuperative heat exchangers are used to recover the exiting exhaust gas heat and reduce the auxiliary fuel consumption. Secondary energy recovery is typically 70 percent.

Catalytic incineration systems are limited in application due to potential poisoning, deactivation, and/or blinding of the catalyst. Lead, arsenic, vanadium, and phosphorus are generally considered poisons to catalysts and deactivate the available reaction sites on the catalyst surface. Particulate can also build up on the catalyst, effectively blocking the porous catalyst matrix and rendering the catalyst inactive. In cases of significant levels of poisoning compounds and particulate loading, catalyst replacement costs are significant.

As in the thermal incineration discussion, potentially, there are two locations where the incinerator can be installed, i.e., upstream or downstream of the SAF baghouse. For the same reasons discussed earlier (e.g., fouling due to particulate matter), the upstream location is considered technically infeasible. Alternatively, the incinerator can be installed downstream of the meltshop baghouse. However, even at this location, fouling due to particulate matter can occur, and further, the exhaust will be at a lower temperature. These cooler temperatures would greatly increase the auxiliary fuel requirements. The associated combustion of additional auxiliary fuel will result in an unacceptable increase in operating costs. Further, the combustion of additional fuel will result in increases in emissions to the atmosphere.

Due to the lack of application of catalytic incineration for SAFs and potentially adverse technology applicability issues, this control alternative is considered technically infeasible and will not be considered any further in this BACT analysis.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

All control alternatives identified in Step 2 were eliminated as not technically feasible for controlling VOC emissions from the SAF.

Step 4 – Evaluate the Most Effective Controls and Document Results

Good operating practices are only technically feasible control option in controlling VOC emissions from the SAF.

Step 5 – Select BACT

A review of USEPA's RACT/BACT/LAER Clearinghouse did not identify any BACT determinations for submerged arc furnaces or any other sources associated with the silicon production operations. Review of state permit information identified the following with respect to submerged electric arc furnaces at silicon production plants:

Facility/ RBLC ID	Permit Date	Process	VOC Limit	Add-On Controls
Globe Metallurgical Inc Niagara Falls, NY Permit#: 9-2911-00078/00009	11/26/10	Two submerged-arc semi-enclosed-type electric furnaces (22 MW/hr)	No limit	No control
Globe Metallurgical Selma, AL 104-0001	9/10/10	20 MW Electric Arc Furnaces (2) producing silicon metal	VOC: 5.7 lb/hr Capacity: 20 MW/hr VOC: 0.29 lbs/MW	No control
West Virginia Alloy, Inc. Alloy, West Virgina R30-01900001-2006	01/18/06	Electric submerged arc furnace No. 15 for the production of silicon metal and ferroalloys	VOC: 4.15 lb/hr Nominal Capacity: 2 tons/hr	No controls
Globe Metallurgical Inc Waterford, OH ID: 06-84-00-0105	10/24/01	Electric Arc Furnaces (Ferrosilicon and Silicon metal production furnaces)	None	No controls

As shown in the above table, VOC emissions from submerged electric arc furnaces are uncontrolled. None of the sources as reflected in the above table have proposed or successfully implemented any add-on control devices to control VOC emissions from SAF operation.

MS Silicon is proposing the BACT for VOC from the SAFs as follows:

- **Good operating practices; and**
- **Total VOC emissions from the SAF shall be limited to 2.4 lbs/ton (averaged over a 30-day period) of silicon produced.**

4.7.3 BACT Analysis for VOC Emissions from Natural Gas Combustion (AA-202)

Natural Gas Combustion Sources – Includes the following:

- Ladle Pre-Heaters (4 – 100 MMBtu/hr): 0.9 tpy VOC;

Step 1 – Identify Control Options, Step 2 – Eliminate Technically Infeasible Control Options, Step 3 – Rank Remaining Control Technologies by Control Effectiveness and Step 4 – Evaluate the Most Effective Controls and Document Results

There are no control options identified in the RBLC that are technically feasible to control VOC that is emitted in small quantities from each combustion unit. See below table for summary of VOC BACT determinations from the RBLC database:

Facility/ RBLC ID	Permit Date	Basis	Process	VOC BACT Limit	Controls
Mid-American Steel and Wire Company OK-0128	09/08/08	BACT-PSD	Ladle Preheater and refractory drying	0.0055 lb/MMBtu (total)	Combustion of natural gas
Nucor Steel AR-0090	04-03/06	BACT-PSD	Ladle Dryer	0.0006 lb/MMBtu	Good combustion practice
Republic Engineered Products, Inc OH-0303	08030/05	LAER	Ladle Dryers/Preheaters	5.5 lb/mmscf	Best operational and engineering practices, good combustion practices
Charter Manufacturing Co. Inc. Charter Steel OH-0276	06/10/04	BACT-PSD	Ladle Preheater and Dryers	0.005 lb/MMBtu	No controls

As shown in the above table, no add-on controls are used for VOC control from the small natural gas combustion equipment at ferroalloy facilities.

Step 5 - Select BACT

The RACT/BACT/LAER Clearinghouse (RBLC) and review of other permits reveal that similar natural gas combustion devices use fuel specifications and good combustion practices for controlling VOC emissions. No similar sized natural gas combustion devices were identified as using add-on VOC controls as BACT.

Thus, BACT is defined as combustion of clean fuel and good combustion practices. For the natural gas combustion sources associated with the proposed plant, combustion of natural gas and good combustion controls were the only control methods evaluated. Since the highest level of VOC control as noted above will be implemented by MS Silicon, an analysis of economic, energy and environmental impacts was not performed.

BACT for the VOC emissions from small natural gas combustion devices to be used to support the silicon manufacturing processes is as follows:

- **Combustion of natural gas;**
- **Good operating practices; and**
- **Total VOC emission limit of 0.0055 lb/MMBtu (AP-42 Emission Factor).**

4.7.4 BACT Analysis for VOC Emissions from Emergency Equipment (AA-501)

Emergency Equipment – Includes the following:

- Diesel-Fired Emergency Generator (1 rated at 670-HP each): 0.27 tpy VOC.

Step 1 – Identify Control Options

There are no control options identified in the RBLC that are technically feasible to control VOC that is emitted at from each piece of emergency equipment. See below table for summary of VOC BACT determinations from the RBLC database:

Step 2 - Technical Feasibility of VOC Control Alternatives

The emergency diesel generator will be used primarily for emergency situations, if any. However, to maintain the integrity of the equipment, the generator will be operated for 100 hours per year or less. Based on a review of similar emission sources, these emission sources typically do not have any add-on controls and should be operated per manufacturer's specifications.

Step 3 - Rank Remaining Alternatives by Control Effectiveness

The most effective method for control of VOC emissions from operation of the emergency fuel combustion devices is the use of fuel specifications that employ clean burning fuels, implementation of good combustion practices and use of combustion controls inherent to the design of the individual combustion devices.

Step 4 - Evaluate Most Effective Controls

Since there are no other feasible technologies to control VOC emissions from the emergency equipment, economic, energy and environmental impact analyses were not performed, nor are required by USEPA's Top-Down approach.

The following table lists the existing VOC BACT determinations for diesel fired emergency equipment. All data in the table is based on the information obtained from the U.S. EPA RACT/BACT/LAER Clearinghouse (RBLC), and electronic versions of permits available at the websites of other permitting agencies.

Facility/ RBLC ID	Permit Date	Process	VOC BACT Limit	Add-On Controls
Idaho Power Company ID-0018	6/25/10	750 KW Emergency Diesel Generator	6.4 G/KW-H	Tier 2 Engine, Good combustion practices
Consumers Energy (MI-0389)	12/29/09	2000 KW Emergency ULSD Generator	6.4 G/KW-H	Engine design and operation
Verenium (FL-0318)	12/10/09	2000 KW Emergency generators	6.4 G/KW-H	The emergency generator and fire pumps are both an Emergency Stationary Compression Ignition Internal Combustion Engine (Stationary ICE) and shall comply with applicable provisions of 40 CFR 60, Subpart IIII
		Emergency ULSD Fired Pump	3.0 g/hp-hr	
Associated Electric Cooperative Inc (OK-0129)	1/23/09	2200 HP low sulfur diesel emergency generator	1.55 lb/hr	Good combustion practices
		267 HP low sulfur diesel emergency fir pump	0.66 lbs/hr	Good combustion practices

As shown in the table above, BACT for the emergency equipment is compliance with NSPS IIII and good combustion/operating practices

Step 5 – Select BACT for VOC from Emergency Equipment

BACT for VOC emissions from the emergency equipment is proposed as:

- **Compliance with NSPS IIII; and**
- **Good combustion/operating practices.**

4.8 Summary of BACT Evaluation

As shown in this BACT evaluation, BACT is being proposed for each regulated air pollutant associated with the equipment/operations at the proposed plant. The emission limitations provided in Tables 4-1 through 4-6 represent BACT taking into account BACT limits established for recently permitted similar operations.

Table 4-1
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of BACT Determinations - Greenhouse Gases

Submerged Arc Furnaces - AA-201
Emission Rates CO_2e - 381,866 tons/year Add on Control or Work Practice Standards 1. Utilization of a new generation furnace (i.e., semi-enclosed SAF); and 2. Good operation and maintenance to improve energy efficiency.
Natural Gas Combustion Equipment - AA-202
Emission Rates • CO2 – 117 lb/MMBtu • Methane – 0.0022 lb/MMBtu • N2O – 0.0002 lb/MMBtu Add on Control or Work Practice Standards 1) Good combustion practices, 2) Combustion of natural gas only, 3) Selection of the most energy efficient burner design based on engineering selection process, and 4) Periodic maintenance.

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Table 4-2
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of BACT Determinations - $PM_{10}/PM_{2.5}$

Submerged Arc Furnaces - AA-201

Emission Rates
$PM_{10}/PM_{2.5}$ – 0.005 gr/dscf

Add on Control or Work Practice Standards
Use of fabric filter control (i.e., baghouse).

Castiong Frames - AA-201a

Emission Rate
No emission limit is being proposed since there is no formal method for quantifying emissions from this type of indoor operation

Add on Control or Work Practice Standards
Best Management Practices to minimize the generation of $PM/PM_{10}/PM_{2.5}$ fugitive emissions from the casting frame operation

Wood Chipper - AA-201b

Emission Rates
No emission limit is being proposed for this operation since there are no available test methods to determine the $PM/PM_{10}/PM_{2.5}$ emission rate

Add on Control or Work Practice Standards
1. Limited hours of operation; and
2. Operation of the wood chipper with an enclosure or similar that will minimize fugitive dust emissions.

Natural Gas Combustion Equipment - AA-202

Emission Rates
None

Add on Control or Work Practice Standards
1. Combustion of natural gas; and
2. Good operating practices.

Material Storage and Handling - AA-101, AA-102, AA-103, AA-101a, AA-102a, AA-103a, AA-104, AA-105, AA-106, AA-403

Material Transfer to and From Coal Storage Pile (AA-101)
No emission limit is being proposed for this operation since there is no available test method to determine the $PM/PM_{10}/PM_{2.5}$ emission rate
Add-on Control or Work Practice Standard -
- Best management practices including the incorporation 3-sided windscreen barrier, reduced drop heights, use of chemical stabilization dust suppressants and/or watering to reduce any visible emissions;
- Development of a fugitive dust control plan

Material Transfer to and From Wood Storage Pile (AA-102)
No emission limit is being proposed for this operation since there is no available test method to determine the $PM/PM_{10}/PM_{2.5}$ emission rate
Add-on Control or Work Practice Standard -
- Best management practices including the incorporation 3-sided windscreen barrier, reduced drop heights, use of chemical stabilization dust suppressants and/or watering to reduce any visible emissions;
- Development of a fugitive dust control plan

Material Transfer to and From Quartz and Limestone Storage Piles (AA-103 and AA-104)
No emission limit is being proposed for this operation since there is no available test method to determine the $PM/PM_{10}/PM_{2.5}$ emission rate
Add-on Control or Work Practice Standard -
- Best management practices including the incorporation 3-sided windscreen barrier, reduced drop heights, use of chemical stabilization dust suppressants and/or watering to reduce any visible emissions;
- Development of a fugitive dust control plan

Material Handling (Coal, Wood, Quartz) Baghouse (AA-101a, AA-102a, AA-103a) and Product Handling Area Baghouse (AA-301 and AA-403)
Emission Rate - 0.003 gr/dscf*

*It should be noted that MS Silicon is voluntarily designing the baghouse to meet 0.0015 gr/dscf to minimize the potential impact on $PM_{10}/PM_{2.5}$ air quality. This emission rate does not constitute BACT

Add-on control or Work Practice Standard -
Fabric Filter Baghouse for PM control

Storage Pile Processing (AA-105)
No emission limit is being proposed for this operation since there is no available test method to determine the $PM/PM_{10}/PM_{2.5}$ emission rate
Add-on Control or Work Practice Standard -
The development of a fugitive dust control plan including the use of measures designed to eliminate dust such as application of wet suppressants, watering, wind screens and speed reduction, as required

Storage Pile Wind Erosion (AA-106)
No emission limit is being proposed for this operation since there is no available test method to determine the $PM/PM_{10}/PM_{2.5}$ emission rate
Add-on Control or Work Practice Standard -
Implementation of a fugitive dust control plan. Visible emissions from the storage piles shall be controlled by the application of water, other dust suppressants or the use of wind screens, as needed

Silica Fume Silo (AA-404)

Emission Rates
$PM_{10}/PM_{2.5}$ – 0.01 gr/dscf

Add on Control or Work Practice Standards
Use of fabric filter control (i.e., bin vent filter)

Paved and Unpaved Roads (AA-402, AA-402a)

Emission Rates
No emission limit is being proposed for this operation since there is no available test method to determine the $PM/PM_{10}/PM_{2.5}$ emission rate.

Add on Control or Work Practice Standards
Development of dust control plan including the use of measures designed to eliminate dust such as application of wet suppressants, watering, speed reduction and vacuuming or sweeping, as required.

Emergency Equipment - AA-501

Emission Rates
None

Add on Control or Work Practice Standards
1. Compliance with NSPS IIII; and
2. Good combustion/operating practices.

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Tab -3
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of BACT Determinations - NO_x

Submerged Arc Furnaces (AA-201)

Emission Rates
NO_x - 45 lbs/ton (averaged over a 30-day period) of silicon produced

Add on Control or Work Practice Standards
None

Natural Gas Combustion Equipment (AA-202)

Emission Rates
NO_x - 0.08 lbs/MMBtu

Add on Control or Work Practice Standards
1. Low NO_x or equivalent burners/technology;
2. Combustion of clean fuel; and
3. Good combustion practices.

Emergency Equipment (AA-501)

Emission Rates
None

Add on Control or Work Practice Standards
1. Compliance with NSPS IIII;
2. Good combustion/operating practices; and
3. Use of ultra low sulfur diesel (ULSD) fuel.

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Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of BACT Determinations - CO

Submerged Arc Furnaces (AA-201)
Emission Rates CO - 34 lbs/ton (averaged over a 30-day period) of silicon produced Add on Control or Work Practice Standards 1. Utilization of a semi-enclosed SAF design. 2. Good combustion and operating practices
Natural Gas Combustion Equipment (AA-202)
Emission Rates CO - 0.0840 lb/MMBtu Work Practice Standards 1. Combustion of natural gas; and 2. Good combustion practices.
Emergency Equipment (AA-501)
Emission Rates None Add on Control or Work Practice Standards 1. Compliance with NSPS IIII; and 2. Good combustion/operating practices.

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Tab. 5
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of BACT Determinations - SO_2

Submerged Arc Furnaces (AA-201)
Emission Rates SO_2 - 52 lbs/ton (averaged over a 30-day period) of silicon produced Add on Control or Work Practice Standards Utilization of low sulfur content material, where technically feasible.
Natural Gas Combustion Equipment (AA-202)
Emission Rates SO_2 - 0.0006 lbs/MMBtu Add on Control or Work Practice Standards 1. Combustion of clean fuel; and 2. Good combustion practices.
Emergency Equipment (AA-501)
Emission Rates None Add on Control or Work Practice Standards 1. Compliance with NSPS IIII; 2. Good combustion/operating practices; and 3. Use of ultra low sulfur diesel (ULSD) fuel.

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Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
Summary of BACT Determinations - VOC

Submerged Arc Furnaces (AA-201)

Emission Rates
VOC - 2.4 lbs/ton (averaged over a 30-day period) of silicon produced

Add on Control or Work Practice Standards
Good operating practices

Natural Gas Combustion Equipment (AA-202)

Emission Rates
VOC - 0.0055 lb/MMBtu (AP-42 emission factor)

Work Practice Standards
1. Combustion of natural gas; and
2. Good combustion practices.

Emergency Equipment (AA-501)

Emission Rates
None

Add on Control or Work Practice Standards
1. Compliance with NSPS IIII; and
2. Good combustion/operating practices.

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Section 5: Air Quality Impact Evaluation

As stated in the Code of Federal Regulations (40 CFR 52) and MDEQ rule APC-S-5, any application for a permit under the PSD provisions shall contain an analysis of ambient air quality in the area that the major project would affect. This requirement only applies to those air pollutants that would trigger PSD applicability (i.e., PSD review).

The proposed plant will be subject to PSD review for emissions of PM_{10}, $PM_{2.5}$, NO_x, CO and SO_2. It is therefore necessary to determine if the proposed plant will have a significant impact on ambient air quality, defined by predicted impacts in excess of a Significant Impact Level (SIL). If the proposed plant has a significant impact on ambient air quality, then a demonstration of compliance with the National Ambient Air Quality Standards (NAAQS) and the Prevention of Significant Deterioration (PSD) Class II increments will be performed for those pollutants that have a significant impact on ambient air quality. The following subsections present the air quality impact analysis for emissions of PM_{10}, $PM_{2.5}$, NO_x, CO and SO_2 as a result of the proposed plant.

An ozone impact analysis is required if VOC emissions from the proposed plant are more than 100 tons/year. Since VOC emissions from the proposed plant will be below 100 tons/year, an air quality impact evaluation is not required, which is consistent with federal and state PSD requirements.

A detailed description of the modeling approach and data requirements for the assessment of air quality impacts due to the proposed plant is included in this section. Currently, the analyses to estimate whether or not the project will have impacts in excess of the SILs or in excess of the Significant Monitoring Concentrations (SMCs) have been completed. It is our understanding that this project will be the first PSD permit in Tishomingo County. As a result, for each air pollutant that results in a significant impact, the corresponding PSD minor source date will be triggered. Subsequently, the proposed plant will be the only PSD Class II Increment consuming source. The results obtained from evaluating compliance with the PSD Class II Increments are provided as part of this application. Any required multisource impact analyses for demonstration of compliance with the NAAQS are pending. The results of such multisource impact analyses will be provided as an addendum to this document in the near future.

5.1 Selected Air Dispersion Model for the Project

The most recent version of the U.S. EPA regulatory model AERMOD (Version 11103), developed by The American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee (AERMIC) was utilized for this project. Regulatory default options available in the model will be used for the compliance demonstrations.

BREEZE AERMOD was used to prepare the input for and process the output from AERMOD. BREEZE AERMOD provides a graphical interface with geographic information system (GIS) capabilities to enhance the AERMOD model and aid the user with setting up the AERMOD input file and organizing and evaluating AERMOD output files. The U.S. EPA's approved regulatory AERMOD code which is used to predict ambient concentrations is unaltered by BREEZE AERMOD.

The AERMOD model family consists of several supporting pre-processor models. The following list summarizes the versions of AERMOD family software that were used for this air dispersion modeling analysis:

- AERMOD 11103;
- Building Profile Input Program for PRIME (BPIPPRM 04274); and
- AERMAP 11103.

5.2 Model Input and Support Data

Several data elements are required as input to support the dispersion model AERMOD, including:

- Representative hourly meteorological data;
- Potential points of predicted impacts, referred to as receptor points; and
- Terrain elevations for each individual receptor point.

Each of these data elements are discussed in the subsequent sections of this protocol.

5.3 Meteorological Data Selection and Pre-processing

MDEQ provides AERMOD View-ready meteorological (met) data sets consisting of five years of met data on their web site at the following url:

http://www.deq.state.ms.us/MDEQ.nsf/page/epd_AERMET_Preprocessedmetdata?OpenDocument

The North East Region met data set with surface data from the Tupelo Regional Airport and upper air data from Jackson provided by MDEQ is considered representative of the Project site. The met data was processed with AERMET View. The most recent five years of the met data, 2007 through 2011, was used for this air dispersion modeling project.

5.4 Coordinate System and Receptor Network

The AERMOD model objects were located using the Universal Transverse Mercator (UTM) coordinate system and North American Datum of 1983 (NAD83).

The receptor grid was designed to identify the maximum points of air quality impact due to the proposed plant and consisted of receptors extending to 50 kilometers from the proposed plant site. The ambient air boundary is defined by features which preclude public access from the plant site. Receptors were closely spaced (50 meters) along the proposed plant site's ambient air boundary to identify the influence of aerodynamic building downwash. The following receptor spacing was used for the receptor grid:

- 50-meter spacing along the ambient air boundary of the proposed plant site;

- 100-meter spacing from the proposed plant fence line to two kilometers out from the proposed plant site;
- 500-meter spacing from two kilometers to five kilometers from the proposed plant site;
- 1,000-meter spacing from five kilometers to ten kilometers from the proposed plant site; and
- 2,000-meter spacing from ten kilometers to fifty kilometers from the proposed plant site.

Figures 5-1 and Figure 5-2 present the receptor network used in the analysis.

5.5 Terrain Data Selection and Pre-processing

Terrain data was assigned to the receptor networks using the latest version of AERMAP (11103) and national elevation data (NED) files at 1-arc second resolution obtained from the United States Geological Survey (USGS) seamless data warehouse server. The elevation of buildings and sources on the site were based upon the planned finished grading of the site.

5.6 Project Emission Inventory

The emission inventory of the plant was based on the potential to emit emission rates provided in this air permit application to construct. The inventory is described in detail in Section 2.0 of this application with supporting backup calculations.

The emission inventory associated with the proposed plant is provided in Table 5-4, Table 5-5, and Table 5-6. AERMOD model objects – buildings, stacks, receptors on the fence line of the site – are depicted in Figure 5-3 and Figure 5-4.

5.7 Determination of the Significance of Project Contributions to Ambient Air Concentrations and Requirement for Pre-Construction Monitoring

The inventory of the proposed plant air emissions was modeled, and the predicted ambient air concentrations were compared with the PSD Class II SILs and the SMCs.

If the predicted concentrations are less than the SILs, the project is demonstrated to not cause or contribute to a violation of the NAAQS or PSD Class II Increments. If predicted concentrations exceed the SILs, further modeling is required to demonstrate that the project will not cause or contribute to a violation of the NAAQS or PSD Class II Increments. The significant impact area (SIA) is defined as the set of receptors at which predicted concentrations due to emissions from the plant are predicted to equal or exceed the SIL.

If the predicted concentrations are less than the SMCs, the plant will be exempt from the requirements to conduct pre or post construction monitoring under the PSD program. The statistical form of the modeled concentration is based on a 5-year National Weather Service met data set.

Tables 5-4a and 5-4b provides a summary of model predicted ambient air concentrations due to the plant and applicable SILs and SMCs. The statistical form of the modeled concentrations indicated in the footnotes of the table is based on a 5-year National Weather Service met data set. The predicted concentrations are appropriate for comparison with the SILs and SMCs.

The plant is predicted to contribute significantly to ambient air quality impacts for 24-hour and annual average PM_{10}, 24-hour and annual average $PM_{2.5}$, annual average, 1-hour, 3-hour and 24-hour SO_2, and 1-hour and annual average NO_2. The SIA distance for these criteria pollutants and averaging periods is provided in Tables 5-4a through 5-4d. Multisource impact analyses for each of these air pollutants to demonstrate compliance with the corresponding NAAQS is currently underway and will be provided to MDEQ as an addendum to this application under separate cover. The plant was predicted to result in predicted concentrations of emissions of CO below the 1-hour and 8-hour SILs, thus no multisource modeling analysis was required. The proposed plant will be below the corresponding NAAQS for emissions of CO.

5.8 Air Quality Monitoring

In addition to the requirement to conduct an air quality impact analysis, the PSD requirements also stipulate that an analysis be performed to assess ambient air quality for a pollutant in any area that the emission of that pollutant would affect.

To assess the ambient air quality from the proposed plant, an air quality impact assessment is typically performed and the predicted impacts are compared to the Significant Monitoring Concentration (SMC). However, for emissions of VOC, no SMC has been developed by USEPA.

If modeled concentrations are below the SMCs, then the requirement for pre- and post-construction monitoring is typically waived. Table 5-4b provides a comparison of the maximum predicted PM_{10}, $PM_{2.5}$, NO_2, SO_2, and CO concentrations, respectively, due to emissions from the proposed plant with the SMCs. Predicted PM_{10} and $PM_{2.5}$ concentrations are above the SMCs, and predicted NO_2, CO and SO_2 concentrations are below the SMCs.

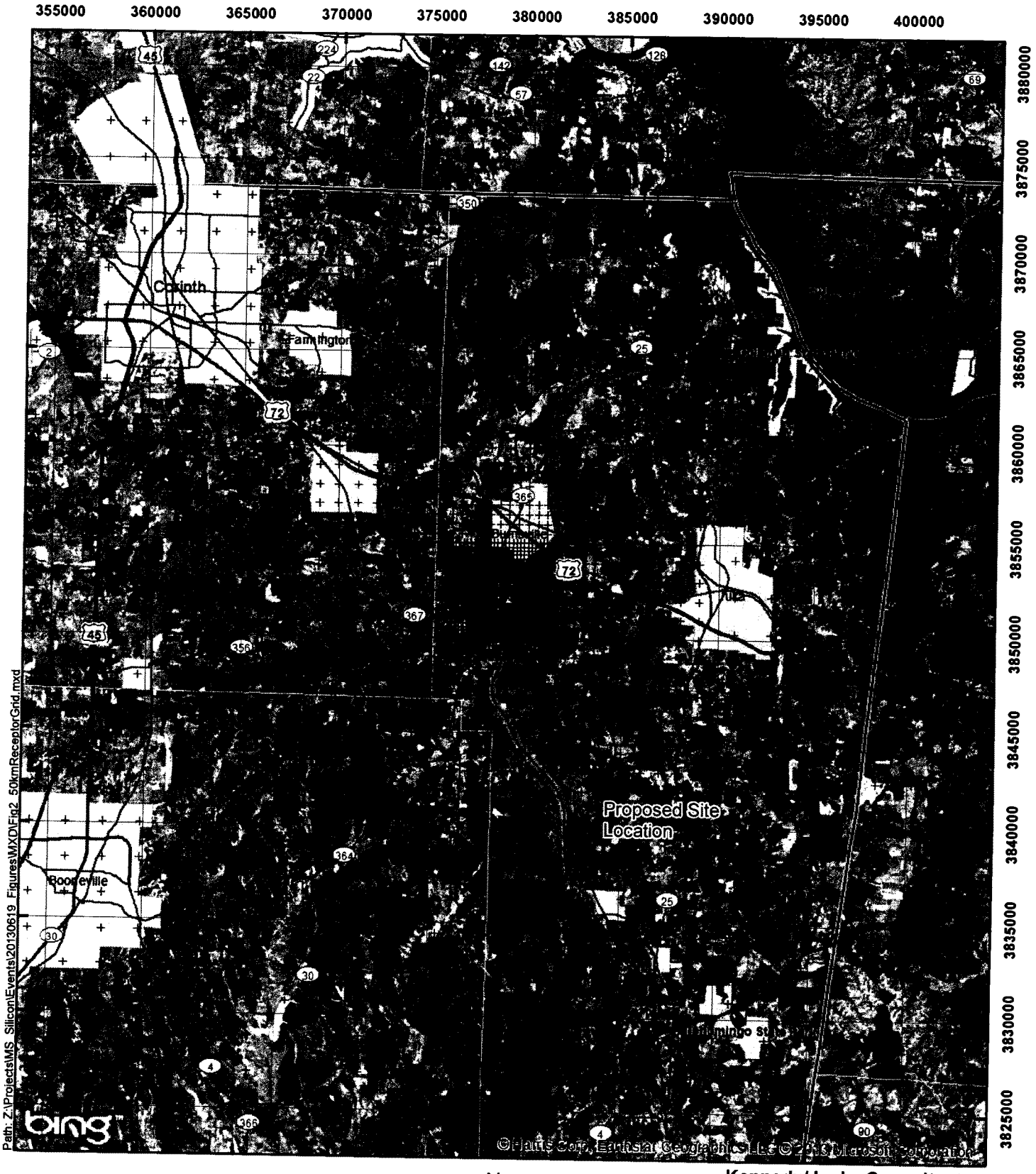
Based on past discussions with MDEQ, it was concluded that sufficient ambient monitoring has been performed throughout the state of Mississippi and that the requirement to conduct any preconstruction or post construction monitoring for emissions of PM_{10}, $PM_{2.5}$, NO_2, CO and SO_2 will not be required by MDEQ. Thus, the requirement to conduct ambient monitoring is being waived by MDEQ.

5.9 PSD Class II Increment Compliance Demonstration

The PM_{10}, $PM_{2.5}$, SO_2 and NO_2 PSD Class II increment compliance demonstrations did not require preparation of a multisource air modeling inventory because the MS Silicon project sources are the only PSD increment consuming source for these regulated air pollutants, being the first major source of these air pollutants to go through PSD review in the area since the increment was established. The results of the air dispersion modeling, which indicates that the MS Silicon plant will be in compliance with the PSD Class II increments, are provided in Table 5-4c.

5.10 NAAQS Compliance Demonstration

As mentioned in the introduction provided in Section 5.0, a multisource NAAQS analysis is currently ongoing. The results of that analysis will be provided to the MDEQ as an addendum to this application. It should be noted, as summarized in Table 5-4d, the proposed plant's emissions of regulated air pollutants will result in predicted concentrations below the NAAQS. As a result, the proposed plant will not cause an impact to human health and welfare.



Legend

- Risk Receptors
- City Areas
- State Boundaries
- County Boundaries
- Interstate
- State Highway
- County Highway

N

0 10,000 20,000

Scale: Feet

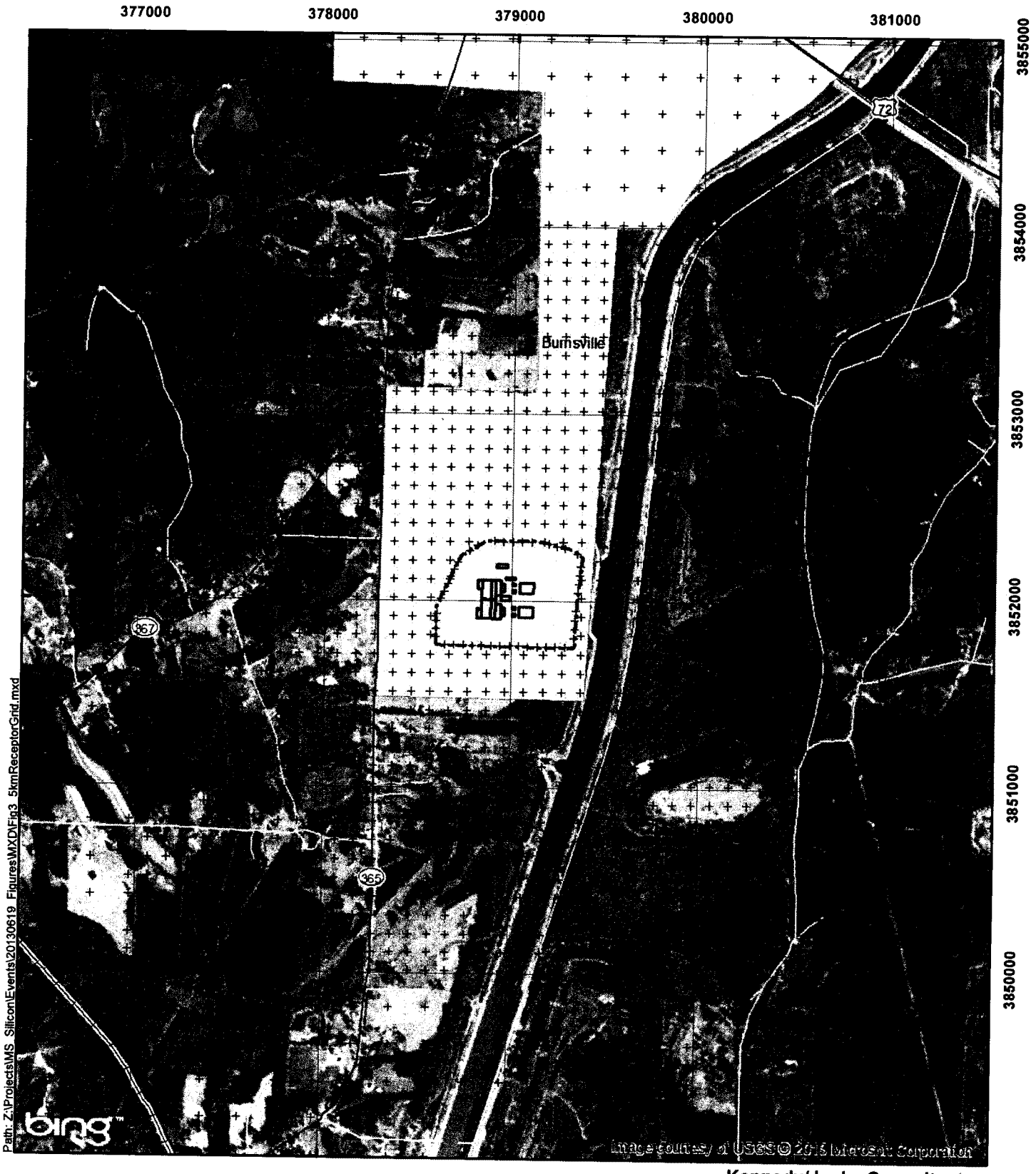
Kennedy/Jenks Consultants

Air Dispersion Modeling
Proposed Silicon Manufacturing Facility
Tishomingo County, Mississippi

50 km Receptor Grid

K/J 1341008*00
August 2013

Figure 5-1



Legend

- Risk Receptors
- Property Boundary
- Buildings
- City Areas
- State Highways
- County Highways
- Local, Rural Roads
- Railroads

N

0 1,000 2,000

Scale: Feet

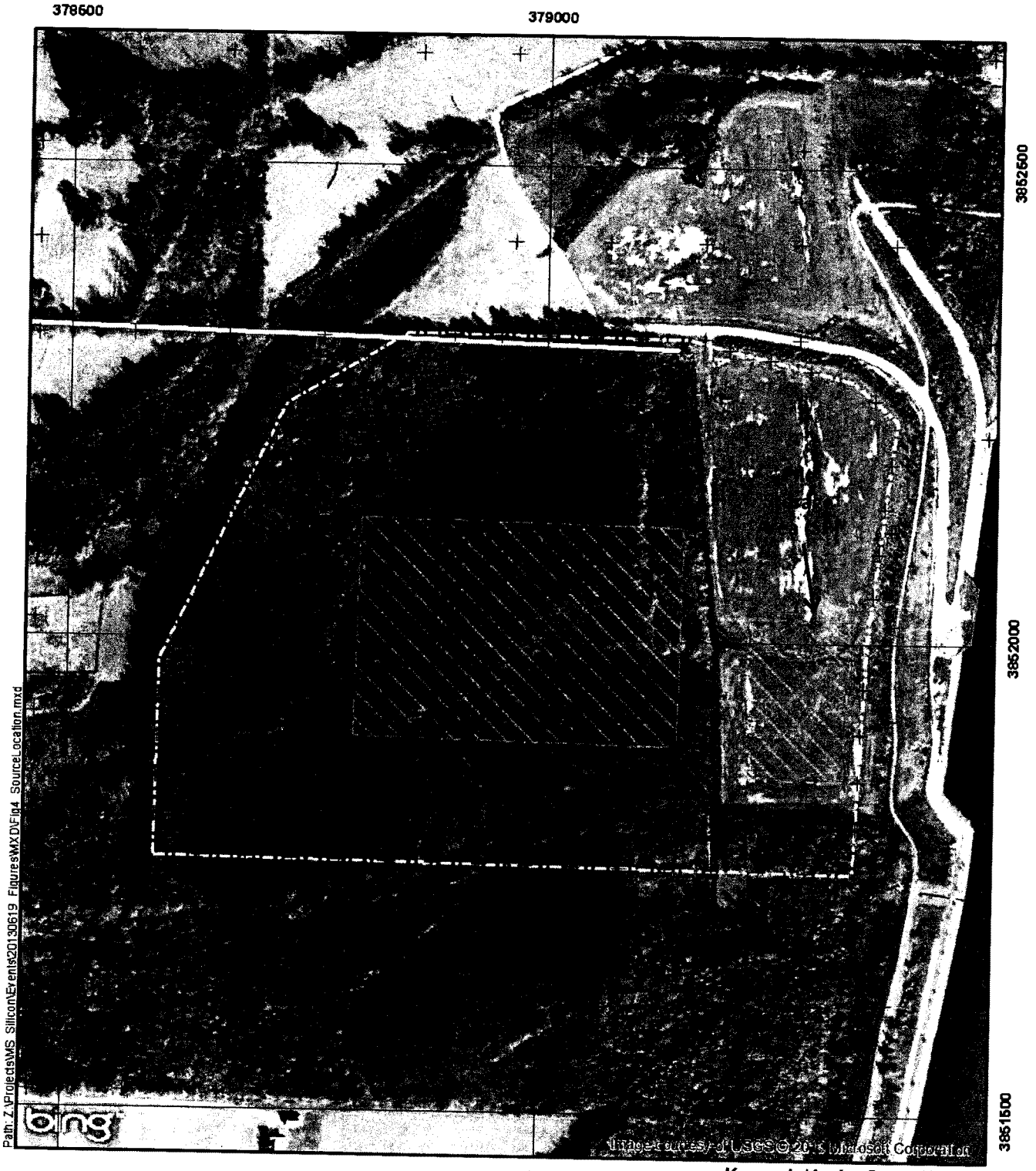
Kennedy/Jenks Consultants

Air Dispersion Modeling
Proposed Silicon Manufacturing Facility
Tishomingo County, Mississippi

5 km Receptor Grid

K/J 1341008*00
August 2013

Figure 5-2



Legend

- Risk Receptors
- Property Boundary
- Buildings
- Point Source
- Area Source
- Volume Source

N

0 200 400

Scale: Feet

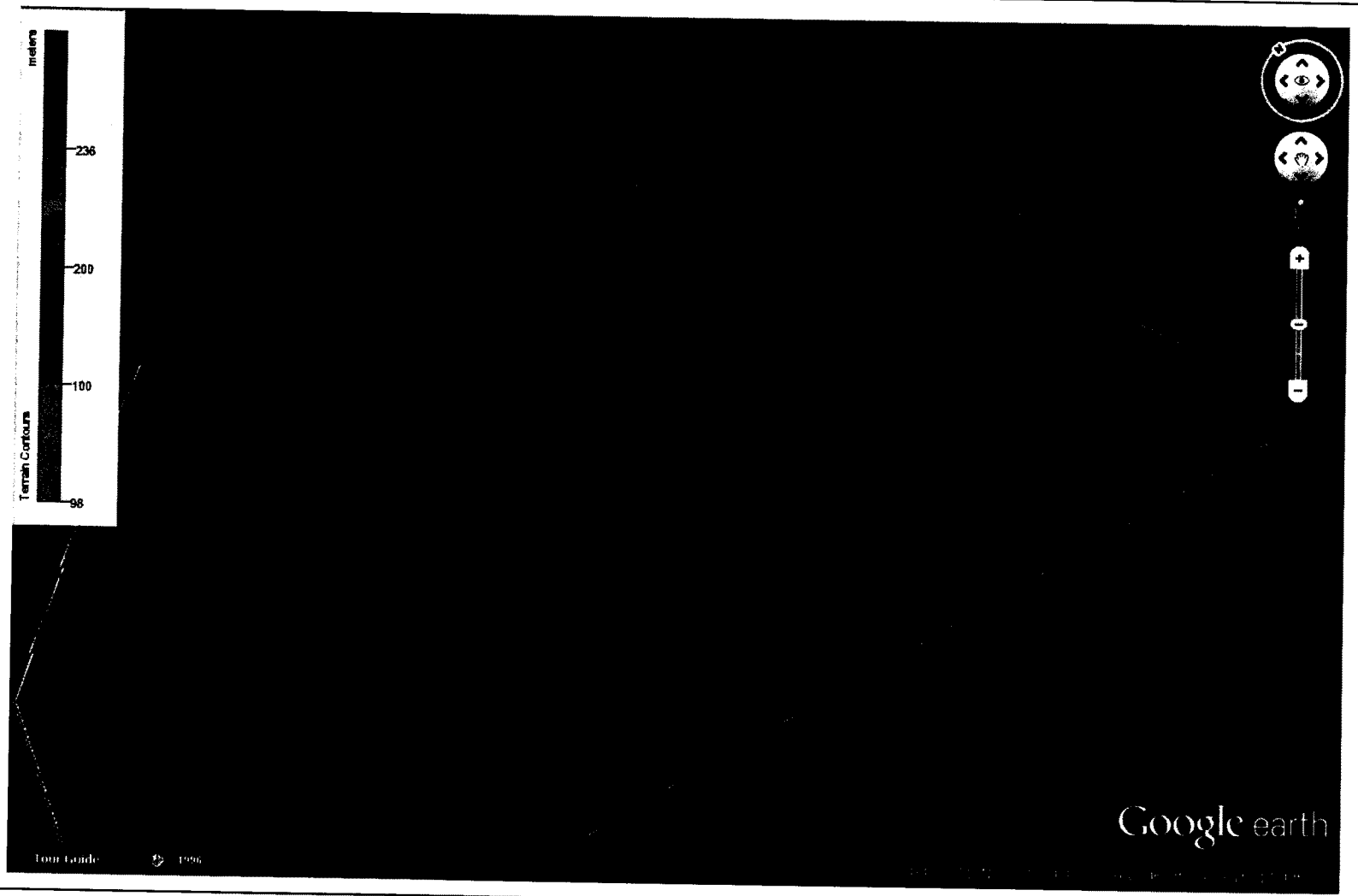
Kennedy/Jenks Consultants

Air Dispersion Modeling
Proposed Silicon Manufacturing Facility
Tishomingo County, Mississippi

Source Location

K/J 1341008*00
August 2013

Figure 5-3



Kennedy/Jenks Consultants

Air Dispersion Modeling Protocol
Proposed Silicon Manufacturing Facility
Tishomingo County, MS

Plant Layout with Location of AERMOD Buildings and Fence Line

1341008*00
August 2013

Figure 5-4

Table 5-1
MS Silicon
Proposed Silicon Manufacturing Plant
Summary of Applicable Standards

Air Pollutant	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PM_{10}	5	24-Hour	Highest first high of the 5 years	10	24-Hour	Highest first high of the 5 years	30	24-Hour	Highest of the second high from each of the 5 years	150	24-Hour	Sixth highest over 5 years (the NAAQS is not to be exceeded more than once per year on average)
	1	Annual	Highest of the 5 years	--	--	--	17	Annual	Highest of the 5 years	--	Annual	--
$PM_{2.5}$	1.2	24-Hour	Average of the highest from each year	4	24-Hour	Average of the highest from each year	9	24-Hour	Highest of the second high from each of the 5 years	35	24-Hour	Average of the eighth highest (98'th percentile) from each year
	0.3	Annual	Average of the highest from each year	--	--	--	4	Annual	Highest of the 5 years	12	Annual	Average of the highest from each year
NO_2	7.52	1-Hour	Average of the highest maximum daily 1-hour concentration from each year	--	--	--	--	--	--	188	1-Hour	Average of the eighth highest (98'th percentile) maximum daily 1-hour concentration from each year
	1	Annual	Highest of the 5 years	14	Annual	Highest of the 5 years	25	Annual	Highest of the 5 years	100	Annual	Average of the highest from each year
SO_2	7.8	1-Hour	Average of the highest maximum daily 1-hour concentration from each year	--	--	--	--	--	--	196	1-Hour	99'th percentile maximum daily 1-hour concentration averaged over 5-years
	25	3-Hour	Highest first high of the 5 years	--	--	--	512	3-Hour	Highest of the second high from each of the 5 years	1,300	3-Hour	Highest of the second high from each of the 5 years
	5	24-Hour	Highest first high of the 5 years	13	24-Hour	Highest first high of the 5 years	91	24-Hour	Highest of the second high from each of the 5 years	365	24-Hour	Highest of the second high from each of the 5 years
	1	Annual	Highest of the 5 years	--	--	--	20	Annual	Highest of the 5 years	80	Annual	Highest of the 5 years
CO	2,000	1-Hour	Average of the highest from each year	--	--	--	--	--	--	40,000	1-Hour	Highest of the second high from each of the 5 years
	500	8-Hour	Average of the highest from each year	575	8-Hour	Highest first high of the 5 years	--	--	--	10,000	8-Hour	Highest of the second high from each of the 5 years

Table 5-2
Mississippi Silicon LLC
Proposed Silicon Manufacturing Plant
Summary of Representative Ambient Air Pollutant Concentrations

Air Pollutant	Location of Monitor	Monitor Location Description	Averaging Period	Measured Concentration*	Measured Concentration Converted to ug/m³	Notes
O_3	Tupelo - Lee County	Tupelo Regional Airport	8-Hour	66 ppm	--	2012 Design Value
PM_{10}*	Jackson - Hinds County	Town	24-Hour	46 ug/m³	46	1st High Averaged Over 3 Years
				30 ug/m³	30	2nd High Averaged Over 3 Years
$PM_{2.5}$	Hernando - DeSoto County	Rural Area	Annual	9.8 ug/m³	9.8	2012 Annual Average Design Value***
	Grenada - Grenada County			9.5 ug/m³	9.5	
	Average			9.65 ug/m³	9.65	
$PM_{2.5}$	Hernando - DeSoto County	Rural Area	24-Hour	18 ug/m³	18	2012 24-Hour Average Design Value***
	Grenada - Grenada County			19 ug/m³	19	
	Average			18.5 ug/m³	18.5	
NO_2	Pascagoula - Jackson County	Town	Annual	4 ppb	7.5	2012 Annual Average
			1-Hour	34 ppb	63.9	2012 1-Hour Average Design Value
SO_2****	Pascagoula - Jackson County	Town	1-Hour	27 ppb	70.7	2012 1-Hour Average Design Value
			3-Hour	27 ppb	70.7	****
			24-Hour	7 ppb	18.3	Highest 2nd High Over 3 Years
			Annual	2.16 ppb	5.7	****
CO*****	Jackson - Hinds County	Town	1-Hour	1.3 ppm	1482	2011 1-Hour Highest 2nd High
			8-Hour	1.0 ppm	1140	2011 8-Hour Highest 2nd High

Notes:
*Background concentrations based on MDEQ's 2012 Air Quality Data Summary
**PM_{10} background concentrations based on EPA's AirData Monitoring Value Report for 2010, 2011 and 2012.
***The monitor located in Lee County is located near the Tupelo Regional Airport. This airport may affected measurements at the $PM_{2.5}$ monitor. Because of this potential influence the two monitors located in DeSoto County (Hernando) and Grenada County (Genada) were considered more representative of the proposed project site. The measured concentrations from these monitors were averaged to represent the background $PM_{2.5}$ levels at the proposed plant site.
****SO_2 24-hour background concentration based on EPA's AirData Monitoring Value Report for 2010, 2011 and 2012. 3-hour concentration was set equal to the 1-hour concentration which was taken from MDEQ's 2012 Air Quality Data Summary. Annual background concentration is based on multiplying the 1-hour concentration by 0.08. The conversion factor obtained from EPA Screen3 conversion factors (converting 1-hour concentrations to other averaging periods).
*****CO 1-hour and 8-hour background concentrations based on the highest 2nd high from EPA's AirData Monitoring Value Report for 2010, 2011 and 2012.
******Concentrations convered from ppm/ppb to ug/m3 based on AP-42, Appendix A - Miscellaneous Data & Conversion Factors (Sept. 1985), Conversion Factors for Various Substances - Gaseous Pollutants

- O_3 - 1 ppm, volume = 1960 µg/m³
- NO_2 - 1 ppm, volume = 1880 µg/m³
- SO_2 - 1 ppm, volume = 2610µg/m³
- CO - 1 ppm, volume = 1.14 mg/m³

Table 5-3
Mississippi Silicon LLC
Proposed Silicon Manufacturing Plant
Emissions Inventory

Point Sources

EMISSION POINT INFORMATION																						
AERMOD Source ID	Emission Point ID	Description	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SAF1	AA-201	Four (4) Submerged Arc Furnaces with Baghouse Control Device	91.44	300	1.93	6.3	19.37	63.5	449.82	350.01	3.49	0.44	3.49	0.44	123.75	15.59	141.9	17.88	93.5	11.78		
SAF2			91.44	300	1.93	6.3	19.37	63.5	449.82	350.01	3.49	0.44	3.49	0.44	123.75	15.59	141.9	17.88	93.5	11.78		
SAF3			91.44	300	1.93	6.3	19.37	63.5	449.82	350.01	3.49	0.44	3.49	0.44	123.75	15.59	141.9	17.88	93.5	11.78		
SAF4			91.44	300	1.93	6.3	19.37	63.5	449.82	350.01	3.49	0.44	3.49	0.44	123.75	15.59	141.9	17.88	93.5	11.78		
RM1	BG5*	Raw Material Baghouse	12.19	40.0	1.37	4.5	18.29	60.0	293.15	68	0.77	0.097	0.77	0.097	--	--	--	--	--	--		
RM2			24.384	80.0	1.37	4.5	18.29	60.0	293.15	68	0.77	0.097	0.77	0.097	--	--	--	--	--	--		
PR1	BG6**	Product Refinement & Handling Baghouse	12.19	40.0	1.07	3.5	18.29	60.0	293.15	68	0.39	0.049	0.39	0.049	--	--	--	--	--	--		
PR2			24.384	80.0	1.07	3.5	18.29	60.0	293.15	68	0.39	0.049	0.77	0.097	--	--	--	--	--	--		

Notes:

*Emission units AA-101a, AA-102a, AA-103a exhaust to this baghouse

**Emission unit AA-301 exhausts to this baghouse

Volume Sources

EMISSION POINT INFORMATION																				
AERMOD Source ID	Emission Point ID	Description	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
F1	AA-202	Four (4) Natural Gas-Fired Ladle Preheaters	20.01	65.6	6.97	18.62	22.9	61.1	0.010	0.00126	0.010	0.00126	1.6	0.20	0.012	0.0015	1.65	0.21		
F2			20.01	65.6	6.97	18.62	22.9	61.1	0.010	0.00126	0.010	0.00126	1.6	0.20	0.012	0.0015	1.65	0.21		
CF1	AA-201a	Casting Frames	14.00	45.9	5.61	13.02	18.4	42.7	0.006	0.000756	0.006	0.000756	--	--	--	--	--	--		
CF2			14.00	45.9	5.61	6.51	18.4	21.4	0.006	0.000756	0.006	0.000756	--	--	--	--	--	--		

Area Sources

EMISSION POINT INFORMATION																						
AERMOD Source ID	Emission Point ID	Description	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PA - Process Area																						
PA	–	Process Area	9.14	30.0	229.66	339.73	78,022.39	753.5	1114.6	839,826.04	1.35	0.1706	2.19E-06	0.24	0.0308	3.95E-07	--	--	--	--	--	--
	AA-101, AA-102, AA-103 & AA-104	Material Handling	--	--	--	--	--	--	--	--	0.411	0.052	--	0.0616	0.0078	--	--	--	--	--	--	--
	AA-403	Slag to tie into Raw Material Baghouse	--	--	--	--	--	--	--	--	No Emissions from this Source			No Emissions from this Source			--	--	--	--	--	--
	AA-404	Silica Fume Silos	--	--	--	--	--	--	--	--	0.03	0.0038	--	0.03	0.0038	--	--	--	--	--	--	--
	AA-402	Vehicle Traffic	--	--	--	--	--	--	--	--	0.8447	0.106	--	0.08447	0.0106	--	--	--	--	--	--	--
	AA-403a	Raw Material Transfer Vehicles	--	--	--	--	--	--	--	--	0.0685	0.0086	--	0.0685	0.0086	--	--	--	--	--	--	--
SP - Pile Storage Area																						
SP	–	Pile Storage Area	9.14	30.0	166.03	105.72	17,552.69	544.7	346.9	188,935.80	0.4866	0.0613	3.49E-06	0.1717	0.0216	1.23E-06	--	--	--	--	--	--
	AA-102b	Wood Chipper	--	--	--	--	--	--	--	--	0.04	5.04E-03	--	0.04	5.04E-03	--	--	--	--	--	--	--
	AA-105	Bulldozing	--	--	--	--	--	--	--	--	0.3896	4.91E-02	--	0.0464	5.85E-03	--	--	--	--	--	--	--
	AA-106	Storage Piles	--	--	--	--	--	--	--	--	0.05696	7.18E-03	--	0.0853	1.08E-02	--	--	--	--	--	--	--

Table 5-4a
Mississippi Silicon LLC
Proposed Silicon Manufacturing Plant
Predicted Concentrations Compared to SILs

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PM_{10}	24-hour	2007	20.47	07/10/05/24	378671.74	3852133.81	5	Highest first high of the 5 years	Yes
		2008	19.03	08/10/05/24	378565.00	3851620.00			Yes
		2009	16.00	09/09/18/24	378653.08	3852095.12			Yes
		2010	16.83	10/07/04/24	378810.99	3852298.80			Yes
		2011	14.63	11/10/20/24	379365.00	3851920.00			Yes
		2007 - 2011	20.47	07/10/05/24	378671.74	3852133.81			Yes
	Annual	2007	3.53	--	378852.62	3852323.27	1.00	Highest of the 5 years	Yes
		2008	2.98	--	378852.62	3852323.27			Yes
		2009	3.25	--	379000.41	3852321.36			Yes
		2010	3.25	--	379000.41	3852321.30			Yes
		2011	3.59	--	379049.67	3852320.72			Yes
		2007 - 2011	--	--	--	--			Yes
$PM_{2.5}$	24-hour	2007	9.41	--	378671.74	3852133.81	1.2	Average of the highest from each year	Yes
		2008	7.79	--	378709.06	3852211.17			Yes
		2009	7.42	--	378653.08	3852095.12			Yes
		2010	8.22	--	378810.99	3852298.8			Yes
		2011	7.77	--	378852.62	3852323.27			Yes
		2007 - 2011	7.43	--	378852.62	3852323.27			Yes
	Annual	2007	1.94	--	378852.62	3852323.27	0.3	Average of the highest from each year	Yes
		2008	1.66	--	378852.62	3852323.27			Yes
		2009	1.62	--	379000.41	3852321.36			Yes
		2010	1.61	--	379000.41	3852321.36			Yes
		2011	1.86	--	379000.41	3852321.36			Yes
		2007 - 2011	1.50	--	379000.41	3852321.36			Yes
NO_2	1-hour	2007	113.20	--	378886.76	3851765.89	7.52	Average of the highest maximum daily 1-hour concentration from each year	Yes
		2008	119.77	--	378935.83	3851765.00			Yes
		2009	114.21	--	380565.00	3851820.00			Yes
		2010	110.72	--	378886.76	3851765.89			Yes
		2011	111.12	--	378935.83	3851765.00			Yes
		2007 - 2011	111.35	--	378935.83	3851765.00			Yes
	Annual	2007	6.19	--	378886.76	3851765.89	1	Highest of the 5 years	Yes
		2008	4.57	--	378886.76	3851765.89			Yes
		2009	4.96	--	378788.62	3851767.67			Yes
		2010	5.48	--	378788.62	3851767.67			Yes
		2011	5.02	--	378788.62	3851767.67			Yes
		2007 - 2011	--	--	--	--			Yes
SO_2	1-hour	2007	109.37	07/12/30/09	380165.00	3850920.00	7.8	Average of the highest maximum daily 1-hour concentration from each year	Yes
		2008	120.94	08/02/24/09	377365.00	3850720.00			Yes
		2009	126.34	09/01/06/12	380665.00	3851820.00			Yes
		2010	118.22	10/01/28/10	380165.00	3852220.00			Yes
		2011	95.45	11/02/23/09	376365.00	3851820.00			Yes
		2007 - 2011	126.34	09/01/06/12	380665.00	3851820.00			Yes
	3-hour	2007	67.70	07/06/18/12	379065.00	3852520.00	25	Highest first high of the 5 years	Yes
		2008	65.84	08/10/22/12	378865.00	3852620.00			Yes
		2009	73.72	09/01/06/15	380565.00	3851120.00			Yes
		2010	67.60	10/06/22/12	379065.00	3852620.00			Yes
		2011	67.81	11/09/01/12	379265.00	3852620.00			Yes
		2007 - 2011	73.72	09/01/06/15	380565.00	3851120.00			Yes
	24-hour	2007	26.11	07/09/05/24	378965.00	3852620.00	5	Highest first high of the 5 years	Yes
		2008	26.10	08/06/06/24	379065.00	3852820.00			Yes
		2009	30.31	09/06/17/24	379665.00	3852020.00			Yes
		2010	28.77	10/06/14/24	379665.00	3852120.00			Yes
		2011	27.24	11/05/28/24	379365.00	3852820.00			Yes
		2007 - 2011	30.31	09/06/17/24	379665.00	3852020.00			Yes
	Annual	2007	4.69	--	378965.00	3852720.00	1	Highest of the 5 years	Yes
		2008	3.32	--	378865.00	3852920.00			Yes
		2009	3.39	--	379365.00	3852820.00			Yes
		2010	4.03	--	379265.00	3852720.00			Yes
		2011	3.91	--	379365.00	3852820.00			Yes
		2007 - 2011	--	--	--	--			Yes
CO	1-hour	2007	116.74	07/01/20/06	378886.76	3851765.89	2000	Average of the highest from each year	No
		2008	123.52	08/05/21/22	378886.76	3851765.89			No
		2009	117.16	09/02/23/07	378935.83	3851765.00			No
		2010	114.18	10/01/12/21	378886.76	3851765.89			No
		2011	114.59	11/12/17/07	378935.83	3851765.00			No
		2007 - 2011	123.52	08/05/21/22	378886.76	3851765.89			No
	8-Hour	2007	63.03	07/12/24/08	378951.14	3852322.00	500	Average of the highest from each year	No
		2008	61.97	08/04/21/08	378886.76	3851765.89			No
		2009	53.96	09/11/20/24	378788.62	3851767.67			No
		2010	47.26	10/11/13/08	379000.41	3852321.36			No
		2011	57.65	11/11/18/08	378788.62	3851767.67			No
		2007 - 2011	63.03	07/12/24/08	378951.14	3852322.00			No

Table 5-4b
Mississippi Silicon LLC
Proposed Silicon Manufacturing Plant
Predicted Concentrations Compared to SMCs

Pollutant	Averaging Period	Meteorological Data Period	Modeled Concentration (µg/m³)	Date of Concentration (YY/MM/DD/HH)	Receptor Point (X Meters)	Receptor Point (Y Meters)	SMCs (µg/m³)	Concentration Average	Does Predicted Concentration Exceed SMCs?
PM_{10}	24-hour	2007	20.47	07/10/05/24	378671.74	3852133.81	10	Highest first high of the 5 years	Yes
		2008	19.03	08/10/05/24	378565.00	3851620.00			Yes
		2009	16.00	09/09/18/24	378653.08	3852095.12			Yes
		2010	16.83	10/07/04/24	378810.99	3852298.80			Yes
		2011	14.63	11/10/20/24	379365.00	3851920.00			Yes
		2007 - 2011	20.47	07/10/05/24	378671.74	3852133.81			Yes
$PM_{2.5}$	24-hour	2007	9.41	--	378671.74	3852133.81	4	Average of the highest from each year	Yes
		2008	7.79	--	378709.06	3852211.17			Yes
		2009	7.42	--	378653.08	3852095.12			Yes
		2010	8.22	--	378810.99	3852298.8			Yes
		2011	7.77	--	378852.62	3852323.27			Yes
		2007 - 2011	7.43	--	378852.62	3852323.27			Yes
NO_2	Annual	2007	6.19	--	378886.76	3851765.89	14	Highest of the 5 years	No
		2008	4.57	--	378886.76	3851765.89			No
		2009	4.96	--	378788.62	3851767.67			No
		2010	5.48	--	378788.62	3851767.67			No
		2011	5.02	--	378788.62	3851767.67			No
		2007 - 2011	--	--	--	--			Yes
SO_2	24-hour	2007	26.11	07/09/05/24	378965.00	3852620.00	13	Highest first high of the 5 years	Yes
		2008	26.10	08/06/06/24	379065.00	3852820.00			Yes
		2009	30.31	09/06/17/24	379665.00	3852020.00			Yes
		2010	28.77	10/06/14/24	379665.00	3852120.00			Yes
		2011	27.24	11/05/28/24	379365.00	3852820.00			Yes
		2007 - 2011	30.31	09/06/17/24	379665.00	3852020.00			Yes
CO	8-Hour	2007	63.03	07/12/24/08	378951.14	3852322.00	575	Highest first high of the 5 years	No
		2008	61.97	08/04/21/08	378886.76	3851765.89			No
		2009	53.96	09/11/20/24	378788.62	3851767.67			No
		2010	47.26	10/11/13/08	379000.41	3852321.36			No
		2011	57.65	11/11/18/08	378788.62	3851767.67			No
		2007 - 2011	63.03	07/12/24/08	378951.14	3852322.00			No

Table 5-4c
Mississippi Silicon LLC
Proposed Silicon Manufacturing Plant
Predicted Concentrations Compared to PSD Class II Increments

Pollutant	Averaging Period	Meteorological Data Period	Modeled Concentration (µg/m³)	Date of Concentration (YY/MM/DD/HR)	Receptor Index (X Meters)	Receptor Index (Y Meters)	PSD Class II Increments (µg/m³)	Concentration Average	Does Predicted Concentration Exceed PSD Class II Increments?
PM_{10}	24-hour	2007	16.07	07/08/09/24	379363.47	3852190.55	30	Highest of the second high from each of the 5 years	No
		2008	16.68	08/09/22/24	378565.00	3851520.00			No
		2009	14.46	09/09/23/24	378665.00	3852120.00			No
		2010	13.96	10/08/31/24	378852.62	3852323.27			No
		2011	13.49	11/08/22/24	378739.55	3851768.56			No
		2007 - 2011	16.68	08/09/22/24	378565.00	3851520.00			No
	Annual	2007	3.53	--	378852.62	3852323.27	17	Highest of the 5 years	No
		2008	2.98	--	378852.62	3852323.27			No
		2009	3.25	--	379000.41	3852321.36			No
		2010	3.25	--	379000.41	3852321.3			No
		2011	3.59	--	379049.67	3852320.72			No
		2007 - 2011	--	--	--	--			Yes
$PM_{2.5}$	24-hour	2007	7.55	--	378852.62	3852323.27	9	Highest of the second high from each of the 5 years	No
		2008	7.17	--	378565.00	3851620.00			No
		2009	7.12	--	378852.62	3852323.27			No
		2010	7.82	--	378810.99	3852298.80			No
		2011	6.74	--	378852.62	3852323.27			No
		2007 - 2011	7.06	--	378852.62	3852323.27			No
	Annual	2007	1.94	--	378852.62	3852323.27	4	Highest of the 5 years	No
		2008	1.66	--	378852.62	3852323.27			No
		2009	1.62	--	379000.41	3852321.36			No
		2010	1.61	--	379000.41	3852321.36			No
		2011	1.86	--	379000.41	3852321.36			No
		2007 - 2011	--	--	--	--			Yes
NO_2	Annual	2007	6.19	--	378886.76	3851765.89	25	Highest of the 5 years	No
		2008	4.57	--	378886.76	3851765.89			No
		2009	4.96	--	378788.62	3851767.67			No
		2010	5.48	--	378788.62	3851767.67			No
		2011	5.02	--	378788.62	3851767.67			No
		2007 - 2011	--	--	--	--			Yes
SO_2	3-hour	2007	66.24	07/08/11/12	378865.00	3851420.00	512	Highest of the second high from each of the 5 years	No
		2008	61.77	08/07/17/12	378765.00	3852720.00			No
		2009	63.13	09/10/19/12	379165.00	3852620.00			No
		2010	65.68	10/09/06/15	379065.00	3852620.00			No
		2011	64.06	11/10/25/15	379265.00	3852620.00			No
		2007 - 2011	66.24	07/08/11/12	378865.00	3851420.00			No
	24-hour	2007	24.84	07/07/16/24	378965.00	3852720.00	91	Highest of the second high from each of the 5 years	No
		2008	24.93	08/06/07/24	379065.00	3852720.00			No
		2009	25.46	09/06/20/24	379465.00	3851620.00			No
		2010	24.46	10/07/03/24	379165.00	3852820.00			No
		2011	23.30	11041924	379465.00	3852920.00			No
		2007 - 2011	25.46	09/06/20/24	379465.00	3851620.00			No
	Annual	2007	4.69	--	378965.00	3852720.00	20	Highest of the 5 years	No
		2008	3.32	--	378865.00	3852920.00			No
		2009	3.39	--	379365.00	3852820.00			No
		2010	4.03	--	379265.00	3852720.00			No
		2011	3.91	--	379365.00	3852820.00			No
		2007 - 2011	--	--	--	--			Yes

Table 5-4d
Mississippi Silicon LLC
Proposed Silicon Manufacturing Plant
Predicted Concentrations Compared to NAAQS

Pollutant	Averaging Period	Meteorological Data Range	Maximum Predicted Concentration (µg/m³)	Date of Maximum Predicted Concentration	Maximum Point (X Coordinate)	Maximum Point (Y Coordinate)	Maximum Concentration Impact (µg/m³)	Background (µg/m³)	Concentration Average	Does Predicted Concentration Exceed NAAQS?
PM_{10}	24-hour	2007	13.74	07/07/28/24	379344.60	3852257.01	46	59.74	Sixth highest over 5 years (the NAAQS is not to be exceeded more than once per year on average)	No
		2008	13.35	08/09/18/24	378665.00	3851720.00	46	59.35		No
		2009	12.06	09/08/06/24	378739.55	3851768.56	46	58.06		No
		2010	12.08	10/12/15/24	378810.99	3852298.80	46	58.08		No
		2011	12.06	11/08/22/24	378665	3851620	46	58.06		No
		2007 - 2011	14.04	07/08/03/24	378765.00	3851620.00	46	60.04		No
$PM_{2.5}$	24-hour	2007	6.62	--	378852.62	3852323.27	18.5	25.12	Average of the eighth highest (98'th percentile) from each year	No
		2008	5.92	--	378810.99	3852298.80	18.5	24.42		No
		2009	6.06	--	378690.48	3851769.45	18.5	24.56		No
		2010	5.65	--	378739.55	3851768.56	18.5	24.15		No
		2011	5.67	--	378690.48	3851769.45	18.5	24.17		No
		2007 - 2011	5.68	--	378852.6	3852323.27	18.5	24.18		No
	Annual	2007	1.94	--	378852.62	3852323.27	9.65	11.59	Average of the highest from each year	No
		2008	1.66	--	378852.62	3852323.27	9.65	11.31		No
		2009	1.62	--	379000.41	3852321.36	9.65	11.27		No
		2010	1.61	--	379000.41	3852321.36	9.65	11.26		No
		2011	1.86	--	379000.41	3852321.36	9.65	11.51		No
		2007 - 2011	1.50	--	379000.41	3852321.36	9.65	11.15		No
NO_2	1-hour	2007	103.36	--	378886.76	3851765.89	63.92	167.28	Average of the eighth highest (98'th percentile) maximum daily 1-hour concentration from each year	No
		2008	103.86	--	378935.83	3851765.00	63.92	167.78		No
		2009	100.01	--	378935.83	3851765.00	63.92	163.93		No
		2010	96.69	--	378886.76	3851765.89	63.92	160.61		No
		2011	95.50	--	378886.76	3851765.89	63.92	159.42		No
		2007 - 2011	98.25	--	378886.76	3851765.89	63.92	162.17		No
	Annual	2007	6.19	--	378886.76	3851765.89	7.52	13.71	Average of the highest from each year	No
		2008	4.57	--	378886.76	3851765.89	7.52	12.09		No
		2009	4.96	--	378788.62	3851767.67	7.52	12.48		No
		2010	5.48	--	378788.62	3851767.67	7.52	13.00		No
		2011	5.02	--	378788.62	3851767.67	7.52	12.54		No
		2007 - 2011	4.57	--	378788.62	3851767.67	7.52	12.09		No
SO_2	1-hour	2007	72.18	07/08/10/09	378965.00	3851420.00	70.74	142.92	99'th percentile maximum daily 1-hour concentration averaged over 5-years	No
		2008	72.95	08/11/02/10	378065.00	3851120.00	70.74	143.69		No
		2009	79.52	09/02/11/11	379965.00	3852220.00	70.74	150.26		No
		2010	80.97	10/01/21/16	380065.00	3852120.00	70.74	151.71		No
		2011	74.38	11/03/23/13	379965.00	3852120.00	70.74	145.12		No
		2007 - 2011	76.00	--	--	--	70.74	146.74		No
	3-hour	2007	66.24	07/08/11/12	378865.00	3851420.00	70.74	136.98	Highest of the second high from each of the 5 years	No
		2008	61.77	08/07/17/12	378765.00	3852720.00	70.74	132.51		No
		2009	63.13	09/10/19/12	379165.00	3852620.00	70.74	133.87		No
		2010	65.68	10/09/06/15	379065.00	3852620.00	70.74	136.42		No
		2011	64.06	11/10/25/15	379265.00	3852620.00	70.74	134.80		No
		2007 - 2011	66.24	07/08/11/12	378865.00	3851420.00	70.74	136.98		No
	24-hour	2007	24.84	07/07/16/24	378965.00	3852720.00	18.34	43.18	Highest of the second high from each of the 5 years	No
		2008	24.93	08/06/07/24	379065.00	3852720.00	18.34	43.27		No
		2009	25.46	09/06/20/24	379465.00	3851620.00	18.34	43.80		No
		2010	24.46	10/07/03/24	379165.00	3852820.00	18.34	42.80		No
		2011	23.30	11041924	379465.00	3852920.00	18.34	41.64		No
		2007 - 2011	25.46	09/06/20/24	379465.00	3851620.00	18.34	43.80		No
	Annual	2007	4.69	--	378965.00	3852720.00	5.66	10.35	Highest of the 5 years	No
		2008	3.32	--	378865.00	3852920.00	5.66	8.98		No
		2009	3.39	--	379365.00	3852820.00	5.66	9.05		No
		2010	4.03	--	379265.00	3852720.00	5.66	9.69		No
		2011	3.91	--	379365.00	3852820.00	5.66	9.57		No
		2007 - 2011	--	--	--	--	--	--		No
CO	1-hour	2007	115.48	07/02/08/19	378886.76	3851765.89	1482	1597.48	Highest of the second high from each of the 5 years	Yes
		2008	116.30	08/01/12/21	378886.76	3851765.89	1482	1598.30		No
		2009	112.48	09/11/04/24	378935.83	3851765.00	1482	1594.48		No
		2010	113.72	10/12/24/22	378886.76	3851765.89	1482	1595.72		No
		2011	113.98	11/12/17/06	378935.83	3851765.00	1482	1595.98		No
		2007 - 2011	117.16	09/02/23/07	378935.83	3851765.00	1482	1599.16		No
	8-Hour	2007	53.64	07/10/13/08	378886.76	3851765.89	1140	1193.64	Highest of the second high from each of the 5 years	No
		2008	61.33	08/03/06/08	378886.76	3851765.89	1140	1201.33		No
		2009	46.31	09/09/30/08	378788.62	3851767.67	1140	1186.31		No
		2010	43.64	10/11/28/08	378739.55	3851768.56	1140	1183.64		No
		2011	48.58	11/03/03/08	378788.62	3851767.67	1140	1188.58		No
		2007 - 2011	61.33	08/03/06/08	378886.76	3851765.89	1140	1201.33		No

Section 6: Additional Impact Analysis

The potential impact of the proposed silicon manufacturing plant's air pollutant emissions associated with construction and related growth are presented in this section. Assessment of the proposed plant's impact on soil, vegetation, and visibility are also presented in this section. A qualitative approach to these analyses was necessary for those areas in which analytical techniques are not well established.

6.1 Construction and Growth Impacts

The project being proposed by MS Silicon will have minimal effect on construction and growth impacts. During the construction phase, MS Silicon will employ various techniques to minimize the potential impact on the surrounding environment. The primary focus will be to reduce the formation of fugitive type particulates that may be generated during the construction phase.

The construction and operation of the proposed silicon manufacturing plant should not result in any noticeable residential growth in the area. Commercial growth is anticipated to occur at a gradual rate in the future. However, this growth will not be directly associated with the proposed plant in Tishomingo County.

6.2 Impact on Soil and Vegetation

The secondary NAAQS are intended to provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings from adverse effects of airborne pollutants. This protection extends to agricultural soil. As demonstrated in Section 5, predicted concentrations of PM_{10}, $PM_{2.5}$, NO_2, CO and SO_2 resulting from the proposed plant will not cause or contribute to a violation of the NAAQS. Since the secondary NAAQS were established to protect human welfare, no significant adverse impacts on soil are anticipated due to the proposed plant in Tishomingo County.

The effects of gaseous air pollutants on vegetation may be classified into three rather broad categories: acute, chronic, and long-term. Acute effects are those that result from relatively short (less than 1 month) exposures to high concentrations of pollutants. Chronic effects occur when organisms are exposed for months or even years to certain threshold levels of pollutants. Long-term effects include abnormal changes in ecosystems and subtle physiological alterations in organisms. Acute and chronic effects are caused by the gaseous pollutant acting directly on the organism, whereas long-term effects may be indirectly caused by secondary agents such as changes in soil pH.

NO_2 may affect vegetation either by direct contact of NO_2 with the leaf surface or by solution in water drops, becoming nitric acid. Acute and chronic threshold injury levels for NO_2 are much higher than those for SO_2.

The maximum predicted NO_2 ambient concentrations due to the proposed silicon manufacturing plant are below the ambient air quality standards, which are designed to protect public health and welfare from any known or adverse effect of air pollutants, including effects on vegetation.

6.3 Analysis of Endangered Species

Potential emissions of regulated criteria pollutants associated with the proposed plant are presented in Section 2.0 of this PSD air permit application. An air quality impact analysis was performed for emissions of PM_{10}, $PM_{2.5}$, NO_2, CO and SO_2. As shown in Section 5.0, emissions of PM_{10}, $PM_{2.5}$, NO_2, CO and SO_2 from the proposed plant will result in potential impacts below the NAAQS that protect human health and welfare.

MS Silicon's facility will be located in Tishomingo County, Mississippi. It is possible there may be endangered species located in Tishomingo County. However, as stated above, air emissions resulting from the proposed plant result in model predicted concentrations below the NAAQS. Therefore, these emissions are not expected to have a significant impact on endangered species which may be present in the county. In addition, maximum impacts from the proposed plant are in the immediate vicinity of the plant and it is unlikely due to the location of the proposed plant that endangered species would reside in these maximum impact areas. Table 6-1a presents the U.S. Fish & Wildlife Service's listing of threatened and endangered species in the State of Mississippi and Table 6-1b presents the list of threatened and endangered species in Tishomingo County.

6.4 Additional Air Quality Impact Analyses

As stipulated in the PSD regulations (40 CFR 52.21(o)) analysis of the impairment that would occur as a result of the proposed silicon manufacturing plant must be conducted. A discussion on this analysis as it relates to the proposed plant is provided below.

6.4.1 Impact on Visibility (Regional Haze Analysis)

As stated previously, the proposed plant will trigger applicability of the PSD regulations. One of the components of the PSD regulations includes the special protection of air quality and air quality related values (AQRV) at potentially affected nearby Class I areas. Assessment of the potential impact to visibility (regional haze analysis) is required if the source is located within 300 km of a Class I area. An evaluation may also be requested if the source's emissions are of sufficient size.

The nearest Class I area to the proposed plant site is identified below:

Class I Area	State	Approximate Distance (Project Site to Class I Area) (km)
Sipsey Wilderness Area	Alabama	100

Figure 6-1 presents the location of the proposed plant in Tishomingo County, Mississippi in relation to the Sipsey Wilderness Class I Area in northern Alabama.

The largest source of regulated air pollutants will occur from the plant's SAFs. As mentioned previously, the SAFs will be installed in phases and will be designed with a baghouse to minimize $PM_{10}/PM_{2.5}$ emissions prior to the associated exhaust gases exiting a 300 foot stack. Predicted concentrations of PM, NO_2 and SO_2 significantly drop with downwind distance from this plant. All other potential emission sources have been shown to result in their maximum concentrations at the property fence line or within one (1) kilometer of the proposed plant based on the configuration of the plant and being located east of the proposed plant site (not downwind of the plant based on the area's predominant wind flow south to north, and southwest to northeast), the proposed plant should have no effect on visibility impairment or resulting concentrations above the Class I increments.

The USDA Forest Service has requested that an AQRV Modeling Analysis for Sipsey Wilderness be included in the PSD permit application. The results of this analysis will be submitted as an addendum to this application upon completion.

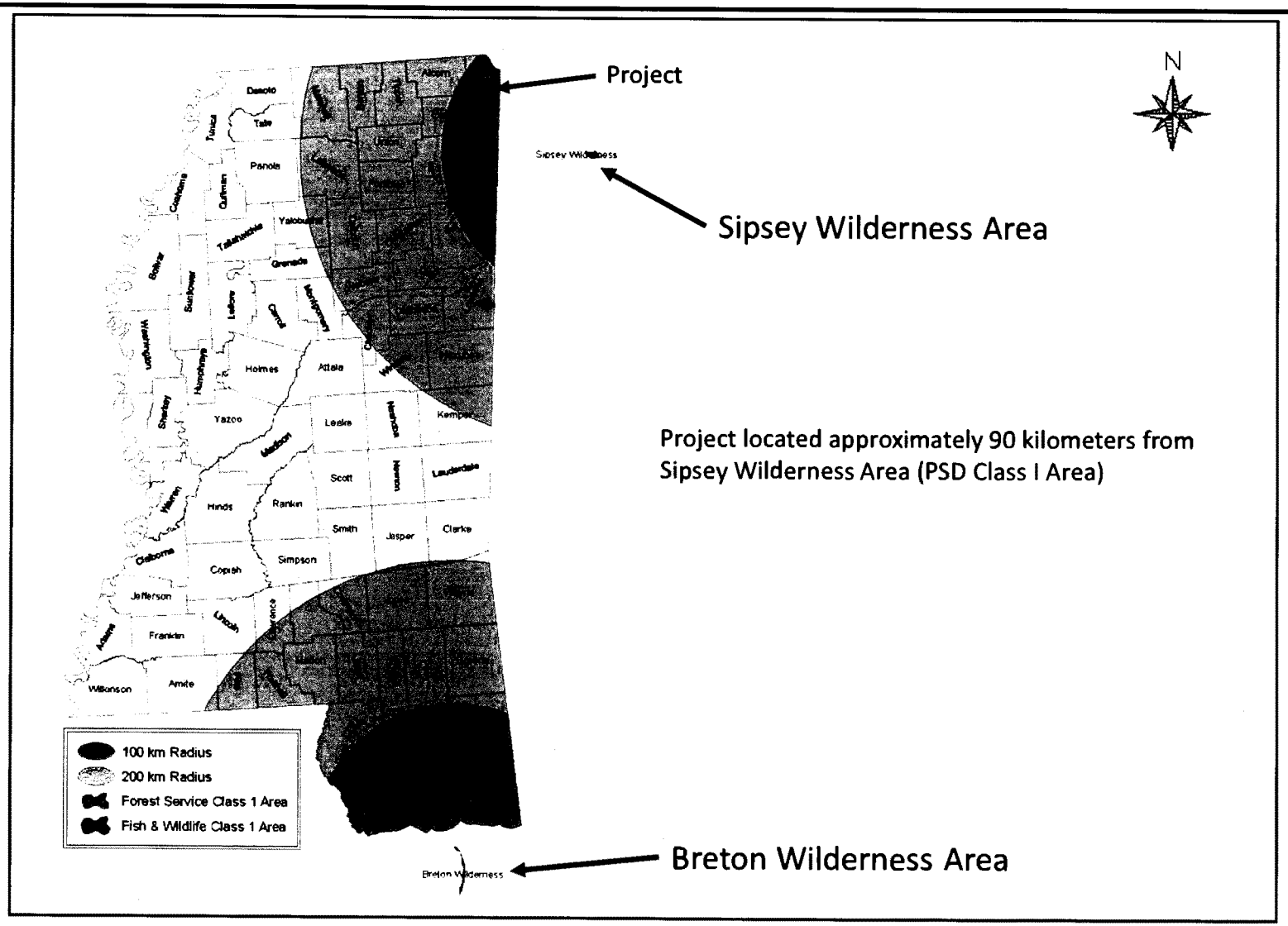


Figure 6-1. Project Location in Relation to Nearest Class I Areas

MS Silicon
Proposed Silicon Manufacturing Plant
Burnsville, Mississippi
August 2013

Kennedy/Jenks Consultants
Engineers & Scientists

Tab

Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
List of Endangered Species in the State of Mississippi

Summary of Animals Listings

Animal species listed in this state and that occur in this state (30 species)

[redacted]	[redacted]
E	Bat, Gray Entire (Myotis grisescens)
E	Bat, Indiana Entire (Myotis sodalis)
T	Bear, Louisiana black Entire (Ursus americanus luteolus)
E	Clubshell, black Entire (Pleurobema curtum)
E	Clubshell, ovate (Pleurobema perovatum)
E	Clubshell, southern (Pleurobema decisum)
E	Combshell, Cumberlandian Entire Range; Except where listed as Experimental Populations (Epioblasma brevidens)
E	Combshell, southern Entire (Epioblasma penita)
E	Crane, Mississippi sandhill Entire (Grus canadensis pulla)
T	Darter, bayou Entire (Etheostoma rubrum)
E	Frog, Mississippi gopher Entire (Rana capito sevosa)
T	Heelsplitter, Alabama (=inflated) Entire (Potamilus inflatus)
E	Manatee, West Indian Entire (Trichechus manatus)
T	Moccasinshell, Alabama (Medionidus acutissimus)
E	Mussel, sheepnose (Plethobasus cyphyus)
E	Mussel, snuffbox (Pleurobema marshalli)
E	Pigtoe, flat (Pleurobema marshalli)
E	Pocketbook, fat Entire (Potamilus capax)
T	Sea turtle, green except where endangered (Chelonia mydas)
E	Sea turtle, hawksbill Entire (Eretmochelys imbricata)
E	Sea turtle, Kemp's ridley Entire (Lepidochelys kempii)
E	Sea turtle, leatherback Entire (Dermochelys coriacea)
E	Stirrupshell Entire (Quadrula stapes)
T	Sturgeon, gulf Entire (Acipenser oxyrinchus desotoi)
E	Sturgeon, pallid Entire (Scaphirhynchus albus)
E	Tern, least interior pop. (Sterna antillarum)
T	Tortoise, gopher W of Mobile/Tombigbee Rs. (Gopherus polyphemus)
T	Turtle, ringed map Entire (Graptemys oculifera)
T	Turtle, yellow-blotched map Entire (Graptemys flavimaculata)
E	Whale, finback Entire (Balaenoptera physalus)
E	Whale, humpback Entire (Megaptera novaeangliae)
E	Woodpecker, red-cockaded Entire (Picoides borealis)

Animal species listed in this state that do not occur in this state (7 species)

[redacted]	[redacted]
E	Beetle, American burying Entire (Nicrophorus americanus)
E	Panther, Florida U.S.A. (LA and AR east to SC and FL) (Puma (=Felis) concolor coryi)
E	Pigtoe, heavy Entire (Pleurobema taitianum)
T	Plover, piping except Great Lakes watershed (Charadrius melodus)
T	Snake, eastern indigo Entire (Drymarchon corais couperi)
E	Sturgeon, Alabama (Scaphirhynchus suttkusi)
E	Wolf, gray U.S.A.: All of AL, AR, CA, CO, CT, DE, FL, GA, KS, KY, LA, MA, MD, ME, MO, MS, NC, NE, NH, NJ, NV, NY, OK, PA, RI, SC, TN, VA, VT and WV; those portions of AZ, NM, and TX not included in an experimental population; and portions of IA, IN, IL, ND, OH, OR, SD, UT, and WA. Mexico . (Canis lupus)

Animal listed species occurring in this state that are not listed in this state (5 species)

[redacted]	[redacted]
E	Butterfly, Mitchell's satyr (Neonympha mitchellii mitchellii)
E	Plover, piping Great Lakes watershed (Charadrius melodus)
E	Sawfish, smalltooth (Pristis pectinata)
E	Stork, wood AL, FL, GA, SC (Mycteria americana)
E	Turtle, Alabama red-belly Entire (Pseudemys alabamensis)

Summary of Plant Listings

Plant species listed in this state and that occur in this state (4 species)

[redacted]	[redacted]
E	Chaffseed, American (Schwalbea americana)
E	Pondberry (Lindera melissifolia)
T	Potato-bean, Price's (Apios priceana)
E	Quillwort, Louisiana (Isoetes louisianensis)

Notes:
Taken from U.S. Fish and Wildlife Services - Species Report.
http://ecos.fws.gov/tess_public/pub/stateListingAndOccurrenceIndividual.jsp?state=MS&s8fid=112761032792&s8fid=112762573902

This report shows the listed species associated in some way with this state.
This list does not include experimental populations and similarity of appearance listings.
This list includes non-nesting sea turtles and whales in State/Territory coastal waters.
This list includes species or populations under the sole jurisdiction of the National Marine Fisheries Service.

E = Endangered; T = Threatened

Tal 3-1b
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnsville, MS
List of Endangered Species in Tishomingo County, MS

Group	Species Name	Status	Lead Office	Recovery Plan Name	Recovery Plan Stage
Clams	Cumberlandian Combshell (Epioblasma brevidens)	Endangered	Tennessee Ecological Services Field Office	Cumberland and Tennessee River Mussels (5 spp.)	Final
Clams	Slabside Pearlymussel (Lexingtonia dolabelloides)	Proposed Endangered	Asheville Ecological Services Field Office	--	--
Clams	Rabbitsfoot (Quadrula cylindrica cylindrica)	Proposed Threatened	Arkansas Ecological Services Field Office	--	--
Insects	Mitchell's Satyr Butterfly (Neonympha mitchellii mitchellii)	Endangered	East Lansing Ecological Services Field Office	Mitchell's Satyr Butterfly	Final
Mammals	Gray Bat (Myotis grisescens)	Endangered	Columbia Ecological Services Field Office	Gray Bat	Final

Notes:
Taken from U.S. Fish and Wildlife Services - Species Report by County.
http://ecos.fws.gov/tess_public/countySearch!speciesByCountyReport.action?fips=28141

Section 7: Suggested Permit Structure

Refer to the following tables for suggested permit language:

- Table 7-1 – Proposed Permit Conditions – Part II – Emission Point Descriptions;
- Table 7-2 – Proposed Permit Conditions – Part III – Emission Point Specific Limitations and Standards;
- Table 7-3 – Proposed Permit Conditions – Part IV – Emission Point Specific Compliance / Performance Requirements; and
- Table 7-4 – Proposed Permit Conditions – Part V – Emission Point Specific Recordkeeping / Reporting Requirements

Table 7-1
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnville, MS
Proposed Permit Conditions - Part II - Emission Point Descriptions

AA-000	**Silicon Manufacturing and Silicon Purification Plant**
AA-100	**Raw Material Receiving, Handling and Storage Operations**
AA-101	Material Handling and Transfer to and from Coal Storage Pile with a material throughput rate of 105,120 tons/yr
AA-101a	Conveyance of Coal To Charging Storage Silo equipped with a common baghouse or a series of smaller baghouses with a total flow rate of approximately 120,000 acfm
AA-102	Material Handling and Transfer to and from Wood Storage Pile with a material throughput rate of 212,763 tons/yr
AA-102a	Conveyance of Wood To Charging Storage Silo equipped with a common baghouse or a series of smaller baghouses with a total flow rate of approximately 120,000 acfm
AA-103	Material Handling and Transfer to and from Quartz Storage Pile with a material throughput rate of 212,763 tons/yr
AA-103a	Conveyance of Quartz To Charging Storage Silo equipped with a common baghouse or a series of smaller baghouses with a total flow rate of approximately 120,000 acfm
AA-104	Material Handling and Transfer of Limestone with a material throughput rate of 183 tons/yr
AA-105	Storage Pile Processing (i.e., Bulldozing)
AA-106	Wind Erosion on Coal, Wood and Quartz Storage Piles
AA-200	**Silicon Manufacturing Plant**
AA-201	Four (4) Submerged Arc Furnaces (SAF) each equipped with a baghouse with a flow rate of approximately 125,000 acfm. The SAF will have the following approximate raw material feed rates and silicon production rates: <u>Raw Material Feed Rates:</u> - Coal - 3.4 tons/hr - Wood - 7.0 tons/hr - Quartz - 7.0 tons/hr - Flux - 0.1 tons/hr <u>Silicon Production Rates:</u> - Per SAF - 2.75 tons/hr, 21,024 tons/yr - Total for 4 SAF - 11.0 tons/hr; 84,096 tons/yr
AA-201a	Casting Frames (One per SAF) <u>Silicon Production Rates:</u> - Per Casting Frame - 2.75 tons/hr, 21,024 tons/yr - Total for 4 Casting Frames - 11.0 tons/hr; 84,096 tons/yr
AA-203	Four (4) Natural Gas-Fired Ladle Preheaters (one per each SAF) rated at 10.0 MMBtu/hr each
AA-300	**Product Refinement and Handling**
AA-301	Product Refinement and Handling equipped with common baghouse or a series of smaller baghouses with a total flow rate of approximately 60,000 acfm
AA-400	**Other Plantwide Operations and Activities**
AA-401	One (1) Oxygen Vertical Storage Tank and One (1) Diesel Storage Tank
AA-402	Plantwide Fugitive Emissions from Roadways
AA-402a	Plantwide Fugitive Emissions from Transport of Raw Materials (Material Storage Piles to SAF Charging Building)
AA-403	Slag Handling and Storage
AA-404	Silica Fume Silos
AA-405	Facility-Wide Miscellaneous Operations Subject to APC-S-6
AA-500	**Emergency Support Equipment**
AA-501	One (1) Diesel-Fired Emergency Generator rated at 670 HP

Table 7-2
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnville, MS
Proposed Permit Conditions - Part III - Emission Point Specific Limitations and Standards

AA-000 - Entire Facility			
AA-000 (Entire Facility)	PSD Construction Permit Issued Issuance Date	Silicon Production	84,096 tons/yr
		Natural Gas Combustion	350,000 MMBtu/yr
		NO_x	1,906.2 tons/yr
		CO	1,444.3 tons/yr
		SO_2	2,170.1 tons/yr
		VOC	93.5 tons/yr
		PM_{10}	81.8 tons/yr
		$PM_{2.5}$	73.3 tons/yr
		HAP	10 tons/yr (Individual) / 25 tons/yr (Total)
AA-100 - Raw Material Receiving, Handling and Storage Operations			
AA-100 (Raw Material Receiving, Handling and Storage Operations)	PSD Construction Permit Issued Issuance Date	Material Throughput	AA-101 (Coal) - 105,120 tpy AA-102 (Wood) - 212,763 tpy AA-103 (Quartz) - 212,763 tpy AA-104 (Limestone) - 183 tpy
		$PM_{10}/PM_{2.5}$	BACT Material Transfer and Handling (AA-101, AA-102, AA-103) • Development of a fugitive dust control plan to minimize PM emissions; and • No emission limit is being proposed for these operations since there is no available test method to determine the PM/PM10/PM2.5 emission rate Material and Product Handling Operations (AA-101a, AA-102a, AA-103a) - Baghouse for PM control; and - A $PM_{10}/PM_{2.5}$ limitation of 0.003 gr/dscf.* *It should be noted that MS Silicon is voluntarily designing the baghouse to meet 0.0015 gr/dscf to minimize the potential impact on PM10/PM2.5 air quality. This emission rate does not constitute BACT
AA-102b (Wood Chipper)	PSD Construction Permit Issued Issuance Date	$PM_{10}/PM_{2.5}$	BACT: No emission limit is being proposed for this operation since there are no available test methods to determine the $PM/PM_{10}/PM_{2.5}$ emission rate - Limited hours of operation; and - Operation of the wood chipper with an enclosure or similar that will minimize fugitive dust emissions.
AA-105 (Storage Pile Processing (i.e., Bulldozing)	PSD Construction Permit Issued Issuance Date	$PM_{10}/PM_{2.5}$	BACT: - No emission limit is being proposed for this operation since there is no available test method to determine the $PM/PM_{10}/PM_{2.5}$ emission rate - Development of fugitive dust control plan including the use of measures designed to eliminate dust such as application of wet suppressants, watering, speed reduction and vacuuming or sweeping, as required.
AA-106 (Wind Erosion)	PSD Construction Permit Issued Issuance Date	$PM_{10}/PM_{2.5}$	BACT: -Implementation of a fugitive dust control plan. Visible emissions from the storage piles shall be controlled by the application of water, other dust suppressants or the use of wind screens, as needed - No emission limit is being proposed for this operation since there is no available test method to determine the $PM/PM_{10}/PM_{2.5}$ emission rate
AA-200 - Silicon Manufacturing Plant			
AA-201 (Submerged Arc Furnaces)	PSD Construction Permit Issued Issuance Date 40 CFR 60, Subpart Z – Ferroalloy Production Facilities	NO_x	BACT: 45 lbs/ton silicon produced (30-day averaging period)
		CO	BACT: 34 lbs/ton silicon produced (30-day averaging period) - Good combustion and operating practices; and - Utilization of a semi-enclosed SAF design. 40 CFR 60, Subpart Z - Less than 20 volume percent on a dry basis
		$PM_{10}/PM_{2.5}$	BACT: Use of fabric filter control. $PM_{10}/PM_{2.5}$ - 0.005 gr/dscf 40 CFR 60, Subpart Z - 0.45 kg/MW-hr (0.99 lb/MW-hr)
		SO_2	BACT: 52 lbs/ton silicon produced (30-day averaging period) - Utilization of low sulfur content material, where technically feasible
		VOC	BACT: 2.4 lbs/ton silicon produced (30-day averaging period) - Good operating practices
		CO_2e	BACT: 381,866 tons/year 1. Utilization of a new generation furnace (i.e., semi-enclosed SAF design). 2. Good operation and maintenance to improve energy efficiency.
		Opacity	40 CFR 60, Subpart Z - 15% from control device

Table 7-2
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnville, MS
Proposed Permit Conditions - Part III - Emission Point Specific Limitations and Standards

AA-201a (Casting Frames)	PSD Construction Permit Issued Issuance Date	$PM_{10}/PM_{2.5}$	BACT: -No emission limit is being proposed since there is no formal method for quantifying emissions from this type of indoor operation - Best management practices
AA-202 (Natural Gas-Fired Ladle Preheaters)	PSD Construction Permit Issued Issuance Date	NO_x	BACT: NO_x - 0.08 lb/MMBtu 1. Low NO_x or equivalent burners/technology; 2. Combustion of clean fuel; and 3. Good combustion practices.
		CO	BACT: CO - 0.0840 lb/MMBtu 1. Combustion of natural gas; and 2. Good combustion practices.
		SO_2	BACT: SO_2 - 0.0006 lbs/MMBtu 1. Combustion of clean fuel; and 2. Good combustion practices.
		VOC	BACT: VOC - 0.0055 lb/MMBtu (AP-42 emission factor) 1. Combustion of natural gas; and 2. Good combustion practices.
		$PM_{10}/PM_{2.5}$	BACT: Total PM - 0.0076 lb/MMBtu (AP-42 Emission Factor) 1. Combustion of Natural Gas Only. 2. Good Combustion Practices
		GHG	BACT - CO_2 – 117 lb/MMBtu - Methane – 0.0022 lb/MMBtu - N_2O – 0.0002 lb/MMBtu Control techniques to be implemented to meet these emission limitations will be: 1. Good combustion practices; 2. Combustion of natural gas only; 3. Selection of the most energy efficient burner design based on engineering selection process; and 4. Periodic maintenance.
AA-300 - Product Refinement & Handling			
AA-301 (Product Refinement & Handling)	PSD Construction Permit Issued Issuance Date	$PM_{10}/PM_{2.5}$	Material and Product Handling Operations (AA-301) BACT: - Baghouse for PM control; and - A $PM_{10}/PM_{2.5}$ limitation of 0.003 gr/dscf.* *It should be noted that MS Silicon is voluntarily designing the baghouse to meet 0.0015 gr/dscf to minimize the potential impact on PM10/PM2.5 air quality. This emission rate does not constitute BACT
AA-400 - Other Plantwide Operations and Activities			
AA-401 (Storage Tanks)	PSD Construction Permit Issued Issuance Date	--	--
AA-402 (Roadway Fugitives)	PSD Construction Permit Issued Issuance Date	$PM_{10}/PM_{2.5}$	BACT: - No emission limit is being proposed for this operation since there is no available test method to determine the $PM/PM_{10}/PM_{2.5}$ emission rate. - Development of dust control plan including the use of measures designed to eliminate dust such as application of wet suppressants, watering, speed reduction and vacuuming or sweeping, as required.
AA-402a (Plantwide Fugitive Emissions from Transport of Raw Materials)	PSD Construction Permit Issued Issuance Date	$PM_{10}/PM_{2.5}$	BACT: - No emission limit is being proposed for this operation since there is no available test method to determine the $PM/PM_{10}/PM_{2.5}$ emission rate. - Development of dust control plan including the use of measures designed to eliminate dust such as application of wet suppressants, watering, speed reduction and vacuuming or sweeping, as required.
AA-403 (Slag Handling and Storage)	PSD Construction Permit Issued Issuance Date	$PM_{10}/PM_{2.5}$	Material and Product Handling Operations (AA-403) BACT: - Baghouse for PM control; and - A $PM_{10}/PM_{2.5}$ limitation of 0.003 gr/dscf.* *It should be noted that MS Silicon is voluntarily designing the baghouse to meet 0.0015 gr/dscf to minimize the potential impact on PM10/PM2.5 air quality. This emission rate does not constitute BACT
AA-404 (Silica Fume Silos)	PSD Construction Permit Issued Issuance Date	$PM_{10}/PM_{2.5}$	BACT: - Bin Vent Filter for PM control; and - A $PM_{10}/PM_{2.5}$ limitation of 0.01 gr/dscf.
AA-405 (Facility-Wide Miscellaneous Operations)	PSD Construction Permit Issued Issuance Date	--	--
AA-500 - Emergency Support Equipment			
AA-501 (Diesel-Fired Emergency Generators)	40 CFR 60, Subpart IIII and Subpart A 40 CFR 63, Subpart ZZZZ and Subpart A	Applicability	40 CFR 60, Subpart IIII - Stationary Compression Ignition Internal Combustion Engines 40 CFR 63, Subpart ZZZZ - Stationary Reciprocating Internal Combustion Engines BACT: Compliance with NSPS IIII, good combustion/operating practices and use of ULSD.

Table 7-3
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnville, MS
Proposed Permit Conditions - Part IV - Emission Point Specific Compliance / Performance Requirements

[redacted]	[redacted]	[redacted]	[redacted]
AA-000 - Entire Facility			
AA - 000 (Entire Facility)	NO_x	Determine the Emission Rate for each consecutive 12-month period	PSD Construction Permit Issued Issuance Date
	CO		
	SO_2		
	VOC		
	$PM_{10}/PM_{2.5}$		
	Silicon Production	Determine the Production for each consecutive 12-month period	PSD Construction Permit Issued Issuance Date
	Opacity	Demonstrate Compliance utilizing EPA Method 22 or EPA Method 9	PSD Construction Permit Issued Issuance Date
	Pre-Test Conference	30 days prior to performance testing for any emission point	PSD Construction Permit Issued Issuance Date
	Control Equipment	Regular Maintenance shall be maintained and kept in log form	PSD Construction Permit Issued Issuance Date
AA-100 - Raw Material Receiving, Handling and Storage Operations			
AA-101, AA-102, AA-103 & AA-104 (Raw Material Receiving, Handling and Storage Operations)	$PM_{10}/PM_{2.5}$	Implement Maintenance Guidelines for demonstrating compliance with BACT	PSD Construction Permit Issued Issuance Date
AA-101a, AA-102a, AA-103a (Conveyance of Raw Materials to Charging Storage Silos)	$PM_{10}/PM_{2.5}$	Implement Maintenance Guidelines for demonstrating compliance with BACT	PSD Construction Permit Issued Issuance Date
AA-105 (Storage Pile Processing)	$PM_{10}/PM_{2.5}$	Implement Maintenance Guidelines for demonstrating compliance with BACT	PSD Construction Permit Issued Issuance Date
AA-106 (Wind Erosion)	$PM_{10}/PM_{2.5}$	Implement Maintenance Guidelines for demonstrating compliance with BACT	PSD Construction Permit Issued Issuance Date
AA-200 - Silicon Manufacturing Plant			
AA-201 (Submerged Arc Furnaces)	NO_x	Installation and Operation of CEMS deadline (Continuous Emission Monitoring System)	PSD Construction Permit Issued Issuance Date
	CO		
	SO_2		
AA-201 (Submerged Arc Furnaces)	NO_x	Initial Performance Testing for demonstrating compliance with BACT and Permit Limits	PSD Construction Permit Issued Issuance Date
	CO		
	SO_2		
	VOC		
AA-201 (Submerged Arc Furnaces)	$PM_{10}/PM_{2.5}$	Implement Maintenance Guidelines for demonstrating compliance with BACT	PSD Construction Permit Issued Issuance Date
AA-201 (Submerged Arc Furnaces)	Performance Test	Compliance with related permit condition	40 CFR 60, Subpart Z – Ferroalloy Production Facilities
AA-201 (Submerged Arc Furnaces)	Emissions Monitoring - Opacity	60.264 - Install, calibrate, maintain and operate a continuous monitoring system for measurement of the opacity of emissions discharged into the atmosphere from the control device(s).	40 CFR 60, Subpart Z – Ferroalloy Production Facilities
	Emissions Monitoring - Furnace Power Input	20.265(b) - Install, calibrate, maintain, and operate a device to measure and continuously record the furnace power input.	
	Emissions Monitoring - Volumetric Flow Rate	20.265(c) - Install, calibrate, and maintain a monitoring device that continuously measures and records the volumetric flow rate through each separately ducted hood of the capture system.	
AA-201a (Casting Frames)	$PM_{10}/PM_{2.5}$	Utilize Best Management Pracitces for demonstrating compliance with BACT	PSD Construction Permit Issued Issuance Date
AA-202 (Natural Gas-Fired Ladle Preheaters)	NO_x	Utilize Good Combustion Practices and Implement Maintenance Guidelines for demonstrating compliance with BACT	PSD Construction Permit Issued Issuance Date
	CO		
	SO_2		
	$PM_{10}/PM_{2.5}$		
	CO_2e		

Table 7-3
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnville, MS
Proposed Permit Conditions - Part IV - Emission Point Specific Compliance / Performance Requirements

[redacted]	[redacted]	[redacted]	[redacted]
AA-300 - Product Refinement & Handling			
AA-300 (Product Refinement & Handling)	$PM_{10}/PM_{2.5}$	Implement Maintenance Guidelines for demonstrating compliance with BACT	PSD Construction Permit Issued Issuance Date
AA-400 - Other Plantwide Operations and Activities			
AA-402 (Roadway Fugitives)	$PM_{10}/PM_{2.5}$	Implement Maintenance Guidelines for demonstrating compliance with BACT	PSD Construction Permit Issued Issuance Date
AA-402a (Plantwide Fugitive Emissions from Transport of Raw Materials)	$PM_{10}/PM_{2.5}$	Implement Maintenance Guidelines for demonstrating compliance with BACT	PSD Construction Permit Issued Issuance Date
AA-403 (Slag Handling and Storage)	$PM_{10}/PM_{2.5}$	Implement Maintenance Guidelines for demonstrating compliance with BACT	PSD Construction Permit Issued Issuance Date
AA-404 (Silica Fume Silos)	$PM_{10}/PM_{2.5}$	Implement Maintenance Guidelines for demonstrating compliance with BACT	PSD Construction Permit Issued Issuance Date
AA-403 (Facility-Wide Miscellaneous Operations)	--	--	PSD Construction Permit Issued Issuance Date
AA-500 - Emergency Support Equipment			
AA-501 (Diesel-Fired Emergency Generators)	NO_x, CO, SO_2, VOC, $PM_{10}/PM_{2.5}$	Implement Maintenance Guidelines for demonstrating compliance with BACT	PSD Construction Permit Issued Issuance Date

Table 7-4
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnville, MS
Proposed Permit Conditions - Part V - Emission Point Recordkeeping / Reporting Requirements

[redacted]	[redacted]	[redacted]	[redacted]
AA-000 - Entire Facility			
AA-000 - Entire Facility	Certificate of Construction	Report in writing the effective date of start-up no later than 10 days following commencement	PSD Construction Permit Issued Issuance Date
	Emission Limitations	Maintain all records necessary to demonstrate compliance	PSD Construction Permit Issued Issuance Date
	Performance Testing	Submit results no later than 60 days from actual test	PSD Construction Permit Issued Issuance Date
	Deviations	Reported within 5 days from the time the deviation began	PSD Construction Permit Issued Issuance Date
	NO_x	Semi-Annual Report of Facility Wide Emission Rate in tons per year as determined for each consecutive 12-month period	PSD Construction Permit Issued Issuance Date
	CO		PSD Construction Permit Issued Issuance Date
	SO_2		PSD Construction Permit Issued Issuance Date
	VOC		PSD Construction Permit Issued Issuance Date
	$PM_{10}/PM_{2.5}$		PSD Construction Permit Issued Issuance Date
	GHGs	Annual GHG Emission Report in metric tons per year as determined for each consecutive 12-month period	PSD Construction Permit Issued Issuance Date
	Silicon Production	Semi-Annual Report of Production	PSD Construction Permit Issued Issuance Date
	Natural Gas Combustion	Semi-Annual Report of Usage Rate	PSD Construction Permit Issued Issuance Date
	Other	None	MDEQ Regulations, APC-S-2
AA-100 - Raw Material Receiving, Handling and Storage Operations			
AA-100 - Raw Material Receiving, Handling and Storage Operations	$PM_{10}/PM_{2.5}$	Development of dust control plan including the use of measures designed to eliminate dust such as application of wet suppressants, watering, speed reduction and vacuuming or sweeping, as required. Monthly Recordkeeping of Raw Material Throughputs	PSD Construction Permit Issued Issuance Date
AA-200 - Silicon Manufacturing Plant			
AA-201 (Submerged Arc Furnaces)	40 CFR 60, Subpart Z – Ferroalloy Production Facilities	Notification of Compliance Status	40 CFR 60, Subpart Z – Ferroalloy Production Facilities
	40 CFR 60, Subpart Z – Ferroalloy Production Facilities	60.265 - Maintain Daily Records of the following: (1) Product being produced. (2) Description of constituents of furnace charge, including the quantity, by weight. (3) Time and duration of each tapping period and the identification of material tapped (slag or product.) (4) All furnace power input data obtained under paragraph (b) of this section. (5) All flow rate data obtained under paragraph (c) of this section or all fan motor power consumption and pressure drop data obtained under paragraph (e) of this section.	40 CFR 60, Subpart Z – Ferroalloy Production Facilities
AA-202 (Natural Gas-Fired Ladle Preheaters)	Natural Gas	Usage on a Monthly Basis, Monitoring and Monthly Emissions	PSD Construction Permit Issued Issuance Date

Table 7-4
Mississippi Silicon, LLC
Proposed Silicon Manufacturing Plant
Burnville, MS
Proposed Permit Conditions - Part V - Emission Point Recordkeeping / Reporting Requirements

[redacted]	[redacted]	[redacted]	[redacted]
AA-400 - Other Plantwide Operations and Activities			
AA-402 (Roadway Fugitives)	$PM_{10}/PM_{2.5}$	Development of dust control plan including the use of measures designed to eliminate dust such as application of wet suppressants, watering, speed reduction and vacuuming or sweeping, as required. Monthly Recordkeeping of Emissions	PSD Construction Permit Issued Issuance Date
AA-402a (Plantwide Fugitive Emissions from Transport of Raw Materials)	$PM_{10}/PM_{2.5}$	Development of dust control plan including the use of measures designed to eliminate dust such as application of wet suppressants, watering, speed reduction and vacuuming or sweeping, as required. Monthly Recordkeeping of Emissions	PSD Construction Permit Issued Issuance Date
AA-403 (Slag Handling and Storage)	$PM_{10}/PM_{2.5}$	Monthly Recordkeeping of Emissions	PSD Construction Permit Issued Issuance Date
AA-404 (Silica Fume Silos)	$PM_{10}/PM_{2.5}$	Monthly Recordkeeping of Emissions	PSD Construction Permit Issued Issuance Date
AA-405 (Facility-Wide Miscellaneous Operations)	--	--	--
AA-500 - Emergency Support Equipment			
AA-S01 (Diesel-Fired Emergency Generators)	Monitoring Requirements	Monitoring Requirements	40 CFR 60.4209
	Compliance	Monitoring for Demonstrating Compliance Requirements	40 CFR 60.4211(a), (b)(1), (c), and (e)
	NO_x, CO, SO_2, VOC, $PM_{10}/PM_{2.5}$	Monitoring and Monthly Recordkeeping of Emissions and Low Sulfur Fuel Oil	PSD Construction Permit Issued Issuance Date

Section 8: MDEQ Application Forms

Included in this Section are the relevant application forms that are required to accompany a request for a construction permit. The follow forms are provided in Appendix A:

- General Form;
- Additional Information Required for Applications, Existing Source Operating Permits, and for Approval to Construct;
- Emission Summary Section – Part I Stack Parameters;
- Emission Summary Section – Part II Regulated Air Pollutant Emission Rates;
- Emission Summary Section – Part III Regulated Hazardous Air Pollutant Emission Rates;
- Application Summary Section;
- Fuel Burning Equipment;
- Manufacturing Process Operations;
- Tank Summary; and
- L4 - Air Pollution Control Devices – Baghouse.

For purpose of streamlining the application, the forms make reference to tables within the application that provide the required information.

Appendix A - MDEQ Application Forms

The follow forms are provided in Appendix A:

- General Form;
- Additional Information Required for Applications, Existing Source Operating Permits, and for Approval to Construct;
- Emission Summary Section – Part I Stack Parameters;
- Emission Summary Section – Part II Regulated Air Pollutant Emission Rates;
- Emission Summary Section – Part III Regulated Hazardous Air Pollutant Emission Rates;
- Application Summary Section;
- Fuel Burning Equipment;
- Manufacturing Process Operations;
- Tank Summary; and
- L4 - Air Pollution Control Devices – Baghouse.

For purpose of streamlining the application, the forms make reference to tables within the application that provide the required information.

STATE OF MISSISSIPPI
DEPT. OF ENVIRONMENTAL QUALITY
OFFICE OF POLLUTION CONTROL
P.O. BOX 2261
JACKSON, MS 39225-2261
(601) 961-5171

RECEIVED
AUG 16 2013
Dept. of Environmental Quality

APPLICATION FOR AIR POLLUTION CONTROL PERMIT TO CONSTRUCT AND/OR OPERATE AIR EMISSIONS EQUIPMENT

TYPE OF PERMIT

- [✓] New Source
- [ ] Modification
- [ ] Renewal of Operating Permit
- [ ] Existing Source Operating Permit

Name Mississippi Silicon LLC

Location: City Burnsville County Tishomingo

Facility No. (if known) _____

APP-NEW.1

APPLICATION FOR PERMIT TO CONSTRUCT AND/OR OPERATE AIR EMISSIONS EQUIPMENT GENERAL FORM

1. Name, Address & Contact for the Owner/Applicant

   A. Name Mississippi Silicon LLC

   B. Mailing Address

      1. Street Address or P.O. Box 313 Lawton Road
      2. City Marietta
      3. State OH
      4. Zip Code 45750
      5. Telephone No. (740) 525-9396

   C. Contact

      1. Name W. Dave Tuten
      2. Title President & CEO

2. Name, Address, Location and Contact for the Facility

   A. Name Mississippi Silicon LLC

   B. Mailing Address

      1. Street Address or P.O. Box 313 Lawton Road
      2. City Marietta
      3. State OH
      4. Zip Code 45750
      5. Telephone No. (740) 525-9396

   C. Site Location

      1. Street 50 Industrial Drive
      2. City Burnsville
      3. County Tishomingo
      4. State MS
      5. Zip Code 38847
      6. Telephone No. ( )

      Note: If the facility is located outside the City limits, please attach a sketch or description showing the approximate location to this application.

   D. Contact

      1. Name W. Dave Tuten
      2. Title President & CEO

3. SIC Code 3339 - Primary Nonferrous Metals

4. Number of Employees

5. Principal Process(es) Silicon Manufacturing

6. Principal Product(s) and maximum amount produced per day Refer to Section 2.0 of the application.

7. Principal Raw Materials and maximum amount consumed per day Quartz - 6 tons/hr, Coal - 3 tons/hr, Wood - 6 tons/hr

ED_002139_00006637-00285

8. Operating Schedule

A. Specify maximum hours per day the operation will occur: 24

B. Specify maximum days per week the operation will occur: 7

C. Specify maximum weeks per year the operation will occur: 52

D. Specify the months the operation will occur: January - December

9. Only if this application is for Operating Permit renewal, has the facility been modified in any way (including production rate, fuel, and/or raw material changes) during period covered by the Operating Permit? ☐ Yes ☐ No If yes, give year(s) in which modification(s) occurred and explain.
Not Applicable

10. If after August 7, 1977, provide the date construction commenced. November 2013

11. If after August 7, 1977, provide the date operation began. November 2015

12. Please list the dates of any modifications or emissions increases since August 7, 1977. Not Applicable

13. EACH APPLICATION MUST BE SIGNED BY THE APPLICANT.

If the applicant is a corporation, it must be signed by a corporate officer as defined in Regulation APC-S-2. If the applicant is a partnership, it must be signed by a partner with authority to bind the partnership. In the case of a governmental agency, the application must be signed by the facility manager or senior staff officer responsible for the installation's or facility's environmental compliance.

I certify that I am familiar with the information contained in the application and that to the best of my knowledge and belief such information is true, complete, and accurate, and that, as an appropriate representative of the applicant, my signature shall constitute an agreement that the applicant assumes the responsibility for any alterations, additions or changes in operation that may be necessary to achieve and maintain compliance with all applicable Rules and Regulations.

W. DAVE TUTEN
Printed Name of Person Signing

PRESIDENT + CEO
Title

8-12-13
Date Application Signed

W. Dave Tuten
Signature of Applicant

PLEASE COMPLETE THE FOLLOWING PAGES WHERE APPLICABLE

APPLICATION FOR AIR POLLUTION CONTROL PERMIT
ADDITIONAL INFORMATION REQUIRED FOR MODIFICATIONS, EXISTING SOURCE OPERATING PERMITS, AND/OR APPROVAL TO CONSTRUCT

The following additional information must be submitted in duplicate. Failure to submit any of the additional information or to conform to the instructions may result in initial rejection of the application.

1) Design Calculations and Specifications - all data and calculations used in selecting or designing process and control equipment.

2) Site Drawings - the drawing(s) or sketch(es) must be to scale and show at least the following:

   A. The property involved with dimensions, clearly defining restricted entry boundaries and, if different, the total property boundaries.

   B. Location and identification of all existing and/or proposed buildings, structures, and/or equipment, including points of discharge of air contaminants to the atmosphere, drawn to scale and in proper orientation.

   C. The dimensions (length, width) of all buildings, structures, and/or equipment, including emission points.

   D. The elevation of all buildings, structures, and/or equipment, including emission points, showing heights, grade baseline, and grade baseline height above mean sea level.

   E. Primary compass direction indicator.

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F. Location of streets and all adjacent properties. Show location of all buildings outside the property that are within 150 feet of the equipment involved in the application. Identify all such buildings (as a residence, apartment, warehouse, etc.), specifying number of stories or approximate height, and indicate the prevailing wind direction.

3) Construction Drawings (See Note Below) - an assembly drawing, dimensioned and to scale, in as many sections as are needed to show clearly the design and operation of the equipment and the means by which air contaminants are controlled. The following must be shown:

A. Size and shape of equipment. Show exterior and interior dimensions and features.

B. Locations, sizes, and shape details of all features which may affect the production, collection, conveying or control of air contaminants of any kind; location, size and shape details concerning all materials handling equipment.

NOTE: Structural design calculations and details are not required.

4) Description of Process and Control Equipment - a written description of each process to be carried out in the facility and the function of the equipment used in the process. The descriptions must be complete and particular attention must be given to explaining all stages in the process where the discharge of any materials might contribute in any way to air pollution. Control procedures must be described in sufficient detail to show the extent of control of air contaminants anticipated in the design, specifying the expected efficiencies of the capture systems and the control devices. All obtainable data must be supplied concerning the nature, volumes, particle size, weights, chemical composition and concentrations of all types of air contaminants.

5) Block Flow Diagram - a drawing showing the steps of the process and the flow of materials through the process and any control devices.

Additional information may be required as is necessary to evaluate the design adequacy of the facility or to comply with the requirements of the Prevention of Significant Deterioration (PSD) regulations.

ALL ENGINEERING PLANS AND SPECIFICATIONS MUST BEAR THE SIGNATURE, REGISTRATION NUMBER, AND SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF MISSISSIPPI.

EMISSIONS SUMMARY SECTION

PART I

STACK PARAMETERS								
Reference Number	Stack Height (feet)	Inside Exit Dia. (feet)	Exit Gas Velocity (ft/sec)	Exit Gas Volume (acfm)	Exit Gas Temperature (NF)	Moisture Content (%)	U.T.M. Coordinates Zone _____	
							East	North
Refer to	Table	2-1b for	stack	parameters				

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EMISSIONS SUMMARY SECTION
PART II

Reference Number	Pollutant	PROPOSED EMISSION RATE			POTENTIAL UNCONTROLLED EMISSIONS	
		See Footnote (1)	(lbs/hr)	(TPY)	(lbs/hr)	(TPY)
Refer to	Table 2-9	for a summary	of potential	emissions		
	Table 7-2	for proposed	permit	limits		

(1) Provide emission rate in units of applicable emission standard, e.g., lb/MMBTU, gr/dscf at 12% CO_2, etc. This may not apply to every emission point or every pollutant from an emission point.

(2) Please provide the total emissions from the facility by pollutant.

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Refer to Table 2-10 for a summary of HAPs from the proposed project.

EMISSIONS SUMMARY SECTION PART III

CAS NO.	HAP	Proposed Emission Rate		Potential Uncontrolled Emission Rate	
		lbs/hr	TPY	lbs/hr	TPY
75070	Acetaldehyde				
60355	Acetamide				
75058	Acetonitrile				
98862	Acetophenone				
53963	Acetylaminofluorene(2)				
107028	Acrolein				
79061	Acrylamide				
79107	Acrylic Acid				
107131	Acrylonitrile				
107051	Allyl Chloride				
92671	Aminodipheyl(4)				
62533	Aniline				
90040	Anisidine(o)				
7440360	Antimony Compounds				
7440382	Arsenic Compounds (inorganic including arsine)				
1332214	Asbestos				
71432	Benzene				
92875	Benzidine				
98077	Benzotrichloride				

CAS NO.	HAP	Proposed Emission Rate		Potential Uncontrolled Emission Rate	
		lbs/hr	TPY	lbs/hr	TPY
100447	Benzyl Chloride				
7440417	Beryllium Compounds				
192524	Biphenyl				
117817	Bis(2-ethhylhexyl)phthalate (DEHP) (Dioctyl Phthalate)				
542881	Bis(chloromethyl)ether				
75252	Bromoform				
106990	Butadiene(1,3)				
7440439	Cadmium Compounds				
156627	Calcium Cyanamide				
105602	Caprolactam				
133062	Captan				
63252	Carbaryl				
75150	Carbon Disulfide				
56235	Carbon Tetrachloride				
463581	Carbonyl Sulfide				
120809	Catechol				
133904	Chloramben				
57749	Chlordane				
7782505	Chlorine				
79118	Chloroacetic Acid				

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CAS NO.	HAP	Proposed Emission Rate		Potential Uncontrolled Emission Rate	
		lbs/hr	TPY	lbs/hr	TPY
532274	Chloroacetophenone(2)				
108907	Chlorobenzene				
510156	Chlorobenzinate				
67663	Chloroform				
107302	Chloromethyl methyl ether				
126998	Chloroprene (Neoprene; 2-Chloro-1,3-Butadiene)				
7440473	Chromium Compounds (IV)				
10210681	Cobalt Carbonyl (as Co)				
7440484	Cobalt Compounds (metal, dust, and fumes as Co)				
16842038	Cobalt Hydrocarbonyl (as Co)				
65996818A	Coke Oven Emissions				
1319773	Cresols/Cresylic acid				
108394	Cresol(m)				
95487	Cresol(o)				
106445	Cresol(p)				
98828	Cumene (Isopropylbenzene)				
---	Cyanide Compounds (NOTE # 1)				
3547044	DDE				
334883	Diazomethane				

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CAS NO.	HAP	Proposed Emission Rate		Potential Uncontrolled Emission Rate	
		lbs/hr	TPY	lbs/hr	TPY
132649	Dibenzofurans				
96128	Dibromo-3-chloropropane(1,2)				
84742	Dibutylphthalate				
106467	Dichlorobenzene(1,4)(p)				
91941	Dichlorobenzidene(3,3)				
111444	Dichloroethyl ether (Bis(2-chloroehtyl)ether)				
542756	Dichloropropene(1,3)				
62737	Dichlorvos				
111422	Diethanolamine				
121697	Diethyl aniline (N,N) (dimethylaniline (N,N))				
64675	Diethyl Sulfate				
119904	Dimethoxybenzidine(3,3')				
60117	4 - Dimethyl aminoazobenzene				
119937	Dimethyl benzidine (3,3')				
79447	Dimethyl carbamoyl chloride				
68122	Dimethyl formamide				
57147	Dimethyl hydrazine(1,1)				
131113	Dimethyl phthalate				
77781	Dimethyl sulfate				

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CAS NO.	HAP	Proposed Emission Rate		Potential Uncontrolled Emission Rate	
		lbs/hr	TPY	lbs/hr	TPY
534521	Dinitro-o-cresol(4,6), and salts				
51285	Dinitrophenol(2,4)				
121142	Dinitrotoluene(2,4)				
123911	Dioxane(1,4) (1,4-diethyleneoxide)				
122667	Diphenylhydrazine(1,2)				
94757	d(2,4), salts and esters				
106898	Epichlorohydrin (Chloro-2,3-epoxypropane(1))				
106887	Epoxybutane(1,2) (1,2-Butylene oxide)				
140885	Ethyl acrylate				
100414	Ethyl benzene				
51796	Ethyl carbamate (Urethane)				
75003	Ethyl chloride (Chloroethane)				
106934	Ethylene dibromide (1,2-Dibromoethane)				
107062	Ethylene dichloride (1,2-Dichloroethane)				
107211	Ethylene glycol				
151564	Ethylene imine (Azridine)				
75218	Ethylene oxide				
96457	Ethylene thiourea				

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CAS NO.	HAP	Proposed Emission Rate		Potential Uncontrolled Emission Rate	
		lbs/hr	TPY	lbs/hr	TPY
75343	Ethylidene dichloride (1,1-Dichloroethane)				
50000	Formaldehyde				
---	Glycol ethers (NOTE #2)				
76448	Heptachlor				
118741	Hexachlorobenzene				
87683	Hexachlorocyclopentadiene				
67721	Hexachloroethane				
822060	Hexamethylene-1,6-diisocyanate				
680319	Hexamethylphosphoramide				
110543	Hexane				
302012	Hydrazine				
7647010	Hydrochloric acid				
7664393	Hydrogen Fluoride (Hydrofluoric acid)				
123319	Hydroquinone				
78591	Isophorone				
7439921	Lead Compounds				
58899	Lindane (all isomers)				
108316	Maleic anhydride				
7439965	Manganese Compounds				
7439976	Mercury Compounds				

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CAS NO.	HAP	Proposed Emission Rate		Potential Uncontrolled Emission Rate	
		lbs/hr	TPY	lbs/hr	TPY
67561	Methanol				
72435	Methoxychlor				
74839	Methyl bromide (Bromomethane)				
74873	Methyl chloride (Chloromethane)				
71556	Methyl chloroform (1,1,1-Trichloroethane)				
78933	Methyl ehtyl ketone (2-Butanone) (MEK)				
60344	Methyl hydrazine				
74884	Methyl iodide (Iodomethane)				
108101	Methyl isobutyl ketone (Hexone)				
624839	Methyl isocyanate				
80626	Methyl methacrylate				
1634044	Methyl tert butyl ether				
101144	Methylene bis(2-chloroaniline)(4,4) (MOCA)				
75092	Methylene chloride (Dichloromethane)				
101688	Methylene diphenyl diisocynate (MDI)				
101779	Methylenedianiline(4,4')				
---	Mineral fibers (NOTE #3)				

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CAS NO.	HAP	Proposed Emission Rate		Potential Uncontrolled Emission Rate	
		lbs/hr	TPY	lbs/hr	TPY
91203	Naphthalene				
7440020	Nickel Compounds				
7440020	Nickel, refinery dust				
12035722	Nickel, subsulfide				
98953	Nitrobenzene				
92933	Nitrodiphenyl(4)				
100027	Nitrophenol(4)				
79469	Nitropropane(2)				
62759	Nitrosodimethylamine(N) (Dimethylnitrosoamine)				
59892	Nitrosomorpholine(N)				
684935	Nitroso-N-methylurea(N)				
56382	Parathion				
82688	Pentachloronitrobenzene (Quintobenzene)				
87865	Pentachlorophenol				
108952	Phenol				
106503	Phenylenediamine(p)				
75445	Phosgene				
7803512	Phosphine				
7723140	Phosphorus				
85449	Phthalic anhydride				

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CAS NO.	HAP	Proposed Emission Rate		Potential Uncontrolled Emission Rate	
		lbs/hr	TPY	lbs/hr	TPY
1336363	Polychlorinated biphenyls (Arochlors)				
---	Polycylic Organic Matter (NOTE #5)				
1120714	Propane sultone(1,3)				
57578	Propiolactone(beta)				
123386	Propionaldehyde				
114261	Propoxur (Baygon)				
78875	Propylene dichloride (1,2 dichloropropane)				
75558	Propylene imine(1,2) (2-methyl aziridine)				
75569	Propylene oxide				
91225	Quinoline				
106514	Quinone (1,4-Cyclohexadienedione)				
---	Radionuclides (including radon) (NOTE #4)				
7782492	Selenium Compounds				
100425	Styrene				
96093	Styrene oxide				
1746016	Tetrachlorodibenzo-p-dioxin(2,3,7,8) (TCDD) (Dioxin)				
79345	Tetrachloroethane(1,1,2,2)				

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CAS NO.	HAP	Proposed Emission Rate		Potential Uncontrolled Emission Rate	
		lbs/hr	TPY	lbs/hr	TPY
127184	Tetrachloroethylene (Perchloroethylene)				
7550450	Titanium Tetrachloride				
108883	Toluene				
95807	Toluene diamine(2,4) (2,4-diaminotoluene)				
584849	Toluene diisocyanate(2,4)				
95534	Toluidine(o)				
8001352	Toxaphene (Chlorinated camphene)				
120821	Trichlorobenzene(1,2,4)				
79005	Trichloroethane(1,1,2)				
79016	Trichloroethylene				
95954	Trichlorophenol(2,4,5)				
88062	Trichlorophenol(2,4,6)				
121448	Triethylamine				
1582098	Trifluralin				
540841	Trimethylpentane(2,2,4)				
75014	Vinyl Chloride				
108054	Vinyl Acetate				
593602	Vinyl Bromide				
75354	Vinylidene chloride (1,1-Dichloroethylene)				

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CAS NO.	HAP	Proposed Emission Rate		Potential Uncontrolled Emission Rate	
		lbs/hr	TPY	lbs/hr	TPY
1330207	Xylenes (mixed)				
108383	Xylene(m)				
95476	Xylene(o)				
106423	Xylene(p)				

NOTE # 1: X'CN where X = H' or any other group where a formal dissociation may occur, for example: KCN or Ca(CN)2.

NOTE # 2: Includes mono- and di- ethers of ethylene glycol, dietheylene glycol and triethylene glycol R-(OCH2CH2)n-OR' where:

n = 1,2,3

R = alkyl or arl groups

R' = R,H, or group which, when removed, yield glycols ethers with the structure: R-(OCH2CH2)n-OH. Polymers are excluded from the glycol category

NOTE # 3: Includes glass microfibers, glass wool fibers, rock wool fibers, and slag wool fibers, each characterized as "respirable" (fiber diameter less then 3.5 micrometers) and possessing an aspect ratio (fiber length divided by fiber diameter) greater than 3.

NOTE # 4: A type of atom which spontaneously undergoes radioactive decay.

NOTE # 5: Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100 Celsius.

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APPLICATION SUMMARY SECTION

I. Indicate below which sections have been completed as part of this application. Where applicable, also indicate the number of each section completed.

Administrative Information	X
Emission Summary Section	
Part I	x
Part II	x
Part III	x
Fuel Burning Equipment	x
Manufacturing Process Operations	
Refuse Disposal	
Tank Section	x
Incineration Section	
Asphalt Plant Section	
Concrete Plant Section	
Air Pollution Control Devices	
Baghouse	x
Cyclone	
Adsorption	
Afterburner	
Scrubber	
Electrostatic Precipitator	
Other Air Pollution Control Equipment/Devices	

II. Please list any other attachments.

Refer to PSD application for additional information.

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FOR ALL APPLICANTS

FUEL BURNING EQUIPMENT
(Except for Refuse Disposal)

This form has 3 pages; each is a continuation of the equipment information from the page before. Please fill in as completely as possible, listing all fuel burning equipment. Reasons should be given explaining any data not filled in.

PAGE 1

1. Fill in company name and address, plus year for which data is given (if existing facility) at top of page. Use data for most recent calendar year available.

2. Reference Number. Use an identifying number for each boiler, furnace, kiln, etc., and use the same reference number on each of the three pages to identify information for the same unit.

3. Manufacturer and Model Number. Nameplate data for boiler, furnace, kiln, etc. Waste gas flares and stationary internal combustion engines should also be included on this form.

4. Rated Capacity in Millions of BTU per hour.

5. Type of Burner Unit. Use Codes (1*) at bottom of form. If not listed put (11) and specify.

6. Usage. Type of fuel burning equipment. Use codes (2*) at bottom of form. If not listed put (5) and specify.

7. Heat Usage. Percent of heat used for process and percent for space heating.

PAGE 2

8. Reference Number. Continue reference numbers from Page 1, using same number to identify information for same unit.

9. Fuel Data
   Fuel Type. Coal, Gas, #2 Oil, #6 Oil, etc.
   Maximum Capacity burned per hour. Gallons, pounds, cubic feet, etc.
   Specify. Average amount burned per year. Gallons, tons, million cubic feet, etc.
   Specify. Heat Content of Fuel. BTU per gallon, pound, cubic foot, etc.
   Specify. Average Percent Sulfur Content.
   Specify. Average Percent Ash Content
   (If percent sulfur and percent ash are not known, list fuel type and supplier's name at bottom of page in spaces provided so that information may be obtained.)

PAGE 3

10. Reference Number. Use same numbers as on Pages 1 and 2 to identify information for same unit.

11. Air Pollution Control Equipment.

    Manufacturer and Model Number. Information from nameplate. Type. Use Table 1. Efficiency. Percent design control on pollutants and actual percent control if known.

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FUEL BURNING EQUIPMENT

1. FACILITY NAME	ADDRESS		For Agency Use Only
Refer to Section 2 of the application for additional information			
FACILITY NUMBER	Information for Calendar Year	DATE	
	19____		

2	3	4	5	6	7	
Reference Number	Manufacturer & Model Number	Rated Capacity 10^6 BTU/hr	Type of Burner Unit (Use Code 1*)	Usage (Use Code 2*)	Most Usage	
					% Process	% Space Heat
Refer to	Section 2 of the application					
Refer to	Tables 2-3a, 2-3b, 2-3c	for emissions				

1*BURNER CODES

1. Cyclone Furnace
2. Pulverized Coal
3. Spreader Stoker
4. Hand Fired
5. Other Stoker (Specify)
6. Multiple Port Gas
7. Forced Draft Gas
8. Atomizing Oil (Air)
9. Atomizing Oil (Mechanical)
10. Rotary Cup Oil
11. Others (Specify)

2*USAGE CODES

1. Boiler, Steam
2. Boiler, Other (Specify)
3. Air Heating for Space Heating
4. Air Heating for Process Usage
5. Others (Specify)

FUEL BURNING EQUIPMENT						Page 2
Fuel Data						
Reference Number	Fuel Type	Maximum Amount Per Hour (Specify Units)	Amount Per Year (Specify Units)	Heat Content BTU/Gal, etc. (Specify Units)	Percent Sulfur	Percent Ash
Refer to	Section 2	of the	application			

FUEL SUPPLIERS:

Fuel Type	Supplier

FUEL BURNING EQUIPMENT

11 Reference Number	12 Air Pollution Control Equipment			
	Manufacturer & Model Number	Type (Use Table 1)	Efficiency Design	Efficiency Actual
Refer to	Section 2 of the	application		

You must complete the appropriate page in the Air Pollution Control Devices Section.

MANUFACTURING PROCESS OPERATIONS
Page 1

1. Company Name and Address, plus year for which information is given (if existing facility) at top of page. Use data for most recent calendar year available.

2. Reference Number. Use an identifying number for each manufacturing process which emits matter to the air and use the same number of all three pages of this form to identify information for the same operation.

3. Process or Unit Operation Name. Identify the unit or process section for which information is given by name.

4. Rated Process Capacity. Give in tons per hour and the maximum rated capacity of the process or unit identified, wet weight.

5. Feed Input. Process rate in wet tons per hour and wet tons per year of materials fed to the operation.

6. Number of Emission Points to Air. Number of stacks, vents, etc., which emit materials to air.

7. Product Output. Product rate in wet tons per hour and wet tons per year from the operation.

Page 2

8. Reference Number. Use same number as on Page 1 of form to identify information for same process or operation.

9. Air Pollution Control Equipment
   Manufacturer and Model Number. Nameplate Data.
   Type. Use Table 1. Collection efficiency. Design and actual collection efficiency if known.

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MANUFACTURING PROCESS OPERATIONS

COMPANY NAME	ADDRESS		For Agency Use Only
Refer to Section 2 of the application for additional information			
FACILITY NUMBER	Information for Calendar Year	DATE	
	19____		

Reference Number	Process or Unit Operation Name	Rated Process Capacity Tons/Hour	Feed Input*		Number of Emission Points to Air	Product Output*	
			Quantity Per Hour	Quantity Per Year		Quantity Per Hour	Quantity Per Year
Refer to	Section 2 of the application						
Refer to	Tables 2-2a through 2-2e	2-4a through 2-4d	for emissions	from the	SAFs and	material	handling

MANUFACTURING PROCESS OPERATIONS				Page 2
Reference Number	Air Pollution Control Equipment			
	Manufacturer and Model Number	Type (Use Table 1)	Collection Efficiency	
			Design	Actual
Refer to	Section 2 of the	application		

You must complete the appropriate page in the Air Pollution Control Devices Section.

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FOR ALL APPLICANTS

REFUSE DISPOSAL

A. Company Name & Address plus year for which information is given if for renewal of permit, at top of page.

B. Type Waste. Describe type of waste materials (paper, garbage, wood crates, sawdust, coal refuse, etc.).

C: Maximum amount per day in pounds.

D. Average amount per year in tons.

E. Method of Disposal. Use codes at bottom of Form (1*).

ED_002139_00006637-00310

REFUSE DISPOSAL		
A Company Name	Information for Year	(Agency Use Only)
Not Applicable		
Address	Date	

B	C	D	E
Description of Waste Materials	Maximum Amount Per day (Pounds)	Amount Per Year (Tons)	Method of Disposal 1*

1* Disposal Method Codes

1. Landfill on site
2. Landfill off site
3. Incinerator (complete Incinerator Section)
4. Burned in Boiler or Furnace

TANK SUMMARY (page 1 of 2) SECTION H

1. Emission Point No./Name: Refer to Section 2 of the application for information regarding the storage tanks

2. Was this tank constructed or modified after August 7, 1977? ☐ yes ☐ no

   If yes please give date and explain. _____

3. Product Stored: _____
   If more than one product is stored, provide the information in 4 A-E for each product.

4. Tank Data:

   A. True Vapor Pressure at storage temperature: _____ psia/°F
   B. Reid Vapor Pressure at storage temperature: _____ psia/°F
   C. Density of product at storage temperature: _____ lb/gal
   D. Molecular Weight of product vapor at storage temperature: _____ lb/lbmol
   E. Throughput for most recent calendar year: _____ gal/yr
   F. Tank Capacity: _____ gal
   G. Tank Diameter: _____ feet
   H. Tank Height / Length: _____ feet
   I. Average Vapor Space Height: _____ feet
   J. Tank Orientation: _____ Vertical or Horizontal
   K. Type of Roof: _____ Dome or Cone
   L. Is the Tank Equipped with a Vapor Recovery System? ☐ Yes ☐ No
      If Yes, describe on separate sheet of paper and attach. Indicate efficiency.
   M. Check the Type of Tank:
      ☐ Fixed Roof
      ☐ Pressure
      ☐ Variable Vapor Space
      ☐ Other, describe: _____
      ☐ External Floating Roof
      ☐ Internal Floating Roof
   N. Check the Closest City:
      ☐ Jackson, Ms.
      ☐ Memphis, Tn.
      ☐ New Orleans, La.
      ☐ Birmingham, Al.
      ☐ Montgomery, Al.
      ☐ Baton Rouge, La.
   O. Check the Tank Paint Color:
      ☐ Aluminum Specular
      ☐ Aluminum Diffuse
      ☐ Red
      ☐ Other, describe: _____
      ☐ Gray Light
      ☐ Gray Medium
      ☐ White
   P. Tank Paint Condition: _____ Good or Poor
   Q. Check Type of Tank Loading
      1. Trucks and Rail Cars
         ☐ Submerged Loading of clean cargo tank
         ☐ Submerged Loading : Dedicated Normal Service
         ☐ Submerged Loading : Dedicated Vapor Balance Service
         ☐ Splash Loading of clean cargo tank
         ☐ Splash Loading : Dedicated Normal Service
         ☐ Splash Loading : Dedicated Vapor Balance Service
      2. Marine Vessels
         ☐ Submerged Loading: Ships
         ☐ Submerged Loading: Barges

R. For External Floating Roof Tanks

1. Check the Type of Tank Seal:

Mechanical Shoe

☐ Primary Seal Only
☐ With Shoe-Mounted Secondary Seal
☐ With Rim-Mounted Secondary Seal

Liquid Mounted Resilient Seal

☐ Primary Seal Only
☐ With Shoe-Mounted Secondary Seal
☐ With Rim-Mounted Secondary Seal

Vapor Mounted Resilient Seal

☐ Primary Seal Only
☐ With Shoe-Mounted Secondary Seal
☐ With Rim-Mounted Secondary Seal

2. Type of External Floating Roof: ☐ Pontoon
☐ Double-Deck

S. For Internal Floating Roof Tanks

1. Check the Type of Tank Seal:

Liquid Mounted Resilient Seal

☐ Primary Seal Only
☐ With Rim-Mounted Secondary Seal

Vapor Mounted Resilient Seal

☐ Primary Seal Only
☐ With Rim-Mounted Secondary Seal

2. Number of Roof Columns: _____
3. Length of Deck Seam _____ feet:
4. Area of Deck: _____ feet^2
5. Effective Column Diameter: _____ feet
6. Check the Type of Tank:

☐ Bolted with Column Supported Roof
☐ Welded with Column Supported Roof
☐ Bolted with Self-Supported Roof
☐ Welded with Self-Supported Roof

5. Emissions Summary

1. Breathing Loss: _____ lb/hr _____ TPY
2. Working Loss: _____ lb/hr _____ TPY
3. Total Emissions: _____ lb/hr _____ TPY

6. UTM Coordinates:

A. Zone ☐ B. North ☐ C. East ☐

SOLID WASTE INCINERATORS (page 1 of 1) SECTION I

1. Manufacturers Information:
   A. Manufacturer Name: Not Applicable
   B. Model Number: _____
   C. Rated Capacity (tons/hour): _____
   D. Type and amount of Waste per year: _____

2. Was this unit constructed or modified after August 7, 1977? ☐ yes ☐ no
   If yes please give date and explain. _____

3. Type of Incinerator: ☐ Single Chamber ☐ Multiple Chamber
   ☐ Other, describe: _____

4. Auxiliary Equipment:
   A. Primary Burner:
      1. Fuel (Type): _____
      2. Btu/hr rating: _____
   B. Secondary Burner
      1. Fuel (Type): _____
      2. Btu/hr rating: _____
   C. Give Sulfur Content if Fuel Oil is Burned: _____ %
   D. Barometric Damper: _____
   E. Guillotine Damper: _____
   F. Other, specify: _____

5. Combustion Air: ☐ Natural Draft ☐ Induced Draft
   ☐ Forced Draft ☐ Starved Air
   ☐ Other, specify: _____

6. Waste Feed Method: ☐ Flue Fed ☐ Chute Fed
   ☐ Continuous Direct ☐ Batch Direct

7. Operating Schedule:
   A. Hours per Day: _____ Days per week: _____
   B. From: _____ (time) To: _____ (time)
   C. Circle the applicable days: M T W T F S S

8. Percent (%) CO_2 in exit gas _____

9. Does this emission point have air pollution control equipment? ☐ Yes ☐ No
   If Yes, please complete the applicable Air Pollution Control Data Sheet found in Section L.

ED_002139_00006637-00314

ASPHALT PLANTS (page 1 of 2) SECTION J

1. Emission Point No./Name: Not Applicable

2. Manufacturers Name and Model No.: _____

3. Date Plant Manufactured: _____

4. Was this unit constructed or modified after August 7, 1977? ☐ yes ☐ no
   If yes please give date and explain. _____

5. Type of Plant: ☐ Batch ☐ Continuous ☐ Drum

6. Production:
   A. Rated capacity of dryer: _____ tons/hour
   B. Normal maximum rate: _____ tons/hour
   C. Annual: _____ tons

7. Dryer: Length: _____ feet Diameter: _____ feet

8. Burner:
   A. Manufacturers name and Model No.: _____
   B. Rated capacity: _____ Btu/hour
   C. Primary fuel
      1. ☐ Gas ☐ Oil Other (specify): _____
      2. Consumption:
         a. Gas: _____ ft^3/hour
         b. Oil: _____ gal/hour
         c. Other (specify units) _____
      3. Heat Value
         a. Gas: _____ Btu/ ft^3
         b. Oil: _____ Btu/gal
         c. Other (specify units) _____
      4. Sulfur content: _____ % S
      5. Ash content: _____ % ash
      6. Density of fuel oil (if applicable): _____ lb/ft^3
   D. Auxiliary fuel
      1. ☐ Gas ☐ Oil ☐ Other (specify): _____
      2. Consumption:
         a. Gas: _____ ft^3/hour
         b. Oil: _____ gal/hour
         c. Other (specify units) _____
      3. Heat Value
         a. Gas: _____ Btu/ ft^3
         b. Oil: _____ Btu/gal
         c. Other (specify units) _____
      4. Sulfur content: _____ % S
      5. Ash content: _____ % ash
      6. Density of fuel oil (if applicable): _____ lb/ft^3

9. Does this emission point have air pollution control equipment? ☐ Yes ☐ No
   If Yes, please complete the applicable Air Pollution Control Data Sheet found in Section L.

10. Miscellaneous:
   A. Are the shaker screens hooded and vented to air emission control systems: ☐ Yes ☐ No
   B. Are the hot elevator and bins vented to the air emission control system: ☐ Yes ☐ No
   C. Are in-plant roads: ☐ Water-sprinkled
      ☐ Oiled
      ☐ Paved
      ☐ Other, describe: _____

11. Does this facility operate a rockcrusher? ☐ Yes ☐ No
   If yes, attach a diagram of the operation and list the capacity and date of construction for each crusher, screener, and conveyer.

CONCRETE PLANTS (page 1 of 2) SECTION K

1. Emission Point No./Name: Not Applicable

2. Was this unit constructed or modified after August 7, 1977? ☐ yes ☐ no
If yes please give date and explain. _____

3. What type of batching will be accomplished:
   - ☐ Wet (Rotary mixing trucks)
   - ☐ Dry (Flat bed trucks with segregated material compartments)
   - ☐ Central Mix (Batching at plant site)

4. Plant Production Rate: _____ yd^3/hr
   _____ tons/hour

5. Will the sand and aggregate be washed before delivery to your facility:
   ☐ Yes ☐ No

6. Explain the method of moving aggregate from storage piles to storage bins located above aggregate hopper: _____

7. Will water sprays be used at the following locations:
   - A. Stockpiles: ☐ Yes ☐ No
   - B. Aggregate Bins ☐ Yes ☐ No
   - C. Conveyor Transfer Points ☐ Yes ☐ No

8. Cement Silo Information:
   - A. How many cement silos will this plant use: _____
   - B. What is the volume of each silo: _____ yd^3
   - C. Explain method of loading cement silo: _____
   - D. Is the silo Compartmented: ☐ Yes ☐ No
   - E. If compartmented, what is the maximum number of cement trucks used to fill one compartment at any one time: _____
   - F. If non-compartmented, what is the maximum number of cement trucks used to fill the silo at any one time: _____
   - G. What type of dust control device will be used on the silo vent: _____

9. The cement hopper will be vented to the:
   - ☐ cement silo
   - ☐ cement silo baghouse
   - ☐ if neither,

   where: _____

10. In-plant roads will be:
    - ☐ paved
    - ☐ oil-coated
    - ☐ water sprinkled

11. Raw materials input to plant:
    - A. Sand _____ yd^3 _____ tons/hour
    - B. Rock _____ yd^3 _____ tons/hour
    - C. Cement _____ yd^3 _____ tons/hour

ED_002139_00006637-00317

12. Will the batch drop point to the truck or central mixer be controlled to prevent dust emissions:
[ ] Yes [ ] No

A. If a shroud with exhaust air suction is to be used, submit the following:
1. Manufacturer Name & Model No.: _____
2. Shroud area: _____ ft^2
3. CFM associated with suction pick-up of dust: _____ cfm
4. Attach baghouse air pollution control form in Section L.

B. If other type of control device is used, explain in detail: _____

_____

13. If your facility has an air pollution control device, please complete the applicable Air Pollution Control Data Sheet found in Section L.

ED_002139_00006637-00318

AIR POLLUTION CONTROL DEVICES SECTION L

1. If the air pollution control device is different from the attached forms, then submit drawings, specifications, manufacturers data, etc.

2. Fill out one form for each air pollution control device and attach to the appropriate emission point description form.

ED_002139_00006637-00319

BAGHOUSES

SECTION L1

1. Emission Point No. / Name : Refer to Section 2 for additional information regarding the baghouses. Refer to

2. Manufacturers Name & Model No.: Tables 2-1a, 2-1b for additional information and 2-2a and 2-4a for emission estimates

3. Date of construction for existing sources or date of anticipated start-up for new sources: _____

4. Baghouse Data:
   a) Cloth area: _____ ft^2
   b) Air to cloth ratio: _____ $acfm/ft^2$
   c) Type of bag: ☐ Woven ☐ Felted ☐ Membrane ☐ Other: _____
   d) Bag material: _____
   e) No. of bags: _____
   f) No. of compartments: _____
   g) Bag length: _____ ft
   h) Bag diameter: _____ ft
   i) Pressure drop: _____ inches H_2O
   j) Pressure measurement device installed: ☐ Yes ☐ No
   k) Air flow: _____ acfm @ _____ °F
   l) Efficiency: _____ %
   m) Dirty air on: ☐ inside ☐ outside of bag
   n) Time between bag cleaning: _____ sec., min., hrs.
   o) Method of bag cleaning: ☐ Shaking ☐ Reverse Air ☐ Pulse Jet ☐ Other: _____
   p) Are extra bags readily available: ☐ Yes ☐ No How Many? _____
   q) How is the collected dust stored, handled, disposed of? _____

5. Which process(es) does the baghouse control emissions from? _____

ED_002139_00006637-00320

CYCLONES

SECTION L2

1. Emission Point No. / Name: Not Applicable

2. Manufacturers Name and Model No.: _____

3. Date of construction for existing sources or date of anticipated start-up for new sources:

_____

4. Cyclone Data:

a) Cyclone type (if more than 1, put total number) :

☐ Simple ☐ Potbellied
☐ High Efficiency ☐ Multiclone

b) Efficiency: _____ %

c) Pollutant viscosity: _____ poise

d) Flow Rate: _____ acfm

e) Pollutant size entering cyclone: _____ microns

f) Pressure drop: _____ inches H_2O

g) Baffles or Louvers (specify): _____

h) Cyclone dimensions:

Inlet: _____ ft
Outlet: _____ ft
Body diameter: _____ ft
Body height: _____ ft
Cone height: _____ ft

i) Wet spray: ☐ Yes ☐ No

1. No. of Nozzles: _____
2. Type of liquid used: _____
3. Flow rate: _____ gpm
4. Make-up rate: _____ gpm
5. % recycled: _____ %

j) Fan location:

1. Downstream:
   ☐ Direct emission
   ☐ Auxiliary Stack
2. Upstream:
   ☐ No cap (vertical emissions)
   ☐ Fixed cap (diffuse emissions)
   ☐ Wind respondent cap (horizontal emissions)

5. Which process(es) does the cyclone(s) control emissions from? _____

_____

_____

6. Attach a diagram of the cyclone(s) used.

ED_002139_00006637-00321

ADSORPTION

SECTION L3

1. Emission Point No. / Name: Not Applicable

2. Manufacturers Name and Model No.: _____

3. Date of construction for existing sources or date of anticipated start-up for new sources:

_____

4. Adsorption Data:

a) Type of Adsorption:
- ☐ One-pass regenerative
- ☐ Recirculating
- ☐ Two-pass regenerative
- ☐ Other: _____

b) Regenerative method:
- ☐ Discarded
- ☐ Thermal (Dry heat)
- ☐ Other: _____
- ☐ Chemical
- ☐ Thermal (Steam)

c) Adsorption material:
- ☐ Activated carbon
- ☐ Other: _____
- ☐ Hydrous silicate

d) Efficiency: _____ %

e) Flow Rate: _____ acfm

f) Pressure Drop: _____ inches H_2O

g) Inlet temperature: _____ °F

h) No. of compartments: _____

i) Size of adsorbent bed:
1. Length: _____ ft
2. Width: _____ ft
3. Height: _____ ft
4. Diameter: _____ ft

j) Regenerative schedule:
1. Maximum time for desorption: _____ sec., min., hrs.
2. Length of time to maximum saturation: _____ sec., min., hrs.

k) How are emissions controlled during regeneration? _____

_____

5. Which process(es) does the adsorber control emissions from? _____

_____

_____

ED_002139_00006637-00322

AFTERBURNER SECTION L4

1. Emission Point No. / Name: Not Applicable

2. Manufacturers Name and Model No.: _____

3. Date of construction for existing sources or date of anticipated start-up for new sources:

_____

4. Afterburner Data:

   a) Type of afterburner:
      1) ☐ Direct flame
      2) ☐ Catalytic
      3) ☐ Other: _____

   b) Efficiency: _____ %

   c) Flow Rate: _____ acfm

   d) Maximum burner rating: _____ MMbtu / hr

   e) Combustion chamber temperature: _____ °F

   f) Retention time: _____ seconds

   g) Combustion chamber dimensions:
      1) Length: _____ ft
      2) Width: _____ ft
      3) Diameter: _____ ft

   h) Fuel type: _____

   i) If fuel oil is burned: _____ % SO_2

   j) Fuel usage rate: _____ gals / hr, cfm, etc.

5. Which process(es) does the afterburner control emissions from? _____

_____

_____

SCRUBBERS (Page 1 of 2) SECTION L5

1. Emission Point No. / Name: Not Applicable

2. Manufacturers Name and Model No.: _____

3. Date of construction for existing sources or date of anticipated start-up for new sources:

_____

4. Scrubber Data:

a) Scrubber type: ☐ Venturi ☐ Orifice
☐ Packed Tower ☐ Gravity Tower
☐ Cyclonic ☐ Condenser
☐ Mist Eliminator ☐ Impingement Plate
☐ Other: _____

b) Liquid injection rate:
1) Design maximum: _____ gpm @ _____psia
2) Expected average: _____ gpm @ _____pisa

c) Pressure drop: _____ inches H_2O

d) Scrubbing liquid:
1) ☐ Once - through ☐ Recycled
2) If recycled: _____ gpm make - up rate
3) If water, describe settling basin: _____
4) Solution / Reactant systems:
a) Chemical make - up: _____
b) How is discharge handled, treated? _____

e) Gas flow: ☐ Counter current ☐ Concurrent
1) Flow rate: _____ acfm
2) Inlet Temperature: _____ °F

f) Venturi Data:
1) Inlet Area: _____ ft^2
2) Throat Area: _____ ft^2
3) Throat velocity: _____ ft / sec
4) ☐ Fixed throat ☐ Variable throat

g) Packed or Plate Tower Data:
1) Surface Area: _____ ft^2
2) Packing depth: _____ ft
3) Type of packing: ☐ Rings ☐ Saddles
☐ Other:
4) No. of plates: _____

h) Demisting Data:

1) Mist eliminator filter area: _____ ft^2

2) Type: ☐ Cyclone ☐ Vanes ☐ Pad

☐ Other: _____

i) Efficiency: _____ %

j) Are extra nozzles readily available? ☐ Yes ☐ No

How many? _____

k) Pressure measurement devices installed? Yes ☐ No ☐

5. Which process(es) does the scrubber control emissions from? _____

_____

_____

ELECTROSTATIC PRECIPITATORS (Page 1 of 2) SECTION L6

1. Emission Point No. / Name: Not Applicable

2. Manufacturers Name and Model No.: _____

3. Date of construction for existing sources or date of anticipated start-up for new sources:

_____

4. Precipitator Data:

a) Precipitator Type:

☐ Single Stage ☐ Low Voltage ☐ Hot Side
☐ Two Stage ☐ High Voltage ☐ Cold Side
☐ Other: _____

b) Efficiency: _____ %

c) Flow rate: _____ acfm

d) Pressure drop: _____ inches H_2O

e) Inlet temperature: _____ ° F

f) Total collection plate area: _____ ft^2

g) Gas viscosity: _____ poise

h) Resistivity of pollutant: _____ ohm - cm

i) Charging field strength: _____ volts

j) Collecting field strength: _____ volts

k) No. of compartments: _____

l) No. of electrically separate fields: _____

n) Fan is: ☐ Upstream ☐ Downstream of precipitator

o) Cleaning Method:

☐ Plate Rapping
☐ Plate Vibrating
☐ None
☐ Washing
☐ Other: _____

p) Rapper frequency:
1) ☐ Automatic ☐ Manual
2) _____ minutes / cycle

q) Corona power: _____ watts / 1000 cfm

r) Electrical usage: _____ kW / hr

m) List the electrical conditions per field:

FIELD NO.	VOLTAGE (kV)	AMPERAGE (mA)

5. Which process(es) does the electrostatic precipitator control emissions from?

_____

_____

OTHER AIR POLLUTION CONTROL EQUIPMENT / DEVICES

SECTION L7

If air pollution control equipment/device(s) are different from the previous sections descriptions or new technology, then explain below and attach manufacturers specifications including efficiency.

Not Applicable

ED_002139_00006637-00328

Refer to Tables 2-2b, 2-3c and 2-11 for summary of GHG emissions

GREENHOUSE GAS (GHG) EMISSIONS SUMMARY FORM

Emission Point ID	Greenhouse Gas (GHG) Pollutants (TPY)						GHG Total	CO_2e
	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	(TPY)	(TPY)
Total								

ED_002139_00006637-00329

Responsible Official/Duly Authorized Representative Identification Form

(The following page is to be used for specifying facility contacts)

Facility Name: **MS Silicon, LLC** Facility Number: **Not Assigned**

I hereby certify that I am qualified under the regulatory definition to be the responsible official for the above-named facility. Specifically, I, **W. Dave Tuten**:
(Typed or printed name)

(X) am an officer of the corporation. My title is **President & CEO**.

( ) perform policy or decision-making functions similar to that of an officer of the corporation.

Explain: _____

_____.

( ) am a general partner in a partnership.

( ) am the owner of a sole proprietorship.

( ) am a principal executive officer or ranking elected official of a municipality, state, federal, or other public agency. My office/title is: _____.

My agency is: _____.

Note: A duly authorized representative may only be designated for corporations, and while a corporation may have several responsible officials, it can only have one duly authorized representative.

I hereby designate _____ as a duly authorized representative to act in my stead.
(Name of individual)

This individual's business title is: _____.

I also certify that this individual is responsible for the overall operation of one or more facilities applying for or subject to a permit under these regulations and that

( ) the facilities employ more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), or

( ) approval of this delegation of authority has been previously requested of and given by the DEQ.

W. Dave Tuten
Signature of responsible official

Signature of duly authorized representative designee

8-12-13
Date

For MDEQ use only:

Acknowledged by

Date

Appendix B - Air Quality Impact Evaluation – AERMOD Output Files - CO

Air Quality Impact Evaluation – AERMOD Output Files

Pollutant – CO

Years – 2007 through 2011

*Air Quality Imapct Evaluation Results are summarized in Tables 5-4a through 5-4d


```
   ********   WARNING MESSAGES   ********
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

***********************************
*** SETUP Finishes Successfully ***
***********************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                   ***        10:39:44
**MODELOPTs:  RegDFAULT CONC                                                                                         PAGE   1
                                                                    ELEV

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  2 Short Term Average(s) of:   1-HR   8-HR
    and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);       3 Source Group(s); and    2064 Receptor(s)

**The Model Assumes A Pollutant Type of:  CO

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
        Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
        Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.2 MB of RAM.

**Detailed Error/Message File:   MSSilicon_CO.err
**File for Summary of Results:   MSSilicon_CO.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
```

```
                                   ***                                    CO_2007.ADO                                   ***
**MODELOPTs:  RegDFAULT CONC                                                ELEV                                                  10:39:44
                                                                                                                                  PAGE    2

                                                   *** POINT SOURCE DATA ***

                NUMBER EMISSION RATE                                                                                                
  SOURCE         PART.  (GRAMS/SEC)      X          Y      BASE     STACK   STACK    STACK     STACK    BLDG   URBAN  CAP/  EMIS RATE
   ID            CATS.                 (METERS)  (METERS) ELEV.   HEIGHT  TEMP.   EXIT VEL.  DIAMETER EXISTS SOURCE HOR  SCALAR
                                                            (METERS) (METERS) (DEG.K)  (M/SEC)  (METERS)                     VARY BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SAF1            0   0.11781E+02  379020.5 3852097.6  143.6    91.44   449.82    19.37     1.93    YES     NO    NO
SAF2            0   0.11781E+02  379019.6 3852052.8  143.2    91.44   449.82    19.37     1.93    YES     NO    NO
SAF3            0   0.11781E+02  379018.2 3851969.8  142.6    91.44   449.82    19.37     1.93    YES     NO    NO
SAF4            0   0.11781E+02  379017.5 3851925.0  142.1    91.44   449.82    19.37     1.93    YES     NO    NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***                 08/07/13
                                  ***                                                                      ***                   10:39:44
**MODELOPTs:  RegDFAULT CONC                                                ELEV                                                  PAGE    3

                                                   *** VOLUME SOURCE DATA ***

                NUMBER EMISSION RATE                                                                                                
  SOURCE         PART.  (GRAMS/SEC)      X          Y      BASE    RELEASE   INIT.     INIT.    URBAN  EMISSION RATE
   ID            CATS.                 (METERS)  (METERS) ELEV.   HEIGHT     SY        SZ     SOURCE  SCALAR VARY
                                                            (METERS) (METERS) (METERS) (METERS)                BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

F1              0   0.20790E+00  378925.8 3852076.8  144.0    20.01     6.97    18.62     NO
F2              0   0.20790E+00  378923.5 3851949.2  143.0    20.01     6.97    18.62     NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***                 08/07/13
                                  ***                                                                      ***                   10:39:44
**MODELOPTs:  RegDFAULT CONC                                                ELEV                                                  PAGE    4

                                         *** SOURCE IDs DEFINING SOURCE GROUPS ***
GROUP ID                                                   SOURCE IDs

 SRCGP1    SAF1         , SAF2         , SAF3         , SAF4         , F1           , F2           ,

 SRCGP2    SAF1         , SAF2         , SAF3         , SAF4         ,

 SRCGP3    F1           , F2           ,
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***                 08/07/13
                                  ***                                                                      ***                   10:39:44
**MODELOPTs:  RegDFAULT CONC                                                ELEV                                                  PAGE    5

                                         *** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1
 IFV    BH       BW       BL      XADJ     YADJ     IFV    BH       BW       BL      XADJ     YADJ
  1   10.7,    16.8,    14.4,   -12.8,     9.6,      2   40.0,    54.1,    84.7,  -214.9,    40.5,
  3   40.0,    64.6,    83.9,  -218.9,     9.9,      4   40.0,    73.2,    80.5,  -216.2,   -21.0,
```

CO_2007.ADO

RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (XR,YR)	OF TYPE	RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (XR,YR)	OF TYPE
1.	63.02528c	(07122408)	AT	(378951.14, 3852322.00)	DC	11.	49.37546c	(07010124)	AT	(378886.76, 3851765.89)	DC
2.	57.56241	(07103008)	AT	(378886.76, 3851765.89)	DC	12.	47.67373	(07113008)	AT	(378935.83, 3851765.00)	DC
3.	55.51542c	(07121708)	AT	(379000.41, 3852321.36)	DC	13.	47.49921	(07041908)	AT	(378886.76, 3851765.89)	DC
4.	53.63224c	(07101308)	AT	(378886.76, 3851765.89)	DC	14.	46.96145m	(07091708)	AT	(378865.00, 3851720.00)	DC
5.	52.72530c	(07103108)	AT	(378886.76, 3851765.89)	DC	15.	46.85460c	(07031208)	AT	(378886.76, 3851765.89)	DC
6.	50.57557m	(07091708)	AT	(378886.76, 3851765.89)	DC	16.	45.87624b	(07101408)	AT	(378886.76, 3851765.89)	DC
7.	50.45401c	(07042108)	AT	(378886.76, 3851765.89)	DC	17.	45.63483c	(07122408)	AT	(378965.00, 3852420.00)	DC
8.	50.23709c	(07040224)	AT	(379000.41, 3852321.36)	DC	18.	45.62396	(07010208)	AT	(378886.76, 3851765.89)	DC
9.	50.18989c	(07042108)	AT	(378865.00, 3851720.00)	DC	19.	45.09333c	(07073008)	AT	(378886.76, 3851765.89)	DC
10.	49.82720	(07110208)	AT	(378886.76, 3851765.89)	DC	20.	45.08448c	(07101308)	AT	(378865.00, 3851720.00)	DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:39:44
**MODELOPTs: RegDFAULT CONC ELEV PAGE 427

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF CO IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	6.05324 AT	(378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	5.22443 AT	(378865.00, 3851720.00, 141.49, 146.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	5.19903 AT	(378901.88, 3852322.63, 142.58, 146.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	5.02054 AT	(378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	4.98378 AT	(378837.69, 3851766.78, 143.17, 143.17, 0.00)	DC	
	6TH HIGHEST VALUE IS	4.62862 AT	(378965.00, 3852420.00, 141.11, 145.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	4.60948 AT	(378965.00, 3852520.00, 140.24, 145.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	4.53617 AT	(378965.00, 3852620.00, 139.84, 146.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	4.43448 AT	(378852.62, 3852323.27, 142.50, 146.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	4.39750 AT	(378865.00, 3852420.00, 140.56, 147.00, 0.00)	DC	
SRCGP2	1ST HIGHEST VALUE IS	3.15198 AT	(378965.00, 3852720.00, 139.70, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.09066 AT	(378965.00, 3852820.00, 139.96, 146.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.08807 AT	(378965.00, 3852620.00, 139.84, 146.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.00874 AT	(379065.00, 3852720.00, 139.14, 145.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.99027 AT	(378865.00, 3852820.00, 141.32, 147.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	2.98224 AT	(378865.00, 3852720.00, 139.61, 147.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	2.95825 AT	(379065.00, 3852620.00, 139.25, 145.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.95727 AT	(379065.00, 3852820.00, 140.05, 140.05, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.93459 AT	(378965.00, 3852920.00, 139.26, 146.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.89064 AT	(378865.00, 3852920.00, 142.10, 147.00, 0.00)	DC	
SRCGP3	1ST HIGHEST VALUE IS	5.13946 AT	(378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	4.07499 AT	(378865.00, 3851720.00, 141.49, 146.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.97067 AT	(378837.69, 3851766.78, 143.17, 143.17, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.66616 AT	(378901.88, 3852322.63, 142.58, 146.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.44523 AT	(378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.27891 AT	(378935.83, 3851765.00, 141.58, 145.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	2.93439 AT	(378852.62, 3852323.27, 142.50, 146.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.74997 AT	(378865.00, 3851620.00, 139.76, 146.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.71435 AT	(379000.41, 3852321.36, 142.76, 142.76, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.40407 AT	(378810.99, 3852298.80, 142.76, 147.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART CO_2007.ADO
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:39:44
**MODELOPTs: RegDFAULT CONC ELEV PAGE 428

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	116.73641	ON 07012006: AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	115.47798	ON 07020819: AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	71.64474	ON 07123009: AT (	380365.00,	3850820.00,	149.51,	152.00,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	54.25663	ON 07053007: AT (	377765.00,	3850820.00,	152.68,	152.68,	0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	116.73641	ON 07012006: AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	115.47798	ON 07020819: AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:39:44
**MODELOPTs: RegDFAULT CONC ELEV PAGE 429

*** THE SUMMARY OF HIGHEST 8-HR RESULTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	63.02528c	ON 07122408: AT (	378951.14,	3852322.00,	142.68,	145.00,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	53.64296c	ON 07101308: AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	39.21837	ON 07091616: AT (	378865.00,	3851520.00,	140.08,	147.00,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	37.86889	ON 07090716: AT (	379065.00,	3852620.00,	139.25,	145.00,	0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	63.02528c	ON 07122408: AT (	378951.14,	3852322.00,	142.68,	145.00,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	53.63224c	ON 07101308: AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:39:44
**MODELOPTs: RegDFAULT CONC ELEV PAGE 430

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d

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                                                                                    CO_2008.ADO

   ********   WARNING MESSAGES   ********
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS Wind speed threshold used          0.50

***********************************
*** SETUP Finishes Successfully ***
***********************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                  ***        10:44:04
**MODELOPTs:  RegDFAULT CONC                                                                                        PAGE   1
                                                                          ELEV

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  2 Short Term Average(s) of:   1-HR   8-HR
    and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);       3 Source Group(s); and    2064 Receptor(s)

**The Model Assumes A Pollutant Type of:  CO

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.2 MB of RAM.

**Detailed Error/Message File:   MSSilicon_CO.err
**File for Summary of Results:   MSSilicon_CO.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                                                                                                Page 5
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*** CO_2008.ADO *** 10:44:04
**MODELOPTs: RegDFAULT CONC ELEV PAGE 2

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.11781E+02	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.11781E+02	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.11781E+02	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.11781E+02	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:44:04
**MODELOPTs: RegDFAULT CONC ELEV PAGE 3

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.20790E+00	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.20790E+00	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:44:04
**MODELOPTs: RegDFAULT CONC ELEV PAGE 4

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
SRCGP1	SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 ,
SRCGP2	SAF1 , SAF2 , SAF3 , SAF4 ,
SRCGP3	F1 , F2 ,

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:44:04
**MODELOPTs: RegDFAULT CONC ELEV PAGE 5

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	16.8,	14.4,	-12.8,	9.6,	2	40.0,	54.1,	84.7,	-214.9,	40.5,
3	40.0,	64.6,	83.9,	-218.9,	9.9,	4	40.0,	73.2,	80.5,	-216.2,	-21.0,

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RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE	RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE
1.	61.96875c	(08042108) AT	(378886.76, 3851765.89) DC	11.	46.13024c	(08042108) AT	(378865.00, 3851720.00) DC
2.	61.33375	(08030608) AT	(378886.76, 3851765.89) DC	12.	46.13016	(08101808) AT	(378837.69, 3851766.78) DC
3.	56.80956c	(08011208) AT	(378886.76, 3851765.89) DC	13.	45.97653	(08030608) AT	(378865.00, 3851720.00) DC
4.	55.21772c	(08050508) AT	(378886.76, 3851765.89) DC	14.	45.17774	(08052124) AT	(378886.76, 3851765.89) DC
5.	51.16960c	(08090724) AT	(378886.76, 3851765.89) DC	15.	45.04443	(08052508) AT	(378886.76, 3851765.89) DC
6.	50.08347c	(08090808) AT	(378886.76, 3851765.89) DC	16.	44.91417c	(08042624) AT	(378865.00, 3851720.00) DC
7.	49.49488c	(08042624) AT	(378886.76, 3851765.89) DC	17.	44.31224	(08083008) AT	(378935.83, 3851765.00) DC
8.	46.81938	(08010324) AT	(378951.14, 3852322.00) DC	18.	43.68155c	(08080908) AT	(378935.83, 3851765.00) DC
9.	46.57237c	(08022808) AT	(379000.41, 3852321.36) DC	19.	43.34105	(08080808) AT	(378984.90, 3851764.11) DC
10.	46.39307c	(08092908) AT	(378788.62, 3851767.67) DC	20.	43.29323c	(08121624) AT	(379049.67, 3852320.72) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

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**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF CO IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	4.53650 AT	(378886.76, 3851765.89, 143.00, 146.00, 0.00) DC	
	2ND HIGHEST VALUE IS	3.90129 AT	(378935.83, 3851765.00, 141.58, 145.00, 0.00) DC	
	3RD HIGHEST VALUE IS	3.84717 AT	(378837.69, 3851766.78, 143.17, 143.17, 0.00) DC	
	4TH HIGHEST VALUE IS	3.73558 AT	(378901.88, 3852322.63, 142.58, 146.00, 0.00) DC	
	5TH HIGHEST VALUE IS	3.68778 AT	(378865.00, 3851720.00, 141.49, 146.00, 0.00) DC	
	6TH HIGHEST VALUE IS	3.59794 AT	(378788.62, 3851767.67, 143.30, 146.00, 0.00) DC	
	7TH HIGHEST VALUE IS	3.54591 AT	(378951.14, 3852322.00, 142.68, 145.00, 0.00) DC	
	8TH HIGHEST VALUE IS	3.47049 AT	(378852.62, 3852323.27, 142.50, 146.00, 0.00) DC	
	9TH HIGHEST VALUE IS	3.18658 AT	(378765.00, 3851720.00, 143.24, 143.24, 0.00) DC	
	10TH HIGHEST VALUE IS	3.18644 AT	(378865.00, 3852420.00, 140.56, 147.00, 0.00) DC	
SRCGP2	1ST HIGHEST VALUE IS	2.23091 AT	(378865.00, 3852920.00, 142.10, 147.00, 0.00) DC	
	2ND HIGHEST VALUE IS	2.21087 AT	(378865.00, 3852820.00, 141.32, 147.00, 0.00) DC	
	3RD HIGHEST VALUE IS	2.18468 AT	(378865.00, 3853020.00, 142.68, 147.00, 0.00) DC	
	4TH HIGHEST VALUE IS	2.16059 AT	(378965.00, 3852820.00, 139.96, 146.00, 0.00) DC	
	5TH HIGHEST VALUE IS	2.14147 AT	(378965.00, 3852920.00, 139.26, 146.00, 0.00) DC	
	6TH HIGHEST VALUE IS	2.12387 AT	(378965.00, 3853020.00, 142.99, 146.00, 0.00) DC	
	7TH HIGHEST VALUE IS	2.10985 AT	(378765.00, 3852920.00, 143.60, 143.60, 0.00) DC	
	8TH HIGHEST VALUE IS	2.09314 AT	(378765.00, 3853020.00, 143.04, 148.00, 0.00) DC	
	9TH HIGHEST VALUE IS	2.08829 AT	(378865.00, 3852720.00, 139.61, 147.00, 0.00) DC	
	10TH HIGHEST VALUE IS	2.08782 AT	(378965.00, 3852720.00, 139.70, 146.00, 0.00) DC	
SRCGP3	1ST HIGHEST VALUE IS	4.04625 AT	(378886.76, 3851765.89, 143.00, 146.00, 0.00) DC	
	2ND HIGHEST VALUE IS	3.47858 AT	(378935.83, 3851765.00, 141.58, 145.00, 0.00) DC	
	3RD HIGHEST VALUE IS	3.28670 AT	(378837.69, 3851766.78, 143.17, 143.17, 0.00) DC	
	4TH HIGHEST VALUE IS	3.02926 AT	(378865.00, 3851720.00, 141.49, 146.00, 0.00) DC	
	5TH HIGHEST VALUE IS	2.96213 AT	(378788.62, 3851767.67, 143.30, 146.00, 0.00) DC	
	6TH HIGHEST VALUE IS	2.92306 AT	(378901.88, 3852322.63, 142.58, 146.00, 0.00) DC	
	7TH HIGHEST VALUE IS	2.75370 AT	(378951.14, 3852322.00, 142.68, 145.00, 0.00) DC	
	8TH HIGHEST VALUE IS	2.64237 AT	(378852.62, 3852323.27, 142.50, 146.00, 0.00) DC	
	9TH HIGHEST VALUE IS	2.39573 AT	(379000.41, 3852321.36, 142.76, 142.76, 0.00) DC	
	10TH HIGHEST VALUE IS	2.37925 AT	(378765.00, 3851720.00, 143.24, 143.24, 0.00) DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

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*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:44:04
**MODELOPTs: RegDFAULT CONC ELEV PAGE 428

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	123.51530	ON 08052122: AT (	378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	116.29772	ON 08011221: AT (	378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	79.29901	ON 08022409: AT (	377165.00, 3850620.00, 149.19, 149.19, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	56.87392	ON 08022409: AT (	377765.00, 3851220.00, 160.52, 160.52, 0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	123.51530	ON 08052122: AT (	378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	116.29772	ON 08011221: AT (	378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:44:04
**MODELOPTs: RegDFAULT CONC ELEV PAGE 429

*** THE SUMMARY OF HIGHEST 8-HR RESULTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	61.96884c	ON 08042108: AT (	378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	61.33375	ON 08030608: AT (	378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	38.58999	ON 08060616: AT (	379065.00, 3852720.00, 139.14, 145.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	35.91794	ON 08060716: AT (	379065.00, 3852620.00, 139.25, 145.00, 0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	61.96875c	ON 08042108: AT (	378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	61.33375	ON 08030608: AT (	378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:44:04
**MODELOPTs: RegDFAULT CONC ELEV PAGE 430

Appendix B - Air Quality Impact Evaluation AERMOD Output Files
Pollutant - CO
Year - 2009

*Air Quality Impact Evaulation results are summarized in Tables 5-4a through 5-4d

```
                                                                                    CO_2009.ADO
 *** Message Summary For AERMOD Model Setup ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            1 Warning Message(s)
A Total of            0 Informational Message(s)


   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


   ********   WARNING MESSAGES   ********
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

***********************************
*** SETUP Finishes Successfully ***
***********************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                  ***        10:45:58
**MODELOPTs:  RegDFAULT CONC                                                                                        PAGE   1
                                                                          ELEV

                                      ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  2 Short Term Average(s) of:   1-HR   8-HR
    and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);       3 Source Group(s); and    2064 Receptor(s)

**The Model Assumes A Pollutant Type of:  CO

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
                                                                                                                  Page 5
```

Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword) CO_2009.ADO

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) = 104.00 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 4.2 MB of RAM.

**Detailed Error/Message File: MSSilicon_CO.err
**File for Summary of Results: MSSilicon_CO.sum

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:45:58
PAGE 2

**MODELOPTs: RegDFAULT CONC ELEV

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.11781E+02	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.11781E+02	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.11781E+02	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.11781E+02	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:45:58
PAGE 3

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.20790E+00	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.20790E+00	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:45:58
PAGE 4

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
SRCGP1	SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 ,

```
  5.      46.50720c(09112024) AT ( 378765.00, 3851720.00)  DC      15.      41.35704c(09120108) AT ( 378788.62, 3851767.67)  DC
  6.      46.30609c(09093008) AT ( 378788.62, 3851767.67)  DC      16.      41.02881c(09112024) AT ( 378837.69, 3851766.78)  DC
  7.      45.26592c(09082224) AT ( 378935.83, 3851765.00)  DC      17.      40.22709c(09112008) AT ( 378788.62, 3851767.67)  DC
  8.      43.64734b(09120608) AT ( 378788.62, 3851767.67)  DC      18.      39.91863c(09012324) AT ( 378965.00, 3851720.00)  DC
  9.      43.59523c(09042924) AT ( 378901.88, 3852322.63)  DC      19.      39.90158 (09022308) AT ( 378788.62, 3851767.67)  DC
 10.      43.43301c(09102108) AT ( 378739.55, 3851768.56)  DC      20.      39.86651c(09112808) AT ( 379098.93, 3852320.09)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                   ***          10:45:58
 **MODELOPTs:  RegDFAULT CONC                                                                                         PAGE 427
                                                                    ELEV

                                 *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***

                                  ** CONC OF CO       IN MICROGRAMS/M**3                          **

GROUP ID                          AVERAGE CONC                 RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  NETWORK
                                                                                                                  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1     1ST HIGHEST VALUE IS      4.82036 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS      4.32617 AT (  378765.00,  3851720.00,   143.24,   143.24,    0.00)  DC
           3RD HIGHEST VALUE IS      4.30251 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
           4TH HIGHEST VALUE IS      4.18224 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
           5TH HIGHEST VALUE IS      4.02335 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
           6TH HIGHEST VALUE IS      3.75041 AT (  378665.00,  3851620.00,   143.02,   143.02,    0.00)  DC
           7TH HIGHEST VALUE IS      3.70357 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
           8TH HIGHEST VALUE IS      3.66541 AT (  379098.93,  3852320.09,   142.51,   142.51,    0.00)  DC
           9TH HIGHEST VALUE IS      3.60325 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
          10TH HIGHEST VALUE IS      3.53374 AT (  378665.00,  3851720.00,   142.78,   148.00,    0.00)  DC

SRCGP2     1ST HIGHEST VALUE IS      2.28543 AT (  379365.00,  3852820.00,   139.31,   139.31,    0.00)  DC
           2ND HIGHEST VALUE IS      2.27884 AT (  379265.00,  3852820.00,   140.30,   140.30,    0.00)  DC
           3RD HIGHEST VALUE IS      2.26530 AT (  379265.00,  3852720.00,   140.12,   140.12,    0.00)  DC
           4TH HIGHEST VALUE IS      2.26072 AT (  379365.00,  3852720.00,   139.58,   139.58,    0.00)  DC
           5TH HIGHEST VALUE IS      2.23065 AT (  379365.00,  3852920.00,   137.26,   142.00,    0.00)  DC
           6TH HIGHEST VALUE IS      2.21281 AT (  379265.00,  3852920.00,   139.54,   143.00,    0.00)  DC
           7TH HIGHEST VALUE IS      2.15241 AT (  379365.00,  3853020.00,   136.56,   143.00,    0.00)  DC
           8TH HIGHEST VALUE IS      2.13354 AT (  379265.00,  3852620.00,   138.00,   143.00,    0.00)  DC
           9TH HIGHEST VALUE IS      2.11541 AT (  379365.00,  3852620.00,   136.37,   213.00,    0.00)  DC
          10TH HIGHEST VALUE IS      2.10882 AT (  379265.00,  3853020.00,   138.92,   143.00,    0.00)  DC

SRCGP3     1ST HIGHEST VALUE IS      4.02096 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS      3.49762 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
           3RD HIGHEST VALUE IS      3.40158 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
           4TH HIGHEST VALUE IS      3.31335 AT (  378765.00,  3851720.00,   143.24,   143.24,    0.00)  DC
           5TH HIGHEST VALUE IS      3.28609 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
           6TH HIGHEST VALUE IS      3.05462 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
           7TH HIGHEST VALUE IS      2.79845 AT (  379098.93,  3852320.09,   142.51,   142.51,    0.00)  DC
           8TH HIGHEST VALUE IS      2.70633 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
           9TH HIGHEST VALUE IS      2.62390 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
          10TH HIGHEST VALUE IS      2.49740 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
```

```
                    DP = DISCPOLR                                                    CO_2009.ADO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                   ***          10:45:58
 **MODELOPTs:  RegDFAULT CONC                                                                                         PAGE 428
                                                                   ELEV

                                   *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***

                                 ** CONC OF CO       IN MICROGRAMS/M**3                          **

GROUP ID                          AVERAGE CONC     DATE
                                                  (YYMMDDHH)            RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  NETWORK
                                                                                                                          GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1   HIGH   1ST HIGH VALUE IS     117.15505  ON 09022307: AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS     112.48484  ON 09110424: AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC

SRCGP2   HIGH   1ST HIGH VALUE IS      84.33650  ON 09010612: AT (  380565.00,  3851820.00,   164.17,   167.10,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      74.22036  ON 09032609: AT (  380365.00,  3851020.00,   153.59,   153.59,    0.00)  DC

SRCGP3   HIGH   1ST HIGH VALUE IS     117.15505  ON 09022307: AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS     112.48484  ON 09110424: AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                   ***          10:45:58
 **MODELOPTs:  RegDFAULT CONC                                                                                         PAGE 429
                                                                   ELEV

                                   *** THE SUMMARY OF HIGHEST  8-HR RESULTS ***

                                 ** CONC OF CO       IN MICROGRAMS/M**3                          **

GROUP ID                          AVERAGE CONC     DATE
                                                  (YYMMDDHH)            RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  NETWORK
                                                                                                                          GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1   HIGH   1ST HIGH VALUE IS      53.95627c ON 09112024: AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      46.30609c ON 09093008: AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC

SRCGP2   HIGH   1ST HIGH VALUE IS      38.84235  ON 09062516: AT (  378465.00,  3851920.00,   145.45,   145.45,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      36.85072  ON 09100116: AT (  379265.00,  3852720.00,   140.12,   140.12,    0.00)  DC

SRCGP3   HIGH   1ST HIGH VALUE IS      53.95627c ON 09112024: AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      46.30609c ON 09093008: AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                   ***          10:45:58
 **MODELOPTs:  RegDFAULT CONC                                                                                         PAGE 430
                                                                   ELEV
```

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d


```
   ********   WARNING MESSAGES   ********
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

************************************
*** SETUP Finishes Successfully ***
************************************

 *** AERMOD - VERSION  12345 ***    *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***       08/07/13
                                    ***                                                                      ***       10:48:26
**MODELOPTs:  RegDFAULT CONC                                        ELEV                                               PAGE   1

                                         ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  2 Short Term Average(s) of:   1-HR   8-HR
    and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);      3 Source Group(s); and    2064 Receptor(s)

**The Model Assumes A Pollutant Type of:  CO

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.2 MB of RAM.

**Detailed Error/Message File:   MSSilicon_CO.err
**File for Summary of Results:   MSSilicon_CO.sum
```

*** AERMOD - VERSION 12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***   08/07/13

*** CO_2010.ADO *** 10:48:26
**MODELOPTs: RegDFAULT CONC ELEV PAGE 2

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.11781E+02	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.11781E+02	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.11781E+02	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.11781E+02	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:48:26
**MODELOPTs: RegDFAULT CONC ELEV PAGE 3

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.20790E+00	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.20790E+00	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:48:26
**MODELOPTs: RegDFAULT CONC ELEV PAGE 4

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

SRCGP1 SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 ,

SRCGP2 SAF1 , SAF2 , SAF3 , SAF4 ,

SRCGP3 F1 , F2 ,
*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:48:26
**MODELOPTs: RegDFAULT CONC ELEV PAGE 5

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	16.8,	14.4,	-12.8,	9.6,	2	40.0,	54.1,	84.7,	-214.9,	40.5,
3	40.0,	64.6,	83.9,	-218.9,	9.9,	4	40.0,	73.2,	80.5,	-216.2,	-21.0,

CO_2010.ADO

RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (XR,YR)	OF TYPE	RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (XR,YR)	OF TYPE
1.	47.25580c	(10111308)	AT	(379000.41, 3852321.36)	DC	11.	42.17987c	(10011508)	AT	(378765.00, 3851720.00)	DC
2.	46.12900c	(10112808)	AT	(378788.62, 3851767.67)	DC	12.	42.12794c	(10102008)	AT	(378935.83, 3851765.00)	DC
3.	46.10323	(10012808)	AT	(379049.67, 3852320.72)	DC	13.	41.83416c	(10010624)	AT	(379000.41, 3852321.36)	DC
4.	45.20952c	(10090408)	AT	(378837.69, 3851766.78)	DC	14.	41.61855	(10031708)	AT	(378984.90, 3851764.11)	DC
5.	44.55368	(10010924)	AT	(378886.76, 3851765.89)	DC	15.	40.97012	(10010208)	AT	(378886.76, 3851765.89)	DC
6.	43.80344c	(10052408)	AT	(378739.55, 3851768.56)	DC	16.	40.76736	(10031724)	AT	(378886.76, 3851765.89)	DC
7.	43.63722c	(10112808)	AT	(378739.55, 3851768.56)	DC	17.	40.48992	(10121824)	AT	(378837.69, 3851766.78)	DC
8.	43.41922c	(10052608)	AT	(378788.62, 3851767.67)	DC	18.	40.10259m	(10050824)	AT	(378886.76, 3851765.89)	DC
9.	43.16772c	(10052408)	AT	(378788.62, 3851767.67)	DC	19.	40.01989	(10010824)	AT	(378935.83, 3851765.00)	DC
10.	42.85802c	(10011508)	AT	(378788.62, 3851767.67)	DC	20.	39.63275c	(10090508)	AT	(378788.62, 3851767.67)	DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** 08/07/13 10:48:26 PAGE 427

**MODELOPTS: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF CO IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	5.27976 AT	(378788.62, 3851767.67, 143.30, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	4.86667 AT	(378837.69, 3851766.78, 143.17, 143.17, 0.00)	DC	
	3RD HIGHEST VALUE IS	4.74083 AT	(378765.00, 3851720.00, 143.24, 143.24, 0.00)	DC	
	4TH HIGHEST VALUE IS	4.64287 AT	(378739.55, 3851768.56, 143.30, 147.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	4.33478 AT	(379049.67, 3852320.72, 142.86, 142.86, 0.00)	DC	
	6TH HIGHEST VALUE IS	4.17593 AT	(379000.41, 3852321.36, 142.76, 142.76, 0.00)	DC	
	7TH HIGHEST VALUE IS	4.10742 AT	(378665.00, 3851620.00, 143.02, 143.02, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.94467 AT	(379165.00, 3852520.00, 140.42, 140.42, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.92842 AT	(379065.00, 3852420.00, 141.14, 141.14, 0.00)	DC	
	10TH HIGHEST VALUE IS	3.92221 AT	(379098.93, 3852320.09, 142.51, 142.51, 0.00)	DC	
SRCGP2	1ST HIGHEST VALUE IS	2.71442 AT	(379265.00, 3852720.00, 140.12, 140.12, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.70072 AT	(379265.00, 3852820.00, 140.30, 140.30, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.62339 AT	(379165.00, 3852720.00, 140.12, 140.12, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.62191 AT	(379365.00, 3852820.00, 139.31, 139.31, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.60224 AT	(379365.00, 3852720.00, 139.58, 139.58, 0.00)	DC	
	6TH HIGHEST VALUE IS	2.59638 AT	(379265.00, 3852920.00, 139.54, 143.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	2.58492 AT	(379165.00, 3852820.00, 140.20, 140.20, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.57468 AT	(379265.00, 3852620.00, 138.00, 143.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.54138 AT	(379365.00, 3852920.00, 137.26, 142.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.52708 AT	(379165.00, 3852620.00, 138.82, 138.82, 0.00)	DC	
SRCGP3	1ST HIGHEST VALUE IS	4.27019 AT	(378788.62, 3851767.67, 143.30, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	4.00324 AT	(378837.69, 3851766.78, 143.17, 143.17, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.51251 AT	(378765.00, 3851720.00, 143.24, 143.24, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.49771 AT	(378739.55, 3851768.56, 143.30, 147.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.24177 AT	(379049.67, 3852320.72, 142.86, 142.86, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.21767 AT	(379000.41, 3852321.36, 142.76, 142.76, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.18268 AT	(378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.69330 AT	(379098.93, 3852320.09, 142.51, 142.51, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.64862 AT	(378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.63784 AT	(378690.48, 3851769.45, 143.30, 147.00, 0.00)	DC	

```
*** RECEPTOR TYPES:  GC = GRIDCART                                   CO_2010.ADO
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/07/13
                                   ***                                                                       ***      10:48:26
**MODELOPTS:  RegDFAULT CONC                                        ELEV                                              PAGE 428

                                  *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***

                        ** CONC OF CO        IN MICROGRAMS/M**3                                  **

                                                      DATE                                                                      NETWORK
GROUP ID                         AVERAGE CONC      (YYMMDDHH)              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    HIGH   1ST HIGH VALUE IS     114.17653  ON 10011221: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
          HIGH   2ND HIGH VALUE IS     113.72386  ON 10122422: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC

SRCGP2    HIGH   1ST HIGH VALUE IS      79.63049  ON 10012810: AT (  380165.00,  3852220.00,   163.93,   214.80,    0.00)  DC
          HIGH   2ND HIGH VALUE IS      69.92730  ON 10110910: AT (  379965.00,  3852120.00,   138.62,   214.80,    0.00)  DC

SRCGP3    HIGH   1ST HIGH VALUE IS     114.17653  ON 10011221: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
          HIGH   2ND HIGH VALUE IS     113.72386  ON 10122422: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC

*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/07/13
                                   ***                                                                       ***      10:48:26
**MODELOPTS:  RegDFAULT CONC                                        ELEV                                              PAGE 429

                                  *** THE SUMMARY OF HIGHEST  8-HR RESULTS ***

                        ** CONC OF CO        IN MICROGRAMS/M**3                                  **

                                                      DATE                                                                      NETWORK
GROUP ID                         AVERAGE CONC      (YYMMDDHH)              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    HIGH   1ST HIGH VALUE IS      47.25580c ON 10111308: AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
          HIGH   2ND HIGH VALUE IS      43.63722c ON 10112808: AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC

SRCGP2    HIGH   1ST HIGH VALUE IS      38.52918  ON 10090616: AT (  379065.00,  3852720.00,   139.14,   145.00,    0.00)  DC
          HIGH   2ND HIGH VALUE IS      38.20335  ON 10063016: AT (  378365.00,  3851720.00,   146.55,   146.55,    0.00)  DC

SRCGP3    HIGH   1ST HIGH VALUE IS      47.25580c ON 10111308: AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
          HIGH   2ND HIGH VALUE IS      43.63722c ON 10112808: AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC

*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/07/13
                                   ***                                                                       ***      10:48:26
**MODELOPTS:  RegDFAULT CONC                                        ELEV                                              PAGE 430
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Appendix B - Air Quality Impact Evaluation
AERMOD Output Files
Pollutant - CO
Year - 2011

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d

```
                                                                                    CO_2011.ADO
 *** Message Summary For AERMOD Model Setup ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            1 Warning Message(s)
A Total of            0 Informational Message(s)


   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


   ********   WARNING MESSAGES   ********
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

***********************************
*** SETUP Finishes Successfully ***
***********************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                   ***        10:50:18
**MODELOPTs:  RegDFAULT CONC                                                                                         PAGE   1
                                                                          ELEV

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  2 Short Term Average(s) of:   1-HR   8-HR
    and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);       3 Source Group(s); and    2064 Receptor(s)

**The Model Assumes A Pollutant Type of:  CO

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
        Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
                                                                                                                Page 5
```

Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword) CO_2011.ADO

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) = 104.00 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 4.2 MB of RAM.

**Detailed Error/Message File: MSSilicon_CO.err
**File for Summary of Results: MSSilicon_CO.sum

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:50:18
PAGE 2

**MODELOPTs: RegDFAULT CONC ELEV

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.11781E+02	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.11781E+02	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.11781E+02	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.11781E+02	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:50:18
PAGE 3

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.20790E+00	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.20790E+00	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:50:18
PAGE 4

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
SRCGP1	SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 ,

```
  5.     45.92473 (11121208) AT ( 378788.62, 3851767.67)  DC        15.     41.32463c(11111808) AT ( 378665.00, 3851720.00)  DC
  6.     44.60287c(11100208) AT ( 378886.76, 3851765.89)  DC        16.     41.21735m(11081524) AT ( 378788.62, 3851767.67)  DC
  7.     44.20332c(11030208) AT ( 378837.69, 3851766.78)  DC        17.     40.97807 (11121208) AT ( 378765.00, 3851720.00)  DC
  8.     43.95774c(11111808) AT ( 378665.00, 3851620.00)  DC        18.     40.84250c(11111808) AT ( 378565.00, 3851520.00)  DC
  9.     43.95666c(11111808) AT ( 378765.00, 3851720.00)  DC        19.     40.74201c(11100608) AT ( 378765.00, 3851720.00)  DC
 10.     43.59110c(11030308) AT ( 378765.00, 3851720.00)  DC        20.     40.51554c(11111808) AT ( 378690.48, 3851769.45)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon.  ***       08/07/13
                                   ***                                                                      ***       10:50:18
**MODELOPTS:  RegDFAULT CONC                                          ELEV                                             PAGE 427

                          *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER    1 YEARS ***

                                  ** CONC OF CO        IN MICROGRAMS/M**3                         **

GROUP ID                          AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  NETWORK
                                                                                                                GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1     1ST HIGHEST VALUE IS      4.89214 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS      4.60818 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
           3RD HIGHEST VALUE IS      4.36714 AT (  378765.00,  3851720.00,   143.24,   143.24,    0.00)  DC
           4TH HIGHEST VALUE IS      4.33430 AT (  379098.93,  3852320.09,   142.51,   142.51,    0.00)  DC
           5TH HIGHEST VALUE IS      4.21122 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
           6TH HIGHEST VALUE IS      4.16107 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
           7TH HIGHEST VALUE IS      4.01487 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
           8TH HIGHEST VALUE IS      3.93868 AT (  379165.00,  3852420.00,   141.26,   141.26,    0.00)  DC
           9TH HIGHEST VALUE IS      3.91231 AT (  379265.00,  3852720.00,   140.12,   140.12,    0.00)  DC
          10TH HIGHEST VALUE IS      3.91193 AT (  379165.00,  3852520.00,   140.42,   140.42,    0.00)  DC

SRCGP2     1ST HIGHEST VALUE IS      2.63211 AT (  379365.00,  3852820.00,   139.31,   139.31,    0.00)  DC
           2ND HIGHEST VALUE IS      2.58330 AT (  379365.00,  3852720.00,   139.58,   139.58,    0.00)  DC
           3RD HIGHEST VALUE IS      2.55871 AT (  379365.00,  3852920.00,   137.26,   142.00,    0.00)  DC
           4TH HIGHEST VALUE IS      2.53976 AT (  379265.00,  3852820.00,   140.30,   140.30,    0.00)  DC
           5TH HIGHEST VALUE IS      2.53236 AT (  379265.00,  3852720.00,   140.12,   140.12,    0.00)  DC
           6TH HIGHEST VALUE IS      2.44697 AT (  379365.00,  3853020.00,   136.56,   143.00,    0.00)  DC
           7TH HIGHEST VALUE IS      2.43857 AT (  379465.00,  3852920.00,   132.67,   213.00,    0.00)  DC
           8TH HIGHEST VALUE IS      2.43847 AT (  379265.00,  3852920.00,   139.54,   143.00,    0.00)  DC
           9TH HIGHEST VALUE IS      2.42697 AT (  379465.00,  3852820.00,   132.83,   214.80,    0.00)  DC
          10TH HIGHEST VALUE IS      2.42119 AT (  379465.00,  3853020.00,   135.08,   142.00,    0.00)  DC

SRCGP3     1ST HIGHEST VALUE IS      4.10300 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS      3.87833 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
           3RD HIGHEST VALUE IS      3.52209 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
           4TH HIGHEST VALUE IS      3.48771 AT (  379098.93,  3852320.09,   142.51,   142.51,    0.00)  DC
           5TH HIGHEST VALUE IS      3.40567 AT (  378765.00,  3851720.00,   143.24,   143.24,    0.00)  DC
           6TH HIGHEST VALUE IS      3.36686 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
           7TH HIGHEST VALUE IS      3.29373 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
           8TH HIGHEST VALUE IS      2.65585 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
           9TH HIGHEST VALUE IS      2.65036 AT (  379148.19,  3852319.45,   140.88,   140.88,    0.00)  DC
          10TH HIGHEST VALUE IS      2.54426 AT (  379065.00,  3852420.00,   141.14,   141.14,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
```

DP = DISCPOLR

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	114.59202	ON 11121707: AT (	378935.83, 3851765.00, 141.58, 145.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	113.97964	ON 11121706: AT (	378935.83, 3851765.00, 141.58, 145.00, 0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	62.40691	ON 11090208: AT (	379965.00, 3852520.00, 158.10, 214.80, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	57.74865	ON 11121811: AT (	379965.00, 3852620.00, 149.87, 214.80, 0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	114.59202	ON 11121707: AT (	378935.83, 3851765.00, 141.58, 145.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	113.97964	ON 11121706: AT (	378935.83, 3851765.00, 141.58, 145.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** THE SUMMARY OF HIGHEST 8-HR RESULTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	57.65391c	ON 11111808: AT (	378788.62, 3851767.67, 143.30, 146.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	48.58221c	ON 11030308: AT (	378788.62, 3851767.67, 143.30, 146.00, 0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	38.11468	ON 11082816: AT (	378565.00, 3851320.00, 143.24, 149.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	36.68252	ON 11092316: AT (	378565.00, 3851420.00, 142.91, 149.00, 0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	57.65387c	ON 11111808: AT (	378788.62, 3851767.67, 143.30, 146.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	48.58221c	ON 11030308: AT (	378788.62, 3851767.67, 143.30, 146.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

```
 *** Message Summary For AERMOD Model Setup ***

 --------- Summary of Total Messages --------

A Total of          0 Fatal Error Message(s)
A Total of          1 Warning Message(s)
A Total of          0 Informational Message(s)

   ******** FATAL ERROR MESSAGES ********
              ***   NONE   ***

   ********   WARNING MESSAGES   ********
ME W186      221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

************************************
*** SETUP Finishes Successfully ***
************************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/07/13
                                   ***                                                                      ***      10:52:41
                                                                                                                     PAGE   1
**MODELOPTs:  RegDFAULT CONC                                         ELEV

                              ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  2 Short Term Average(s) of:   1-HR   8-HR
   and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);       3 Source Group(s); and     2064 Receptor(s)

**The Model Assumes A Pollutant Type of:  CO

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
```

```
Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)                    CO_2007-2011.ADO

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.2 MB of RAM.

**Detailed Error/Message File:   MSSilicon_CO.err
**File for Summary of Results:   MSSilicon_CO.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                  ***          10:52:41
**MODELOPTs:  RegDFAULT CONC                                                  ELEV                                   PAGE    2


                                                  *** POINT SOURCE DATA ***

  SOURCE      NUMBER EMISSION RATE                          BASE     STACK   STACK    STACK     STACK    BLDG   URBAN  CAP/   EMIS RATE
    ID         PART.  (GRAMS/SEC)     X         Y          ELEV.    HEIGHT  TEMP.   EXIT VEL. DIAMETER EXISTS SOURCE HOR   SCALAR
               CATS.                (METERS) (METERS)     (METERS) (METERS) (DEG.K)  (M/SEC)  (METERS)                        VARY BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SAF1            0   0.11781E+02  379020.5 3852097.6   143.6    91.44   449.82    19.37     1.93    YES     NO     NO
SAF2            0   0.11781E+02  379019.6 3852052.8   143.2    91.44   449.82    19.37     1.93    YES     NO     NO
SAF3            0   0.11781E+02  379018.2 3851969.8   142.6    91.44   449.82    19.37     1.93    YES     NO     NO
SAF4            0   0.11781E+02  379017.5 3851925.0   142.1    91.44   449.82    19.37     1.93    YES     NO     NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                  ***          10:52:41
**MODELOPTs:  RegDFAULT CONC                                                  ELEV                                   PAGE    3


                                                  *** VOLUME SOURCE DATA ***

  SOURCE      NUMBER EMISSION RATE                          BASE    RELEASE   INIT.    INIT.   URBAN  EMISSION RATE
    ID         PART.  (GRAMS/SEC)     X         Y          ELEV.   HEIGHT    SY       SZ     SOURCE  SCALAR VARY
               CATS.                (METERS) (METERS)     (METERS) (METERS) (METERS) (METERS)          BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

F1              0   0.20790E+00  378925.8 3852076.8   144.0    20.01     6.97    18.62     NO
F2              0   0.20790E+00  378923.5 3851949.2   143.0    20.01     6.97    18.62     NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                  ***          10:52:41
**MODELOPTs:  RegDFAULT CONC                                                  ELEV                                   PAGE    4


                                  *** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID                                                  SOURCE IDs


SRCGP1    SAF1        , SAF2        , SAF3        , SAF4        , F1          , F2          ,
```

SRCGP2 SAF1 , SAF2 , SAF3 , SAF4 ,

SRCGP3 F1 , F2 ,

**MODELOPTs: RegDFAULT CONC ELEV

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	16.8,	14.4,	-12.8,	9.6,	2	40.0,	54.1,	84.7,	-214.9,	40.5,
3	40.0,	64.6,	83.9,	-218.9,	9.9,	4	40.0,	73.2,	80.5,	-216.2,	-21.0,
5	40.0,	79.4,	74.5,	-123.2,	45.0,	6	40.0,	83.3,	66.5,	-125.7,	29.4,
7	40.0,	84.7,	56.3,	-124.3,	12.9,	8	40.0,	83.4,	44.5,	-119.2,	-3.9,
9	40.0,	79.7,	31.3,	-110.4,	-20.7,	10	40.0,	82.9,	42.0,	-110.7,	-36.9,
11	40.0,	84.6,	54.1,	-109.0,	-51.9,	12	15.2,	85.4,	92.9,	12.5,	7.1,
13	15.2,	90.8,	93.6,	10.0,	17.2,	14	15.2,	93.5,	91.6,	7.2,	26.8,
15	15.2,	93.2,	86.7,	4.1,	35.6,	16	15.2,	90.2,	79.2,	1.0,	43.3,
17	15.2,	84.4,	69.3,	-2.2,	49.7,	18	10.7,	15.3,	12.4,	-2.3,	-10.4,
19	10.7,	16.8,	14.4,	-1.5,	-9.6,	20	28.0,	118.5,	213.2,	9.6,	-72.6,
21	28.0,	147.6,	207.2,	23.4,	-51.3,	22	28.0,	172.2,	194.8,	36.6,	-28.5,
23	40.0,	79.4,	74.5,	48.6,	-45.0,	24	40.0,	83.3,	66.5,	59.2,	-29.4,
25	40.0,	84.7,	56.3,	68.0,	-12.9,	26	40.0,	83.4,	44.5,	74.7,	3.9,
27	40.0,	79.7,	31.3,	79.1,	20.7,	28	40.0,	82.9,	42.0,	68.8,	36.9,
29	40.0,	84.6,	54.1,	54.9,	51.9,	30	15.2,	85.4,	92.9,	-105.4,	-7.1,
31	15.2,	90.8,	93.6,	-103.6,	-17.2,	32	15.2,	93.5,	91.6,	-98.8,	-26.8,
33	15.2,	93.2,	86.7,	-90.9,	-35.6,	34	15.2,	90.2,	79.2,	-80.2,	-43.3,
35	15.2,	84.4,	69.3,	-67.1,	-49.7,	36	10.7,	15.3,	12.4,	-10.1,	10.4,

SOURCE ID: SAF2

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	17.1,	14.3,	-4.8,	10.9,	2	38.1,	65.7,	84.7,	-172.5,	49.1,
3	40.0,	64.6,	83.9,	-179.7,	31.5,	4	40.0,	73.2,	80.5,	-181.3,	7.1,
5	40.0,	79.5,	74.6,	-177.5,	-17.5,	6	40.0,	83.4,	66.5,	-168.3,	-41.6,
7	40.0,	84.7,	56.3,	-108.1,	54.7,	8	40.0,	83.4,	44.5,	-110.5,	40.0,
9	40.0,	79.7,	31.3,	-109.5,	24.1,	10	40.0,	82.9,	42.0,	-117.6,	7.4,
11	40.0,	84.6,	54.1,	-123.5,	-9.5,	12	40.0,	83.8,	64.6,	-125.6,	-26.1,
13	40.0,	80.4,	73.1,	-123.9,	-41.9,	14	40.0,	74.5,	79.4,	-118.5,	-56.4,
15	10.7,	19.2,	18.2,	-49.2,	12.3,	16	10.7,	18.4,	16.7,	-50.0,	5.1,
17	10.7,	17.1,	14.8,	-49.3,	-2.2,	18	10.7,	15.3,	12.4,	-47.1,	-9.5,
19	10.7,	17.1,	14.3,	-9.5,	-10.9,	20	15.2,	89.3,	77.5,	-77.8,	44.8,
21	28.0,	147.6,	207.2,	-15.8,	-72.9,	22	28.0,	172.2,	194.8,	1.7,	-56.6,
23	28.0,	191.6,	176.6,	19.2,	-38.5,	24	28.0,	205.2,	152.9,	36.0,	-19.3,
25	40.0,	84.7,	56.3,	51.8,	-54.7,	26	40.0,	83.4,	44.5,	66.0,	-40.0,
27	40.0,	79.7,	31.3,	78.2,	-24.1,	28	40.0,	82.9,	42.0,	75.6,	-7.4,
29	40.0,	84.6,	54.1,	69.4,	9.5,	30	40.0,	83.8,	64.6,	61.0,	26.1,
31	40.0,	80.4,	73.1,	50.8,	41.9,	32	40.0,	74.5,	79.4,	39.1,	56.4,
33	10.7,	19.4,	18.3,	-0.3,	6.8,	34	10.7,	18.7,	16.8,	-0.9,	8.3,
35	10.7,	17.4,	14.8,	-1.4,	9.4,	36	10.7,	15.6,	12.3,	-1.9,	10.3,

SOURCE ID: SAF3

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	17.0,	14.3,	-12.7,	9.7,	2	10.7,	18.4,	16.4,	-15.3,	8.6,
3	10.7,	19.2,	18.0,	-17.5,	7.2,	4	10.7,	19.5,	19.0,	-19.2,	5.6,
5	40.0,	79.5,	74.6,	-123.0,	45.1,	6	40.0,	83.4,	66.5,	-125.5,	29.6,

CO_2007-2011.ADO

```
  5.     57.56241 (07103008) AT ( 378886.76, 3851765.89)  DC       15.     50.57557m(07091708) AT ( 378886.76, 3851765.89)  DC
  6.     56.80956c(08011208) AT ( 378886.76, 3851765.89)  DC       16.     50.45401c(07042108) AT ( 378886.76, 3851765.89)  DC
  7.     55.51542c(07121708) AT ( 379000.41, 3852321.36)  DC       17.     50.23709c(07040224) AT ( 379000.41, 3852321.36)  DC
  8.     55.21772c(08050508) AT ( 378886.76, 3851765.89)  DC       18.     50.18989c(07042108) AT ( 378865.00, 3851720.00)  DC
  9.     53.95627c(09112024) AT ( 378788.62, 3851767.67)  DC       19.     50.08347c(08090808) AT ( 378886.76, 3851765.89)  DC
 10.     53.63224c(07101308) AT ( 378886.76, 3851765.89)  DC       20.     49.82720 (07110208) AT ( 378886.76, 3851765.89)  DC

*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR
*** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/07/13
                                  ***                                                                      ***      10:52:41
**MODELOPTs:  RegDFAULT CONC                                 ELEV                                                   PAGE 427

                      *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   5 YEARS ***

                      ** CONC OF CO        IN MICROGRAMS/M**3                              **
```

GROUP ID		AVERAGE CONC		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	4.41822	AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	
	2ND HIGHEST VALUE IS	4.39372	AT (	378788.62,	3851767.67,	143.30,	146.00,	0.00)	DC	
	3RD HIGHEST VALUE IS	4.12583	AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	4TH HIGHEST VALUE IS	3.96311	AT (	378765.00,	3851720.00,	143.24,	143.24,	0.00)	DC	
	5TH HIGHEST VALUE IS	3.87519	AT (	379000.41,	3852321.36,	142.76,	142.76,	0.00)	DC	
	6TH HIGHEST VALUE IS	3.87074	AT (	379049.67,	3852320.72,	142.86,	142.86,	0.00)	DC	
	7TH HIGHEST VALUE IS	3.74458	AT (	378739.55,	3851768.56,	143.30,	147.00,	0.00)	DC	
	8TH HIGHEST VALUE IS	3.73033	AT (	378951.14,	3852322.00,	142.68,	145.00,	0.00)	DC	
	9TH HIGHEST VALUE IS	3.59801	AT (	378865.00,	3851720.00,	141.49,	146.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	3.52107	AT (	379098.93,	3852320.09,	142.51,	142.51,	0.00)	DC	
SRCGP2	1ST HIGHEST VALUE IS	2.30924	AT (	379265.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	2ND HIGHEST VALUE IS	2.30905	AT (	379265.00,	3852820.00,	140.30,	140.30,	0.00)	DC	
	3RD HIGHEST VALUE IS	2.28215	AT (	379165.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	4TH HIGHEST VALUE IS	2.27150	AT (	379165.00,	3852820.00,	140.20,	140.20,	0.00)	DC	
	5TH HIGHEST VALUE IS	2.23302	AT (	379265.00,	3852920.00,	139.54,	143.00,	0.00)	DC	
	6TH HIGHEST VALUE IS	2.21963	AT (	379365.00,	3852820.00,	139.31,	139.31,	0.00)	DC	
	7TH HIGHEST VALUE IS	2.21159	AT (	379365.00,	3852720.00,	139.58,	139.58,	0.00)	DC	
	8TH HIGHEST VALUE IS	2.19272	AT (	379165.00,	3852920.00,	139.85,	139.85,	0.00)	DC	
	9TH HIGHEST VALUE IS	2.18762	AT (	379265.00,	3852620.00,	138.00,	143.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	2.17765	AT (	379165.00,	3852620.00,	138.82,	138.82,	0.00)	DC	
SRCGP3	1ST HIGHEST VALUE IS	3.65606	AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	
	2ND HIGHEST VALUE IS	3.52492	AT (	378788.62,	3851767.67,	143.30,	146.00,	0.00)	DC	
	3RD HIGHEST VALUE IS	3.47262	AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	4TH HIGHEST VALUE IS	2.94984	AT (	379000.41,	3852321.36,	142.76,	142.76,	0.00)	DC	
	5TH HIGHEST VALUE IS	2.90073	AT (	378765.00,	3851720.00,	143.24,	143.24,	0.00)	DC	
	6TH HIGHEST VALUE IS	2.88669	AT (	379049.67,	3852320.72,	142.86,	142.86,	0.00)	DC	
	7TH HIGHEST VALUE IS	2.84195	AT (	378951.14,	3852322.00,	142.68,	145.00,	0.00)	DC	
	8TH HIGHEST VALUE IS	2.78121	AT (	378739.55,	3851768.56,	143.30,	147.00,	0.00)	DC	
	9TH HIGHEST VALUE IS	2.75158	AT (	378865.00,	3851720.00,	141.49,	146.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	2.61328	AT (	378901.88,	3852322.63,	142.58,	146.00,	0.00)	DC	

```
*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
```

DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:52:41
**MODELOPTs: RegDFAULT CONC ELEV PAGE 428

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	123.51530	ON 08052122: AT	(378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	117.15505	ON 09022307: AT	(378935.83, 3851765.00, 141.58, 145.00, 0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	84.33650	ON 09010612: AT	(380565.00, 3851820.00, 164.17, 167.10, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	74.22036	ON 09032609: AT	(380365.00, 3851020.00, 153.59, 153.59, 0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	123.51530	ON 08052122: AT	(378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	117.15505	ON 09022307: AT	(378935.83, 3851765.00, 141.58, 145.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:52:41
**MODELOPTs: RegDFAULT CONC ELEV PAGE 429

*** THE SUMMARY OF HIGHEST 8-HR RESULTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	63.02528c	ON 07122408: AT	(378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	61.33375	ON 08030608: AT	(378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	39.21837	ON 07091616: AT	(378865.00, 3851520.00, 140.08, 147.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	38.52918	ON 10090616: AT	(379065.00, 3852720.00, 139.14, 145.00, 0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	63.02528c	ON 07122408: AT	(378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	61.33375	ON 08030608: AT	(378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 10:52:41
**MODELOPTs: RegDFAULT CONC ELEV PAGE 430

Appendix B - Air Quality Impact Evaluation – AERMOD Output Files – NO2

Air Quality Impact Evaluation – AERMOD Output Files

Pollutant – NO_2

Years – 2007 through 2011

Appendix B - Air Quality Impact Evaluation AERMOD Output Files
Pollutant - NO2
Year - 2007

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d

```
   ********   WARNING MESSAGES   ********
CO W361       25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
ME W186      221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

************************************
*** SETUP Finishes Successfully ***
************************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***     08/06/13
                                   ***                                                                      ***     16:14:08
**MODELOPTS:  RegDFAULT CONC                                    ELEV                                                 PAGE   1

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.
        6. Full Conversion Assumed for NO2.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:   1-HR
   and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);       3 Source Group(s); and     2064 Receptor(s)

**The Model Assumes A Pollutant Type of:  NO2

**Note that special processing requirements apply for the 1-hour NO2 NAAQS - check available guidance.
  Model will process user-specified ranks of daily maximum 1-hour values averaged across the number of years modeled.
  For annual NO2 NAAQS modeling, the multi-year maximum of PERIOD values can be simulated using the MULTYEAR keyword.
  Multi-year PERIOD and 1-hour values should only be done in a single model run using the MULTYEAR option with a
  single multi-year meteorological data file using STARTEND keyword.

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
        Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
        Model Outputs External File(s) of Maximum Daily 1-hr Values by Day (MAXDAILY Keyword)
        Model Outputs External File(s) of Maximum Daily 1-hr Values by Year (MXDYBYYR Keyword)
        Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours
```

NO2_2007.ADO

```
**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =    104.00 ;  Decay Coef. =    0.000    ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.6 MB of RAM.

**Detailed Error/Message File:    MSSilicon_NO2.err
**File for Summary of Results:    MSSilicon_NO2.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***     08/06/13
                                   ***                                                                        ***     16:14:08
                                                                                                                      PAGE   2
**MODELOPTS:  RegDFAULT CONC                                    ELEV
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.15592E+02	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.15592E+02	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.15592E+02	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.15592E+02	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***     08/06/13
                                   ***                                                                        ***     16:14:08
                                                                                                                      PAGE   3
**MODELOPTS:  RegDFAULT CONC                                    ELEV
```

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.20160E+00	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.20160E+00	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***     08/06/13
                                   ***                                                                        ***     16:14:08
                                                                                                                      PAGE   4
**MODELOPTS:  RegDFAULT CONC                                    ELEV
```

*** SOURCE IDs DEFINING SOURCE GROUPS ***

```
GROUP ID                                   SOURCE IDs

 SRCGP1     SAF1       , SAF2      , SAF3      , SAF4      , F1        , F2        ,

 SRCGP2     SAF1       , SAF2      , SAF3      , SAF4      ,

 SRCGP3     F1         , F2        ,
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***     08/06/13
                                   ***                                                                        ***     16:14:08
**MODELOPTS:  RegDFAULT CONC                                    ELEV                                                  PAGE   5
```

```
                    GP = GRIDPOLR                                                    NO2_2007.ADO
                    DC = DISCCART
                    DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                  ***                                                                   ***          16:14:08
 **MODELOPTs:  RegDFAULT CONC                                                                                         PAGE 268
                                                                          ELEV

                                 *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***

                                  ** CONC OF NO2      IN MICROGRAMS/M**3                          **

GROUP ID                          AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  NETWORK
                                                                                                              GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1     1ST HIGHEST VALUE IS      6.19313 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS      5.58387 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
           3RD HIGHEST VALUE IS      5.49137 AT (  378965.00,  3852620.00,   139.84,   146.00,    0.00)  DC
           4TH HIGHEST VALUE IS      5.47282 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC
           5TH HIGHEST VALUE IS      5.46886 AT (  378965.00,  3852520.00,   140.24,   145.00,    0.00)  DC
           6TH HIGHEST VALUE IS      5.42579 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
           7TH HIGHEST VALUE IS      5.35246 AT (  378965.00,  3852720.00,   139.70,   146.00,    0.00)  DC
           8TH HIGHEST VALUE IS      5.30434 AT (  378965.00,  3852420.00,   141.11,   145.00,    0.00)  DC
           9TH HIGHEST VALUE IS      5.24999 AT (  378865.00,  3852620.00,   140.03,   147.00,    0.00)  DC
          10TH HIGHEST VALUE IS      5.19123 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC

SRCGP2     1ST HIGHEST VALUE IS      4.17173 AT (  378965.00,  3852720.00,   139.70,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS      4.09058 AT (  378965.00,  3852820.00,   139.96,   146.00,    0.00)  DC
           3RD HIGHEST VALUE IS      4.08714 AT (  378965.00,  3852620.00,   139.84,   146.00,    0.00)  DC
           4TH HIGHEST VALUE IS      3.98215 AT (  379065.00,  3852720.00,   139.14,   145.00,    0.00)  DC
           5TH HIGHEST VALUE IS      3.95771 AT (  378865.00,  3852820.00,   141.32,   147.00,    0.00)  DC
           6TH HIGHEST VALUE IS      3.94709 AT (  378865.00,  3852720.00,   139.61,   147.00,    0.00)  DC
           7TH HIGHEST VALUE IS      3.91534 AT (  379065.00,  3852620.00,   139.25,   145.00,    0.00)  DC
           8TH HIGHEST VALUE IS      3.91403 AT (  379065.00,  3852820.00,   140.05,   140.05,    0.00)  DC
           9TH HIGHEST VALUE IS      3.88401 AT (  378965.00,  3852920.00,   139.26,   146.00,    0.00)  DC
          10TH HIGHEST VALUE IS      3.82584 AT (  378865.00,  3852920.00,   142.10,   147.00,    0.00)  DC

SRCGP3     1ST HIGHEST VALUE IS      4.98372 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS      3.95151 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC
           3RD HIGHEST VALUE IS      3.85035 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
           4TH HIGHEST VALUE IS      3.55507 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
           5TH HIGHEST VALUE IS      3.34083 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
           6TH HIGHEST VALUE IS      3.17955 AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
           7TH HIGHEST VALUE IS      2.84547 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
           8TH HIGHEST VALUE IS      2.66664 AT (  378865.00,  3851620.00,   139.76,   146.00,    0.00)  DC
           9TH HIGHEST VALUE IS      2.63210 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
          10TH HIGHEST VALUE IS      2.33122 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                  ***                                                                   ***          16:14:08
 **MODELOPTs:  RegDFAULT CONC                                                                                         PAGE 269
                                                                          ELEV

                     *** THE SUMMARY OF MAXIMUM   1ST-HIGHEST MAX DAILY  1-HR RESULTS AVERAGED OVER   1 YEARS ***

                                  ** CONC OF NO2      IN MICROGRAMS/M**3                          **
```

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	113.19894 AT	(378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	108.31650 AT	(378935.83, 3851765.00, 141.58, 145.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	99.28317 AT	(378901.88, 3852322.63, 142.58, 146.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	96.76633 AT	(378865.00, 3851720.00, 141.49, 146.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	96.49286 AT	(380165.00, 3851020.00, 144.82, 152.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	96.48609 AT	(380365.00, 3850820.00, 149.51, 152.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	95.81991 AT	(379965.00, 3853020.00, 144.99, 214.80, 0.00)	DC	
	8TH HIGHEST VALUE IS	95.44885 AT	(378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	95.25543 AT	(380165.00, 3850820.00, 144.91, 152.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	95.13194 AT	(379965.00, 3851120.00, 142.15, 151.00, 0.00)	DC	
SRCGP2	1ST HIGHEST VALUE IS	94.82392 AT	(380365.00, 3850820.00, 149.51, 152.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	94.68746 AT	(380165.00, 3851020.00, 144.82, 152.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	94.04833 AT	(379965.00, 3853020.00, 144.99, 214.80, 0.00)	DC	
	4TH HIGHEST VALUE IS	93.34621 AT	(380165.00, 3850820.00, 144.91, 152.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	92.94718 AT	(379965.00, 3851120.00, 142.15, 151.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	92.73419 AT	(379865.00, 3852920.00, 140.05, 214.80, 0.00)	DC	
	7TH HIGHEST VALUE IS	92.08285 AT	(379865.00, 3853020.00, 138.26, 214.80, 0.00)	DC	
	8TH HIGHEST VALUE IS	91.80830 AT	(380565.00, 3850620.00, 148.40, 159.10, 0.00)	DC	
	9TH HIGHEST VALUE IS	91.38784 AT	(379965.00, 3851020.00, 142.51, 151.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	91.25063 AT	(380365.00, 3850620.00, 145.73, 152.00, 0.00)	DC	
SRCGP3	1ST HIGHEST VALUE IS	113.19894 AT	(378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	108.31650 AT	(378935.83, 3851765.00, 141.58, 145.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	99.28317 AT	(378901.88, 3852322.63, 142.58, 146.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	96.76633 AT	(378865.00, 3851720.00, 141.49, 146.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	95.44885 AT	(378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	92.52747 AT	(378984.90, 3851764.11, 139.85, 145.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	92.34841 AT	(378965.00, 3851720.00, 139.37, 145.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	89.72362 AT	(378837.69, 3851766.78, 143.17, 143.17, 0.00)	DC	
	9TH HIGHEST VALUE IS	87.88236 AT	(379000.41, 3852321.36, 142.76, 142.76, 0.00)	DC	
	10TH HIGHEST VALUE IS	81.58629 AT	(378852.62, 3852323.27, 142.50, 146.00, 0.00)	DC	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** 08/06/13 16:14:08 PAGE 270

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM 8TH-HIGHEST MAX DAILY 1-HR RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF NO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	103.35720 AT	(378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	97.70501 AT	(378935.83, 3851765.00, 141.58, 145.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	86.04162 AT	(378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	85.01237 AT	(378865.00, 3851720.00, 141.49, 146.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	83.86854 AT	(378901.88, 3852322.63, 142.58, 146.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	80.29145 AT	(379000.41, 3852321.36, 142.76, 142.76, 0.00)	DC	
	7TH HIGHEST VALUE IS	78.89746 AT	(378984.90, 3851764.11, 139.85, 145.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	78.74406 AT	(378837.69, 3851766.78, 143.17, 143.17, 0.00)	DC	
	9TH HIGHEST VALUE IS	76.55573 AT	(378965.00, 3851720.00, 139.37, 145.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	71.63385 AT	(378852.62, 3852323.27, 142.50, 146.00, 0.00)	DC	
SRCGP2	1ST HIGHEST VALUE IS	63.30675 AT	(379065.00, 3852520.00, 140.24, 145.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	62.65657 AT	(378965.00, 3852520.00, 140.24, 145.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	62.29576 AT	(378965.00, 3852620.00, 139.84, 146.00, 0.00)	DC	

```
                                                                                    NO2_2007.ADO
         4TH HIGHEST VALUE IS      61.31123 AT (  379165.00,  3852520.00,   140.42,   140.42,    0.00)  DC
         5TH HIGHEST VALUE IS      60.57768 AT (  379165.00,  3852420.00,   141.26,   141.26,    0.00)  DC
         6TH HIGHEST VALUE IS      60.54997 AT (  379065.00,  3852620.00,   139.25,   145.00,    0.00)  DC
         7TH HIGHEST VALUE IS      60.38104 AT (  378865.00,  3852620.00,   140.03,   147.00,    0.00)  DC
         8TH HIGHEST VALUE IS      60.25366 AT (  378865.00,  3852520.00,   139.87,   147.00,    0.00)  DC
         9TH HIGHEST VALUE IS      60.17002 AT (  378765.00,  3852620.00,   140.20,   148.00,    0.00)  DC
        10TH HIGHEST VALUE IS      59.69896 AT (  378965.00,  3851520.00,   139.76,   146.00,    0.00)  DC

SRCGP3   1ST HIGHEST VALUE IS     103.35720 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
         2ND HIGHEST VALUE IS      97.70501 AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
         3RD HIGHEST VALUE IS      86.04162 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
         4TH HIGHEST VALUE IS      85.01237 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC
         5TH HIGHEST VALUE IS      83.86854 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
         6TH HIGHEST VALUE IS      80.29145 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
         7TH HIGHEST VALUE IS      78.89746 AT (  378984.90,  3851764.11,   139.85,   145.00,    0.00)  DC
         8TH HIGHEST VALUE IS      78.74406 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
         9TH HIGHEST VALUE IS      76.55573 AT (  378965.00,  3851720.00,   139.37,   145.00,    0.00)  DC
        10TH HIGHEST VALUE IS      71.63385 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                  ***        16:14:08
                                                                                                                   PAGE 271
 **MODELOPTS:  RegDFAULT CONC                                          ELEV

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            6 Warning Message(s)
 A Total of         1127 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of          786 Calm Hours Identified

 A Total of          341 Missing Hours Identified (  3.89 Percent)

    ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***

    ********   WARNING MESSAGES   ********
 CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
 ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
 CN W305       3 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3
 CN W305       3 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4
 CN W305       7 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
 CN W305      10 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2

    ************************************
    *** AERMOD Finishes Successfully ***
    ************************************
```

Appendix B - Air Quality Impact Evaluation
AERMOD Output Files
Pollutant - NO2
Year - 2008

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d


```
 ********  WARNING MESSAGES   ********
CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

***********************************
*** SETUP Finishes Successfully ***
***********************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***     08/06/13
                                   ***                                                                  ***     16:20:34
                                                                                                                PAGE   1
**MODELOPTS:  RegDFAULT CONC                                   ELEV

                                     ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.
        6. Full Conversion Assumed for NO2.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:   1-HR
    and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);       3 Source Group(s); and    2064 Receptor(s)

**The Model Assumes A Pollutant Type of:  NO2

**Note that special processing requirements apply for the 1-hour NO2 NAAQS - check available guidance.
  Model will process user-specified ranks of daily maximum 1-hour values averaged across the number of years modeled.
  For annual NO2 NAAQS modeling, the multi-year maximum of PERIOD values can be simulated using the MULTYEAR keyword.
  Multi-year PERIOD and 1-hour values should only be done in a single model run using the MULTYEAR option with a
  single multi-year meteorological data file using STARTEND keyword.

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
        Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
        Model Outputs External File(s) of Maximum Daily 1-hr Values by Day (MAXDAILY Keyword)
        Model Outputs External File(s) of Maximum Daily 1-hr Values by Year (MXDYBYYR Keyword)
        Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours
```

NO2_2008.ADO

```
**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =      0.0
                 Emission Units = GRAMS/SEC                              ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.6 MB of RAM.

**Detailed Error/Message File:    MSSilicon_NO2.err
**File for Summary of Results:    MSSilicon_NO2.sum
```

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                       ***        16:20:34
                                                                                                                        PAGE   2
**MODELOPTs:  RegDFAULT CONC                                        ELEV
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.15592E+02	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.15592E+02	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.15592E+02	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.15592E+02	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                       ***        16:20:34
                                                                                                                        PAGE   3
**MODELOPTs:  RegDFAULT CONC                                        ELEV
```

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.20160E+00	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.20160E+00	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                       ***        16:20:34
                                                                                                                        PAGE   4
**MODELOPTs:  RegDFAULT CONC                                        ELEV
```

*** SOURCE IDs DEFINING SOURCE GROUPS ***

```
GROUP ID                                        SOURCE IDs

SRCGP1     SAF1      , SAF2      , SAF3      , SAF4      , F1        , F2        ,

SRCGP2     SAF1      , SAF2      , SAF3      , SAF4      ,

SRCGP3     F1        , F2        ,
```

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                       ***        16:20:34
                                                                                                                        PAGE   5
**MODELOPTs:  RegDFAULT CONC                                        ELEV
```

```
                    GP = GRIDPOLR
                    DC = DISCCART
                    DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                  ***                                                                   ***          16:20:34
 **MODELOPTs:  RegDFAULT CONC                                                                                         PAGE 268
                                                                    ELEV

                                 *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***

                                  ** CONC OF NO2      IN MICROGRAMS/M**3                          **

GROUP ID                        AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  NETWORK
                                                                                                            GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1     1ST HIGHEST VALUE IS      4.57250 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS      3.93263 AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
           3RD HIGHEST VALUE IS      3.92890 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
           4TH HIGHEST VALUE IS      3.90988 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
           5TH HIGHEST VALUE IS      3.80903 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC
           6TH HIGHEST VALUE IS      3.73543 AT (  378865.00,  3852820.00,   141.32,   147.00,    0.00)  DC
           7TH HIGHEST VALUE IS      3.71876 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
           8TH HIGHEST VALUE IS      3.71388 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
           9TH HIGHEST VALUE IS      3.69814 AT (  378865.00,  3852720.00,   139.61,   147.00,    0.00)  DC
          10TH HIGHEST VALUE IS      3.66016 AT (  378865.00,  3852620.00,   140.03,   147.00,    0.00)  DC

SRCGP2     1ST HIGHEST VALUE IS      2.95268 AT (  378865.00,  3852920.00,   142.10,   147.00,    0.00)  DC
           2ND HIGHEST VALUE IS      2.92615 AT (  378865.00,  3852820.00,   141.32,   147.00,    0.00)  DC
           3RD HIGHEST VALUE IS      2.89148 AT (  378865.00,  3853020.00,   142.68,   147.00,    0.00)  DC
           4TH HIGHEST VALUE IS      2.85961 AT (  378965.00,  3852820.00,   139.96,   146.00,    0.00)  DC
           5TH HIGHEST VALUE IS      2.83430 AT (  378965.00,  3852920.00,   139.26,   146.00,    0.00)  DC
           6TH HIGHEST VALUE IS      2.81100 AT (  378965.00,  3853020.00,   142.99,   146.00,    0.00)  DC
           7TH HIGHEST VALUE IS      2.79245 AT (  378765.00,  3852920.00,   143.60,   143.60,    0.00)  DC
           8TH HIGHEST VALUE IS      2.77033 AT (  378765.00,  3853020.00,   143.04,   148.00,    0.00)  DC
           9TH HIGHEST VALUE IS      2.76391 AT (  378865.00,  3852720.00,   139.61,   147.00,    0.00)  DC
          10TH HIGHEST VALUE IS      2.76329 AT (  378965.00,  3852720.00,   139.70,   146.00,    0.00)  DC

SRCGP3     1ST HIGHEST VALUE IS      3.92364 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS      3.37317 AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
           3RD HIGHEST VALUE IS      3.18711 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
           4TH HIGHEST VALUE IS      2.93746 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC
           5TH HIGHEST VALUE IS      2.87237 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
           6TH HIGHEST VALUE IS      2.83449 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
           7TH HIGHEST VALUE IS      2.67026 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
           8TH HIGHEST VALUE IS      2.56230 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
           9TH HIGHEST VALUE IS      2.32313 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
          10TH HIGHEST VALUE IS      2.30715 AT (  378765.00,  3851720.00,   143.24,   143.24,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                  ***                                                                   ***          16:20:34
 **MODELOPTs:  RegDFAULT CONC                                                                                         PAGE 269
                                                                    ELEV

                 *** THE SUMMARY OF MAXIMUM   1ST-HIGHEST MAX DAILY  1-HR RESULTS AVERAGED OVER   1 YEARS ***

                                  ** CONC OF NO2      IN MICROGRAMS/M**3                          **
```

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	119.77241 AT (	378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	119.31919 AT (	378935.83, 3851765.00, 141.58, 145.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	107.13006 AT (	377165.00, 3850620.00, 149.19, 149.19, 0.00)	DC	
	4TH HIGHEST VALUE IS	106.87790 AT (	377565.00, 3850820.00, 146.75, 151.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	105.59206 AT (	377365.00, 3850620.00, 152.05, 152.05, 0.00)	DC	
	6TH HIGHEST VALUE IS	105.46006 AT (	376965.00, 3850420.00, 145.68, 150.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	105.21977 AT (	377365.00, 3850820.00, 153.48, 153.48, 0.00)	DC	
	8TH HIGHEST VALUE IS	102.12388 AT (	377165.00, 3850420.00, 147.26, 147.26, 0.00)	DC	
	9TH HIGHEST VALUE IS	101.83639 AT (	378365.00, 3851020.00, 143.42, 150.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	101.53211 AT (	378265.00, 3851020.00, 145.52, 150.00, 0.00)	DC	
SRCGP2	1ST HIGHEST VALUE IS	104.95457 AT (	377165.00, 3850620.00, 149.19, 149.19, 0.00)	DC	
	2ND HIGHEST VALUE IS	104.57939 AT (	377565.00, 3850820.00, 146.75, 151.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	103.63593 AT (	377365.00, 3850620.00, 152.05, 152.05, 0.00)	DC	
	4TH HIGHEST VALUE IS	103.48970 AT (	376965.00, 3850420.00, 145.68, 150.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	102.83064 AT (	377365.00, 3850820.00, 153.48, 153.48, 0.00)	DC	
	6TH HIGHEST VALUE IS	100.42212 AT (	377165.00, 3850420.00, 147.26, 147.26, 0.00)	DC	
	7TH HIGHEST VALUE IS	99.74356 AT (	378365.00, 3851020.00, 143.42, 150.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	99.24607 AT (	378265.00, 3851020.00, 145.52, 150.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	98.27034 AT (	378165.00, 3850820.00, 145.42, 149.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	98.18461 AT (	378365.00, 3851120.00, 144.07, 150.00, 0.00)	DC	
SRCGP3	1ST HIGHEST VALUE IS	119.77241 AT (	378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	119.31919 AT (	378935.83, 3851765.00, 141.58, 145.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	97.78915 AT (	378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	95.78973 AT (	378901.88, 3852322.63, 142.58, 146.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	94.03378 AT (	378865.00, 3851720.00, 141.49, 146.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	93.59454 AT (	378984.90, 3851764.11, 139.85, 145.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	89.36737 AT (	379000.41, 3852321.36, 142.76, 142.76, 0.00)	DC	
	8TH HIGHEST VALUE IS	89.27647 AT (	378837.69, 3851766.78, 143.17, 143.17, 0.00)	DC	
	9TH HIGHEST VALUE IS	82.06948 AT (	378965.00, 3851720.00, 139.37, 145.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	81.87618 AT (	378852.62, 3852323.27, 142.50, 146.00, 0.00)	DC	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** 08/06/13 16:20:34 PAGE 270

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM 8TH-HIGHEST MAX DAILY 1-HR RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF NO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	103.86394 AT (	378935.83, 3851765.00, 141.58, 145.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	98.75571 AT (	378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	81.96726 AT (	378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	78.88862 AT (	378865.00, 3851720.00, 141.49, 146.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	78.29287 AT (	379000.41, 3852321.36, 142.76, 142.76, 0.00)	DC	
	6TH HIGHEST VALUE IS	78.08788 AT (	378837.69, 3851766.78, 143.17, 143.17, 0.00)	DC	
	7TH HIGHEST VALUE IS	77.95801 AT (	378965.00, 3851720.00, 139.37, 145.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	77.85890 AT (	378901.88, 3852322.63, 142.58, 146.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	72.70491 AT (	378984.90, 3851764.11, 139.85, 145.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	70.72127 AT (	378852.62, 3852323.27, 142.50, 146.00, 0.00)	DC	
SRCGP2	1ST HIGHEST VALUE IS	59.26525 AT (	379065.00, 3852520.00, 140.24, 145.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	58.56000 AT (	378865.00, 3852620.00, 140.03, 147.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	58.39116 AT (	378865.00, 3852520.00, 139.87, 147.00, 0.00)	DC	

```
                                                                                NO2_2008.ADO
         4TH HIGHEST VALUE IS      58.31547 AT (  379065.00,  3852620.00,   139.25,   145.00,    0.00)  DC
         5TH HIGHEST VALUE IS      58.25171 AT (  379265.00,  3852520.00,   138.75,   142.00,    0.00)  DC
         6TH HIGHEST VALUE IS      58.21560 AT (  379365.00,  3852420.00,   136.89,   213.00,    0.00)  DC
         7TH HIGHEST VALUE IS      58.03545 AT (  378765.00,  3852620.00,   140.20,   148.00,    0.00)  DC
         8TH HIGHEST VALUE IS      57.52752 AT (  378565.00,  3851620.00,   142.82,   148.00,    0.00)  DC
         9TH HIGHEST VALUE IS      57.52149 AT (  378865.00,  3852720.00,   139.61,   147.00,    0.00)  DC
        10TH HIGHEST VALUE IS      57.51588 AT (  379265.00,  3852420.00,   140.44,   140.44,    0.00)  DC

SRCGP3   1ST HIGHEST VALUE IS     103.86394 AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
         2ND HIGHEST VALUE IS      98.75571 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
         3RD HIGHEST VALUE IS      81.96726 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
         4TH HIGHEST VALUE IS      78.88862 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC
         5TH HIGHEST VALUE IS      78.29287 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
         6TH HIGHEST VALUE IS      78.08788 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
         7TH HIGHEST VALUE IS      77.95801 AT (  378965.00,  3851720.00,   139.37,   145.00,    0.00)  DC
         8TH HIGHEST VALUE IS      77.85890 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
         9TH HIGHEST VALUE IS      72.70491 AT (  378984.90,  3851764.11,   139.85,   145.00,    0.00)  DC
        10TH HIGHEST VALUE IS      70.72127 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                  ***        16:20:34
                                                                                                                   PAGE 271
 **MODELOPTs:  RegDFAULT CONC                                                ELEV

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            6 Warning Message(s)
 A Total of         1233 Informational Message(s)

 A Total of         8784 Hours Were Processed

 A Total of          834 Calm Hours Identified

 A Total of          399 Missing Hours Identified (  4.54 Percent)

    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***

    ********   WARNING MESSAGES   ********
 CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
 ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2
 CN W305      43 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3
 CN W305      43 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4

    ************************************
    *** AERMOD Finishes Successfully ***
    ************************************
```

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d

```
*** Message Summary For AERMOD Model Setup ***                              NO2_2009.ADO

 --------- Summary of Total Messages --------

A Total of          0 Fatal Error Message(s)
A Total of          2 Warning Message(s)
A Total of          0 Informational Message(s)

   ******** FATAL ERROR MESSAGES ********
               ***   NONE   ***

   ********   WARNING MESSAGES   ********
CO W361        25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
ME W186       221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

************************************
*** SETUP Finishes Successfully ***
************************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/06/13
                                   ***                                                                      ***      16:22:52
                                                                                                                     PAGE   1
**MODELOPTs:  RegDFAULT CONC                                        ELEV

                                    ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.
         6. Full Conversion Assumed for NO2.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:   1-HR
    and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);       3 Source Group(s); and    2064 Receptor(s)

**The Model Assumes A Pollutant Type of:  NO2

**Note that special processing requirements apply for the 1-hour NO2 NAAQS - check available guidance.
  Model will process user-specified ranks of daily maximum 1-hour values averaged across the number of years modeled.
  For annual NO2 NAAQS modeling, the multi-year maximum of PERIOD values can be simulated using the MULTYEAR keyword.
  Multi-year PERIOD and 1-hour values should only be done in a single model run using the MULTYEAR option with a
  single multi-year meteorological data file using STARTEND keyword.
```

```
**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
        Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
        Model Outputs External File(s) of Maximum Daily 1-hr Values by Day (MAXDAILY Keyword)
        Model Outputs External File(s) of Maximum Daily 1-hr Values by Year (MXDYBYYR Keyword)
        Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                               m for Missing Hours
                                                               b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                  ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.6 MB of RAM.

**Detailed Error/Message File:   MSSilicon_NO2.err
**File for Summary of Results:   MSSilicon_NO2.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***       08/06/13
                                   ***                                                                    ***       16:22:52
                                                                                                                    PAGE   2
**MODELOPTs:  RegDFAULT CONC                                     ELEV
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.15592E+02	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.15592E+02	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.15592E+02	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.15592E+02	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***       08/06/13
                                   ***                                                                    ***       16:22:52
                                                                                                                    PAGE   3
**MODELOPTs:  RegDFAULT CONC                                     ELEV
```

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.20160E+00	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.20160E+00	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	

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 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***       08/06/13
                                   ***                                                                    ***       16:22:52
                                                                                                                    PAGE   4
**MODELOPTs:  RegDFAULT CONC                                     ELEV
```

NO2_2009.ADO

RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE	RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE
1.	111.62184	(09010612) AT	(380565.00, 3851820.00) DC	11.	104.31278	(09112109) AT	(377565.00, 3851820.00) DC
2.	111.38097	(09010612) AT	(380765.00, 3851820.00) DC	12.	103.95107	(09010612) AT	(380965.00, 3851620.00) DC
3.	109.25968	(09010613) AT	(380565.00, 3851020.00) DC	13.	102.64705	(09112109) AT	(377565.00, 3851620.00) DC
4.	107.98429	(09010613) AT	(380365.00, 3851220.00) DC	14.	102.56818	(09112109) AT	(377965.00, 3851820.00) DC
5.	106.86315	(09010612) AT	(380965.00, 3851820.00) DC	15.	101.95356	(09010612) AT	(380765.00, 3851620.00) DC
6.	106.35114	(09010613) AT	(380165.00, 3851220.00) DC	16.	101.27063	(09010613) AT	(380765.00, 3851020.00) DC
7.	106.32825	(09112109) AT	(377765.00, 3851820.00) DC	17.	100.99290	(09112109) AT	(377365.00, 3851620.00) DC
8.	106.18940	(09010613) AT	(380365.00, 3851020.00) DC	18.	100.06354	(09010613) AT	(380965.00, 3850820.00) DC
9.	105.63315	(09010612) AT	(380365.00, 3851820.00) DC	19.	98.94693	(09010613) AT	(380565.00, 3850820.00) DC
10.	104.56075	(09010613) AT	(380765.00, 3850820.00) DC	20.	98.78769	(09112109) AT	(377965.00, 3851720.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** 08/06/13 16:22:52

**MODELOPTs: RegDFAULT CONC ELEV PAGE 267

*** THE MAXIMUM 20 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: SRCGP3 ***
INCLUDING SOURCE(S): F1 , F2 ,

** CONC OF NO2 IN MICROGRAMS/M**3 **

RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE	RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE
1.	113.60490	(09022307) AT	(378935.83, 3851765.00) DC	11.	101.52194	(09041523) AT	(378935.83, 3851765.00) DC
2.	109.07621	(09110424) AT	(378935.83, 3851765.00) DC	12.	100.00780	(09122917) AT	(378935.83, 3851765.00) DC
3.	108.76373	(09121103) AT	(378935.83, 3851765.00) DC	13.	98.23127	(09111220) AT	(378886.76, 3851765.89) DC
4.	107.02991	(09071724) AT	(378935.83, 3851765.00) DC	14.	98.06111	(09031418) AT	(378984.90, 3851764.11) DC
5.	106.02790	(09013106) AT	(378935.83, 3851765.00) DC	15.	98.00039	(09070623) AT	(378935.83, 3851765.00) DC
6.	105.22773	(09052921) AT	(378886.76, 3851765.89) DC	16.	97.83331	(09070703) AT	(378886.76, 3851765.89) DC
7.	104.33773	(09031603) AT	(378886.76, 3851765.89) DC	17.	97.53678	(09110103) AT	(378886.76, 3851765.89) DC
8.	102.67980	(09070903) AT	(378886.76, 3851765.89) DC	18.	96.92936	(09070824) AT	(378886.76, 3851765.89) DC
9.	102.49859	(09113020) AT	(378886.76, 3851765.89) DC	19.	96.56641	(09113024) AT	(378886.76, 3851765.89) DC
10.	101.65835	(09031923) AT	(378935.83, 3851765.00) DC	20.	95.97663	(09021206) AT	(378886.76, 3851765.89) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** 08/06/13 16:22:52

**MODELOPTs: RegDFAULT CONC ELEV PAGE 268

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF NO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	4.95714 AT	(378788.62, 3851767.67, 143.30, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	4.55345 AT	(378765.00, 3851720.00, 143.24, 143.24, 0.00)	DC	
	3RD HIGHEST VALUE IS	4.49091 AT	(378739.55, 3851768.56, 143.30, 147.00, 0.00)	DC	

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                                                                                NO2_2009.ADO
          4TH HIGHEST VALUE IS      4.29775 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
          5TH HIGHEST VALUE IS      4.16229 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
          6TH HIGHEST VALUE IS      4.13875 AT (  378665.00,  3851620.00,   143.02,   143.02,    0.00)  DC
          7TH HIGHEST VALUE IS      4.09917 AT (  379265.00,  3852720.00,   140.12,   140.12,    0.00)  DC
          8TH HIGHEST VALUE IS      4.02210 AT (  379165.00,  3852520.00,   140.42,   140.42,    0.00)  DC
          9TH HIGHEST VALUE IS      4.00492 AT (  379265.00,  3852620.00,   138.00,   143.00,    0.00)  DC
         10TH HIGHEST VALUE IS      3.95178 AT (  379265.00,  3852820.00,   140.30,   140.30,    0.00)  DC

SRCGP2    1ST HIGHEST VALUE IS      3.02484 AT (  379365.00,  3852820.00,   139.31,   139.31,    0.00)  DC
          2ND HIGHEST VALUE IS      3.01611 AT (  379265.00,  3852820.00,   140.30,   140.30,    0.00)  DC
          3RD HIGHEST VALUE IS      2.99820 AT (  379265.00,  3852720.00,   140.12,   140.12,    0.00)  DC
          4TH HIGHEST VALUE IS      2.99213 AT (  379365.00,  3852720.00,   139.58,   139.58,    0.00)  DC
          5TH HIGHEST VALUE IS      2.95233 AT (  379365.00,  3852920.00,   137.26,   142.00,    0.00)  DC
          6TH HIGHEST VALUE IS      2.92872 AT (  379265.00,  3852920.00,   139.54,   143.00,    0.00)  DC
          7TH HIGHEST VALUE IS      2.84877 AT (  379365.00,  3853020.00,   136.56,   143.00,    0.00)  DC
          8TH HIGHEST VALUE IS      2.82380 AT (  379265.00,  3852620.00,   138.00,   143.00,    0.00)  DC
          9TH HIGHEST VALUE IS      2.79981 AT (  379365.00,  3852620.00,   136.37,   213.00,    0.00)  DC
         10TH HIGHEST VALUE IS      2.79108 AT (  379265.00,  3853020.00,   138.92,   143.00,    0.00)  DC

SRCGP3    1ST HIGHEST VALUE IS      3.89911 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
          2ND HIGHEST VALUE IS      3.39163 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
          3RD HIGHEST VALUE IS      3.29850 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
          4TH HIGHEST VALUE IS      3.21295 AT (  378765.00,  3851720.00,   143.24,   143.24,    0.00)  DC
          5TH HIGHEST VALUE IS      3.18651 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
          6TH HIGHEST VALUE IS      2.96205 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
          7TH HIGHEST VALUE IS      2.71365 AT (  379098.93,  3852320.09,   142.51,   142.51,    0.00)  DC
          8TH HIGHEST VALUE IS      2.62432 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
          9TH HIGHEST VALUE IS      2.54439 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
         10TH HIGHEST VALUE IS      2.42172 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                   ***        16:22:52
 **MODELOPTs:  RegDFAULT CONC                                                                                        PAGE 269
                                                                                ELEV

                     *** THE SUMMARY OF MAXIMUM   1ST-HIGHEST MAX DAILY  1-HR RESULTS AVERAGED OVER   1 YEARS ***

                                 ** CONC OF NO2      IN MICROGRAMS/M**3                          **

GROUP ID                        AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  NETWORK GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS     114.20684 AT (  380565.00,  3851820.00,   164.17,   167.10,    0.00)  DC
          2ND HIGHEST VALUE IS     113.71947 AT (  380765.00,  3851820.00,   154.36,   213.00,    0.00)  DC
          3RD HIGHEST VALUE IS     113.60490 AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
          4TH HIGHEST VALUE IS     111.32007 AT (  380565.00,  3851020.00,   158.01,   158.01,    0.00)  DC
          5TH HIGHEST VALUE IS     110.05830 AT (  380365.00,  3851220.00,   154.19,   154.19,    0.00)  DC
          6TH HIGHEST VALUE IS     109.18162 AT (  377765.00,  3851820.00,   157.82,   165.10,    0.00)  DC
          7TH HIGHEST VALUE IS     108.97358 AT (  380965.00,  3851820.00,   166.31,   209.00,    0.00)  DC
          8TH HIGHEST VALUE IS     108.91960 AT (  380165.00,  3851220.00,   143.38,   152.80,    0.00)  DC
          9TH HIGHEST VALUE IS     108.50035 AT (  380365.00,  3851820.00,   153.90,   157.00,    0.00)  DC
         10TH HIGHEST VALUE IS     108.41916 AT (  380365.00,  3851020.00,   153.59,   153.59,    0.00)  DC

SRCGP2    1ST HIGHEST VALUE IS     111.62184 AT (  380565.00,  3851820.00,   164.17,   167.10,    0.00)  DC
          2ND HIGHEST VALUE IS     111.38097 AT (  380765.00,  3851820.00,   154.36,   213.00,    0.00)  DC
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                                                                                NO2_2009.ADO
          3RD HIGHEST VALUE IS     109.25968 AT (  380565.00,  3851020.00,   158.01,   158.01,    0.00)  DC
          4TH HIGHEST VALUE IS     107.98429 AT (  380365.00,  3851220.00,   154.19,   154.19,    0.00)  DC
          5TH HIGHEST VALUE IS     106.86315 AT (  380965.00,  3851820.00,   166.31,   209.00,    0.00)  DC
          6TH HIGHEST VALUE IS     106.35114 AT (  380165.00,  3851220.00,   143.38,   152.80,    0.00)  DC
          7TH HIGHEST VALUE IS     106.32825 AT (  377765.00,  3851820.00,   157.82,   165.10,    0.00)  DC
          8TH HIGHEST VALUE IS     106.18940 AT (  380365.00,  3851020.00,   153.59,   153.59,    0.00)  DC
          9TH HIGHEST VALUE IS     105.63315 AT (  380365.00,  3851820.00,   153.90,   157.00,    0.00)  DC
         10TH HIGHEST VALUE IS     104.56075 AT (  380765.00,  3850820.00,   152.18,   212.00,    0.00)  DC

SRCGP3    1ST HIGHEST VALUE IS     113.60490 AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
          2ND HIGHEST VALUE IS     105.22773 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
          3RD HIGHEST VALUE IS      98.06111 AT (  378984.90,  3851764.11,   139.85,   145.00,    0.00)  DC
          4TH HIGHEST VALUE IS      95.39940 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
          5TH HIGHEST VALUE IS      93.83564 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
          6TH HIGHEST VALUE IS      90.53375 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
          7TH HIGHEST VALUE IS      90.28002 AT (  378965.00,  3851720.00,   139.37,   145.00,    0.00)  DC
          8TH HIGHEST VALUE IS      87.25333 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
          9TH HIGHEST VALUE IS      85.00135 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC
         10TH HIGHEST VALUE IS      84.47768 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                  ***          16:22:52
 **MODELOPTs:  RegDFAULT CONC                                                                                        PAGE 270
                                                                   ELEV

                    *** THE SUMMARY OF MAXIMUM   8TH-HIGHEST MAX DAILY  1-HR RESULTS AVERAGED OVER   1 YEARS ***

                                 ** CONC OF NO2      IN MICROGRAMS/M**3                          **

GROUP ID                       AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  NETWORK
                                                                                                              GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS     100.00780 AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
          2ND HIGHEST VALUE IS      96.92936 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
          3RD HIGHEST VALUE IS      84.58410 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
          4TH HIGHEST VALUE IS      82.31577 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
          5TH HIGHEST VALUE IS      80.68266 AT (  378984.90,  3851764.11,   139.85,   145.00,    0.00)  DC
          6TH HIGHEST VALUE IS      76.60921 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
          7TH HIGHEST VALUE IS      76.29221 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC
          8TH HIGHEST VALUE IS      73.52798 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
          9TH HIGHEST VALUE IS      72.84272 AT (  378965.00,  3851720.00,   139.37,   145.00,    0.00)  DC
         10TH HIGHEST VALUE IS      68.66173 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC

SRCGP2    1ST HIGHEST VALUE IS      59.68586 AT (  379265.00,  3852520.00,   138.75,   142.00,    0.00)  DC
          2ND HIGHEST VALUE IS      59.09099 AT (  379265.00,  3852620.00,   138.00,   143.00,    0.00)  DC
          3RD HIGHEST VALUE IS      59.04134 AT (  378965.00,  3851420.00,   138.91,   147.00,    0.00)  DC
          4TH HIGHEST VALUE IS      59.03066 AT (  379165.00,  3852620.00,   138.82,   138.82,    0.00)  DC
          5TH HIGHEST VALUE IS      58.92231 AT (  379165.00,  3852520.00,   140.42,   140.42,    0.00)  DC
          6TH HIGHEST VALUE IS      58.89241 AT (  378665.00,  3851620.00,   143.02,   143.02,    0.00)  DC
          7TH HIGHEST VALUE IS      58.40222 AT (  379265.00,  3852420.00,   140.44,   140.44,    0.00)  DC
          8TH HIGHEST VALUE IS      57.26197 AT (  379265.00,  3852720.00,   140.12,   140.12,    0.00)  DC
          9TH HIGHEST VALUE IS      57.02565 AT (  379065.00,  3852620.00,   139.25,   145.00,    0.00)  DC
         10TH HIGHEST VALUE IS      56.87046 AT (  378965.00,  3851520.00,   139.76,   146.00,    0.00)  DC

SRCGP3    1ST HIGHEST VALUE IS     100.00780 AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
          2ND HIGHEST VALUE IS      96.92936 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
          3RD HIGHEST VALUE IS      84.58410 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
          4TH HIGHEST VALUE IS      82.31577 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
          5TH HIGHEST VALUE IS      80.68266 AT (  378984.90,  3851764.11,   139.85,   145.00,    0.00)  DC
          6TH HIGHEST VALUE IS      76.60921 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
          7TH HIGHEST VALUE IS      76.29221 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC
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                                                                                NO2_2009.ADO
        8TH HIGHEST VALUE IS      73.52798 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
        9TH HIGHEST VALUE IS      72.84272 AT (  378965.00,  3851720.00,   139.37,   145.00,    0.00)  DC
       10TH HIGHEST VALUE IS      68.66173 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC

*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                  ***        16:22:52
                                                                                                                   PAGE 271
**MODELOPTs:  RegDFAULT CONC                                                ELEV

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            6 Warning Message(s)
A Total of         1096 Informational Message(s)

A Total of         8760 Hours Were Processed

A Total of          916 Calm Hours Identified

A Total of          180 Missing Hours Identified (  2.05 Percent)

   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***

   ********   WARNING MESSAGES   ********
CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2
CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4
CN W305       7 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
CN W305       7 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3

   ************************************
   *** AERMOD Finishes Successfully ***
   ************************************
```

Appendix B - Air Quality Impact
Evaluation AERMOD Output Files
Pollutant - NO2
Year - 2010

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d


```
  ********   WARNING MESSAGES   ********
CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

***********************************
*** SETUP Finishes Successfully ***
***********************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/06/13
                                   ***                                                                      ***      16:26:57
                                                                                                                     PAGE   1
**MODELOPTs:  RegDFAULT CONC                                           ELEV

                                      ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.
        6. Full Conversion Assumed for NO2.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:   1-HR
    and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);      3 Source Group(s); and    2064 Receptor(s)

**The Model Assumes A Pollutant Type of:  NO2

**Note that special processing requirements apply for the 1-hour NO2 NAAQS - check available guidance.
  Model will process user-specified ranks of daily maximum 1-hour values averaged across the number of years modeled.
  For annual NO2 NAAQS modeling, the multi-year maximum of PERIOD values can be simulated using the MULTYEAR keyword.
  Multi-year PERIOD and 1-hour values should only be done in a single model run using the MULTYEAR option with a
  single multi-year meteorological data file using STARTEND keyword.

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs External File(s) of Maximum Daily 1-hr Values by Day (MAXDAILY Keyword)
         Model Outputs External File(s) of Maximum Daily 1-hr Values by Year (MXDYBYYR Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours
```

NO2_2010.ADO

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) = 104.00 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 4.6 MB of RAM.

**Detailed Error/Message File: MSSilicon_NO2.err
**File for Summary of Results: MSSilicon_NO2.sum

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/06/13
*** *** 16:26:57
PAGE 2

**MODELOPTs: RegDFAULT CONC ELEV

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.15592E+02	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.15592E+02	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.15592E+02	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.15592E+02	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/06/13
*** *** 16:26:57
PAGE 3

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.20160E+00	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.20160E+00	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/06/13
*** *** 16:26:57
PAGE 4

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
SRCGP1	SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 ,
SRCGP2	SAF1 , SAF2 , SAF3 , SAF4 ,
SRCGP3	F1 , F2 ,

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/06/13
*** *** 16:26:57
PAGE 5

**MODELOPTs: RegDFAULT CONC ELEV

GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/06/13
*** *** 16:26:57
PAGE 268

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF NO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	5.47699 AT (	378788.62,	3851767.67,	143.30,	146.00,	0.00)	DC	
	2ND HIGHEST VALUE IS	5.03179 AT (	378765.00,	3851720.00,	143.24,	143.24,	0.00)	DC	
	3RD HIGHEST VALUE IS	5.02471 AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	
	4TH HIGHEST VALUE IS	4.90738 AT (	378739.55,	3851768.56,	143.30,	147.00,	0.00)	DC	
	5TH HIGHEST VALUE IS	4.65043 AT (	379165.00,	3852520.00,	140.42,	140.42,	0.00)	DC	
	6TH HIGHEST VALUE IS	4.63660 AT (	379265.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	7TH HIGHEST VALUE IS	4.63497 AT (	379165.00,	3852620.00,	138.82,	138.82,	0.00)	DC	
	8TH HIGHEST VALUE IS	4.59016 AT (	379049.67,	3852320.72,	142.86,	142.86,	0.00)	DC	
	9TH HIGHEST VALUE IS	4.57305 AT (	379165.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	10TH HIGHEST VALUE IS	4.57177 AT (	378665.00,	3851620.00,	143.02,	143.02,	0.00)	DC	
SRCGP2	1ST HIGHEST VALUE IS	3.59261 AT (	379265.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	2ND HIGHEST VALUE IS	3.57449 AT (	379265.00,	3852820.00,	140.30,	140.30,	0.00)	DC	
	3RD HIGHEST VALUE IS	3.47214 AT (	379165.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	4TH HIGHEST VALUE IS	3.47018 AT (	379365.00,	3852820.00,	139.31,	139.31,	0.00)	DC	
	5TH HIGHEST VALUE IS	3.44414 AT (	379365.00,	3852720.00,	139.58,	139.58,	0.00)	DC	
	6TH HIGHEST VALUE IS	3.43639 AT (	379265.00,	3852920.00,	139.54,	143.00,	0.00)	DC	
	7TH HIGHEST VALUE IS	3.42122 AT (	379165.00,	3852820.00,	140.20,	140.20,	0.00)	DC	
	8TH HIGHEST VALUE IS	3.40767 AT (	379265.00,	3852620.00,	138.00,	143.00,	0.00)	DC	
	9TH HIGHEST VALUE IS	3.36359 AT (	379365.00,	3852920.00,	137.26,	142.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	3.34467 AT (	379165.00,	3852620.00,	138.82,	138.82,	0.00)	DC	
SRCGP3	1ST HIGHEST VALUE IS	4.14079 AT (	378788.62,	3851767.67,	143.30,	146.00,	0.00)	DC	
	2ND HIGHEST VALUE IS	3.88193 AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	
	3RD HIGHEST VALUE IS	3.40607 AT (	378765.00,	3851720.00,	143.24,	143.24,	0.00)	DC	
	4TH HIGHEST VALUE IS	3.39171 AT (	378739.55,	3851768.56,	143.30,	147.00,	0.00)	DC	
	5TH HIGHEST VALUE IS	3.14354 AT (	379049.67,	3852320.72,	142.86,	142.86,	0.00)	DC	
	6TH HIGHEST VALUE IS	3.12017 AT (	379000.41,	3852321.36,	142.76,	142.76,	0.00)	DC	
	7TH HIGHEST VALUE IS	3.08624 AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	8TH HIGHEST VALUE IS	2.61169 AT (	379098.93,	3852320.09,	142.51,	142.51,	0.00)	DC	
	9TH HIGHEST VALUE IS	2.56835 AT (	378951.14,	3852322.00,	142.68,	145.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	2.55791 AT (	378690.48,	3851769.45,	143.30,	147.00,	0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/06/13
*** *** 16:26:57
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**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM 1ST-HIGHEST MAX DAILY 1-HR RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF NO2 IN MICROGRAMS/M**3 **

```
                                                                                                                                  NETWORK
GROUP ID                        AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS     110.71663 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
          2ND HIGHEST VALUE IS     107.81368 AT (  380165.00,  3852220.00,   163.93,   214.80,    0.00)  DC
          3RD HIGHEST VALUE IS     104.94394 AT (  377965.00,  3850820.00,   146.44,   151.00,    0.00)  DC
          4TH HIGHEST VALUE IS     104.41292 AT (  380365.00,  3852220.00,   146.80,   214.80,    0.00)  DC
          5TH HIGHEST VALUE IS     104.37454 AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
          6TH HIGHEST VALUE IS     103.36353 AT (  378165.00,  3851020.00,   147.60,   152.80,    0.00)  DC
          7TH HIGHEST VALUE IS     103.09703 AT (  379965.00,  3852220.00,   142.85,   214.80,    0.00)  DC
          8TH HIGHEST VALUE IS     102.02365 AT (  378065.00,  3851020.00,   153.07,   153.07,    0.00)  DC
          9TH HIGHEST VALUE IS     100.01575 AT (  377765.00,  3850620.00,   149.15,   149.15,    0.00)  DC
         10TH HIGHEST VALUE IS      99.04251 AT (  378165.00,  3851120.00,   151.51,   151.51,    0.00)  DC

SRCGP2    1ST HIGHEST VALUE IS     105.39330 AT (  380165.00,  3852220.00,   163.93,   214.80,    0.00)  DC
          2ND HIGHEST VALUE IS     102.68786 AT (  377965.00,  3850820.00,   146.44,   151.00,    0.00)  DC
          3RD HIGHEST VALUE IS     102.27022 AT (  380365.00,  3852220.00,   146.80,   214.80,    0.00)  DC
          4TH HIGHEST VALUE IS     100.83032 AT (  378165.00,  3851020.00,   147.60,   152.80,    0.00)  DC
          5TH HIGHEST VALUE IS     100.39673 AT (  379965.00,  3852220.00,   142.85,   214.80,    0.00)  DC
          6TH HIGHEST VALUE IS      99.42888 AT (  378065.00,  3851020.00,   153.07,   153.07,    0.00)  DC
          7TH HIGHEST VALUE IS      97.99374 AT (  377765.00,  3850620.00,   149.15,   149.15,    0.00)  DC
          8TH HIGHEST VALUE IS      96.38278 AT (  379965.00,  3852120.00,   138.62,   214.80,    0.00)  DC
          9TH HIGHEST VALUE IS      96.21944 AT (  378165.00,  3851120.00,   151.51,   151.51,    0.00)  DC
         10TH HIGHEST VALUE IS      96.10507 AT (  377965.00,  3850620.00,   151.78,   151.78,    0.00)  DC

SRCGP3    1ST HIGHEST VALUE IS     110.71663 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
          2ND HIGHEST VALUE IS     104.37454 AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
          3RD HIGHEST VALUE IS      97.14286 AT (  378984.90,  3851764.11,   139.85,   145.00,    0.00)  DC
          4TH HIGHEST VALUE IS      96.95864 AT (  378965.00,  3851720.00,   139.37,   145.00,    0.00)  DC
          5TH HIGHEST VALUE IS      96.94416 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
          6TH HIGHEST VALUE IS      95.11553 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
          7TH HIGHEST VALUE IS      93.47035 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC
          8TH HIGHEST VALUE IS      92.71827 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
          9TH HIGHEST VALUE IS      89.36737 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
         10TH HIGHEST VALUE IS      84.75160 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                   ***         16:26:57
                                                                                                                     PAGE 270
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                     *** THE SUMMARY OF MAXIMUM   8TH-HIGHEST MAX DAILY  1-HR RESULTS AVERAGED OVER   1 YEARS ***

                                 ** CONC OF NO2      IN MICROGRAMS/M**3                          **

                                                                                                                                  NETWORK
GROUP ID                        AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS      96.69259 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
          2ND HIGHEST VALUE IS      90.26138 AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
          3RD HIGHEST VALUE IS      84.86958 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
          4TH HIGHEST VALUE IS      80.76200 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC
          5TH HIGHEST VALUE IS      78.52034 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
          6TH HIGHEST VALUE IS      77.39800 AT (  378984.90,  3851764.11,   139.85,   145.00,    0.00)  DC
          7TH HIGHEST VALUE IS      76.77753 AT (  378965.00,  3851720.00,   139.37,   145.00,    0.00)  DC
          8TH HIGHEST VALUE IS      76.02572 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
          9TH HIGHEST VALUE IS      72.83013 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
         10TH HIGHEST VALUE IS      71.17557 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC

SRCGP2    1ST HIGHEST VALUE IS      60.34714 AT (  379165.00,  3852520.00,   140.42,   140.42,    0.00)  DC
          2ND HIGHEST VALUE IS      60.15236 AT (  379065.00,  3852620.00,   139.25,   145.00,    0.00)  DC
          3RD HIGHEST VALUE IS      60.13021 AT (  378965.00,  3852620.00,   139.84,   146.00,    0.00)  DC
```

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                                                                                NO2_2010.ADO
         4TH HIGHEST VALUE IS      59.57625 AT (  379965.00,  3852120.00,   138.62,   214.80,    0.00)  DC
         5TH HIGHEST VALUE IS      59.25640 AT (  379165.00,  3852620.00,   138.82,   138.82,    0.00)  DC
         6TH HIGHEST VALUE IS      58.82574 AT (  379065.00,  3852520.00,   140.24,   145.00,    0.00)  DC
         7TH HIGHEST VALUE IS      58.47598 AT (  379165.00,  3852720.00,   140.12,   140.12,    0.00)  DC
         8TH HIGHEST VALUE IS      58.20001 AT (  379065.00,  3852720.00,   139.14,   145.00,    0.00)  DC
         9TH HIGHEST VALUE IS      57.71048 AT (  378965.00,  3852720.00,   139.70,   146.00,    0.00)  DC
        10TH HIGHEST VALUE IS      57.23833 AT (  379265.00,  3852720.00,   140.12,   140.12,    0.00)  DC

SRCGP3   1ST HIGHEST VALUE IS      96.69259 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
         2ND HIGHEST VALUE IS      90.26138 AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
         3RD HIGHEST VALUE IS      84.86958 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
         4TH HIGHEST VALUE IS      80.76200 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC
         5TH HIGHEST VALUE IS      78.52034 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
         6TH HIGHEST VALUE IS      77.39800 AT (  378984.90,  3851764.11,   139.85,   145.00,    0.00)  DC
         7TH HIGHEST VALUE IS      76.77753 AT (  378965.00,  3851720.00,   139.37,   145.00,    0.00)  DC
         8TH HIGHEST VALUE IS      76.02572 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
         9TH HIGHEST VALUE IS      72.83013 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
        10TH HIGHEST VALUE IS      71.17557 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                   ***        16:26:57
                                                                                                                    PAGE 271

 **MODELOPTS:  RegDFAULT CONC                                          ELEV


 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            6 Warning Message(s)
 A Total of         1492 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of         1234 Calm Hours Identified

 A Total of          258 Missing Hours Identified (  2.95 Percent)


    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***


    ********   WARNING MESSAGES   ********
 CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
 ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4

    ************************************
    *** AERMOD Finishes Successfully ***
    ************************************
```

Appendix B - Air Quality Impact Evaluation
AERMOD Output Files
Pollutant - NO2
Year - 2011

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d

```
                                                                                    NO2_2011.ADO
 *** Message Summary For AERMOD Model Setup ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            2 Warning Message(s)
A Total of            0 Informational Message(s)


   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


   ********   WARNING MESSAGES   ********
CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

***********************************
*** SETUP Finishes Successfully ***
***********************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                  ***                                                                   ***        16:30:01
                                                                                                                   PAGE   1
**MODELOPTs:  RegDFAULT CONC                                          ELEV

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.
        6. Full Conversion Assumed for NO2.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:   1-HR
    and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);       3 Source Group(s); and    2064 Receptor(s)

**The Model Assumes A Pollutant Type of:  NO2

**Note that special processing requirements apply for the 1-hour NO2 NAAQS - check available guidance.
  Model will process user-specified ranks of daily maximum 1-hour values averaged across the number of years modeled.
  For annual NO2 NAAQS modeling, the multi-year maximum of PERIOD values can be simulated using the MULTYEAR keyword.
  Multi-year PERIOD and 1-hour values should only be done in a single model run using the MULTYEAR option with a
  single multi-year meteorological data file using STARTEND keyword.
```

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
Model Outputs Tables of ANNUAL Averages by Receptor
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
Model Outputs External File(s) of Maximum Daily 1-hr Values by Day (MAXDAILY Keyword)
Model Outputs External File(s) of Maximum Daily 1-hr Values by Year (MXDYBYYR Keyword)
Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) = 104.00 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 4.6 MB of RAM.

**Detailed Error/Message File: MSSilicon_NO2.err
**File for Summary of Results: MSSilicon_NO2.sum

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**MODELOPTs: RegDFAULT CONC ELEV

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.15592E+02	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.15592E+02	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.15592E+02	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.15592E+02	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	

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**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.20160E+00	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.20160E+00	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	

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**MODELOPTs: RegDFAULT CONC ELEV

RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE		RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE	
1.	82.59738	(11090208) AT	(379965.00, 3852520.00)	DC	11.	76.77135	(11070307) AT	(378365.00, 3850220.00)	DC
2.	81.35515	(11090208) AT	(379965.00, 3852620.00)	DC	12.	76.69466	(11022309) AT	(375965.00, 3851520.00)	DC
3.	81.35467	(11090208) AT	(380165.00, 3852620.00)	DC	13.	76.64116	(11070307) AT	(378165.00, 3850420.00)	DC
4.	81.19844	(11022309) AT	(376965.00, 3851820.00)	DC	14.	76.45002	(11092908) AT	(379965.00, 3853620.00)	DC
5.	78.53680	(11070307) AT	(378165.00, 3850220.00)	DC	15.	76.43204	(11121811) AT	(379965.00, 3852620.00)	DC
6.	78.51656	(11090208) AT	(379865.00, 3852520.00)	DC	16.	75.87719	(11090208) AT	(379965.00, 3852720.00)	DC
7.	77.98205	(11070307) AT	(378365.00, 3850420.00)	DC	17.	75.81445	(11090208) AT	(380365.00, 3852820.00)	DC
8.	77.84359	(11090208) AT	(379965.00, 3852420.00)	DC	18.	75.75618	(11090208) AT	(380365.00, 3852620.00)	DC
9.	77.78230	(11070307) AT	(378165.00, 3850020.00)	DC	19.	75.73629	(11022309) AT	(375465.00, 3851520.00)	DC
10.	77.61333	(11092908) AT	(379765.00, 3853420.00)	DC	20.	75.72233	(11090208) AT	(379865.00, 3852420.00)	DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/06/13
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**MODELOPTs: RegDFAULT CONC ELEV

*** THE MAXIMUM 20 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: SRCGP3 ***
INCLUDING SOURCE(S): F1 , F2 ,

** CONC OF NO2 IN MICROGRAMS/M**3 **

RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE		RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE	
1.	111.11953	(11121707) AT	(378935.83, 3851765.00)	DC	11.	97.75563	(11100105) AT	(378935.83, 3851765.00)	DC
2.	110.52571	(11121706) AT	(378935.83, 3851765.00)	DC	12.	97.41407	(11121404) AT	(378901.88, 3852322.63)	DC
3.	106.82389	(11052703) AT	(378886.76, 3851765.89)	DC	13.	96.06111	(11110419) AT	(378935.83, 3851765.00)	DC
4.	103.68375	(11122421) AT	(378886.76, 3851765.89)	DC	14.	95.66835	(11112701) AT	(378886.76, 3851765.89)	DC
5.	101.52847	(11121708) AT	(378886.76, 3851765.89)	DC	15.	95.62954	(11081205) AT	(378935.83, 3851765.00)	DC
6.	100.07818	(11082920) AT	(378886.76, 3851765.89)	DC	16.	95.60155	(11110205) AT	(378951.14, 3852322.00)	DC
7.	99.50268	(11100203) AT	(378886.76, 3851765.89)	DC	17.	95.49679	(11021102) AT	(378886.76, 3851765.89)	DC
8.	98.72242	(11032004) AT	(378837.69, 3851766.78)	DC	18.	94.93429	(11100124) AT	(378935.83, 3851765.00)	DC
9.	98.60040	(11110419) AT	(378965.00, 3851720.00)	DC	19.	94.64032	(11021720) AT	(378951.14, 3852322.00)	DC
10.	97.87699	(11081206) AT	(378886.76, 3851765.89)	DC	20.	93.47616	(11073006) AT	(378886.76, 3851765.89)	DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

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**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF NO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	5.02312 AT	(378788.62, 3851767.67, 143.30, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	4.72678 AT	(379049.67, 3852320.72, 142.86, 142.86, 0.00)	DC	
	3RD HIGHEST VALUE IS	4.68979 AT	(379265.00, 3852720.00, 140.12, 140.12, 0.00)	DC	

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                                                                                NO2_2011.ADO
          4TH HIGHEST VALUE IS       4.61595 AT (  379365.00,  3852720.00,   139.58,   139.58,    0.00)  DC
          5TH HIGHEST VALUE IS       4.59795 AT (  379365.00,  3852820.00,   139.31,   139.31,    0.00)  DC
          6TH HIGHEST VALUE IS       4.58970 AT (  379265.00,  3852620.00,   138.00,   143.00,    0.00)  DC
          7TH HIGHEST VALUE IS       4.57500 AT (  378765.00,  3851720.00,   143.24,   143.24,    0.00)  DC
          8TH HIGHEST VALUE IS       4.50251 AT (  379098.93,  3852320.09,   142.51,   142.51,    0.00)  DC
          9TH HIGHEST VALUE IS       4.48481 AT (  379265.00,  3852820.00,   140.30,   140.30,    0.00)  DC
         10TH HIGHEST VALUE IS       4.45439 AT (  379165.00,  3852520.00,   140.42,   140.42,    0.00)  DC

SRCGP2    1ST HIGHEST VALUE IS       3.48368 AT (  379365.00,  3852820.00,   139.31,   139.31,    0.00)  DC
          2ND HIGHEST VALUE IS       3.41907 AT (  379365.00,  3852720.00,   139.58,   139.58,    0.00)  DC
          3RD HIGHEST VALUE IS       3.38652 AT (  379365.00,  3852920.00,   137.26,   142.00,    0.00)  DC
          4TH HIGHEST VALUE IS       3.36144 AT (  379265.00,  3852820.00,   140.30,   140.30,    0.00)  DC
          5TH HIGHEST VALUE IS       3.35165 AT (  379265.00,  3852720.00,   140.12,   140.12,    0.00)  DC
          6TH HIGHEST VALUE IS       3.23863 AT (  379365.00,  3853020.00,   136.56,   143.00,    0.00)  DC
          7TH HIGHEST VALUE IS       3.22752 AT (  379465.00,  3852920.00,   132.67,   213.00,    0.00)  DC
          8TH HIGHEST VALUE IS       3.22739 AT (  379265.00,  3852920.00,   139.54,   143.00,    0.00)  DC
          9TH HIGHEST VALUE IS       3.21217 AT (  379465.00,  3852820.00,   132.83,   214.80,    0.00)  DC
         10TH HIGHEST VALUE IS       3.20452 AT (  379465.00,  3853020.00,   135.08,   142.00,    0.00)  DC

SRCGP3    1ST HIGHEST VALUE IS       3.97867 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
          2ND HIGHEST VALUE IS       3.76081 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
          3RD HIGHEST VALUE IS       3.41536 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
          4TH HIGHEST VALUE IS       3.38202 AT (  379098.93,  3852320.09,   142.51,   142.51,    0.00)  DC
          5TH HIGHEST VALUE IS       3.30246 AT (  378765.00,  3851720.00,   143.24,   143.24,    0.00)  DC
          6TH HIGHEST VALUE IS       3.26483 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
          7TH HIGHEST VALUE IS       3.19392 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
          8TH HIGHEST VALUE IS       2.57537 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
          9TH HIGHEST VALUE IS       2.57005 AT (  379148.19,  3852319.45,   140.88,   140.88,    0.00)  DC
         10TH HIGHEST VALUE IS       2.46717 AT (  379065.00,  3852420.00,   141.14,   141.14,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
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 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                      *** THE SUMMARY OF MAXIMUM   1ST-HIGHEST MAX DAILY  1-HR RESULTS AVERAGED OVER   1 YEARS ***

                                  ** CONC OF NO2      IN MICROGRAMS/M**3                          **

                                                                                                          NETWORK
GROUP ID                       AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS     111.11953 AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
          2ND HIGHEST VALUE IS     106.82389 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
          3RD HIGHEST VALUE IS      98.72242 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
          4TH HIGHEST VALUE IS      98.60040 AT (  378965.00,  3851720.00,   139.37,   145.00,    0.00)  DC
          5TH HIGHEST VALUE IS      97.41407 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
          6TH HIGHEST VALUE IS      95.60155 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
          7TH HIGHEST VALUE IS      93.23375 AT (  378984.90,  3851764.11,   139.85,   145.00,    0.00)  DC
          8TH HIGHEST VALUE IS      87.53516 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
          9TH HIGHEST VALUE IS      85.37972 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
         10TH HIGHEST VALUE IS      84.76659 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC

SRCGP2    1ST HIGHEST VALUE IS      82.59738 AT (  379965.00,  3852520.00,   158.10,   214.80,    0.00)  DC
          2ND HIGHEST VALUE IS      81.35515 AT (  379965.00,  3852620.00,   149.87,   214.80,    0.00)  DC
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	3RD HIGHEST VALUE IS	81.35467 AT (	380165.00,	3852620.00,	169.36,	214.80,	0.00)	DC
	4TH HIGHEST VALUE IS	81.19844 AT (	376965.00,	3851820.00,	170.55,	170.55,	0.00)	DC
	5TH HIGHEST VALUE IS	78.53680 AT (	378165.00,	3850220.00,	139.91,	147.00,	0.00)	DC
	6TH HIGHEST VALUE IS	78.51656 AT (	379865.00,	3852520.00,	137.89,	214.80,	0.00)	DC
	7TH HIGHEST VALUE IS	77.98205 AT (	378365.00,	3850420.00,	139.78,	147.00,	0.00)	DC
	8TH HIGHEST VALUE IS	77.84359 AT (	379965.00,	3852420.00,	149.59,	214.80,	0.00)	DC
	9TH HIGHEST VALUE IS	77.78230 AT (	378165.00,	3850020.00,	141.38,	146.00,	0.00)	DC
	10TH HIGHEST VALUE IS	77.61333 AT (	379765.00,	3853420.00,	126.10,	148.00,	0.00)	DC
SRCGP3	1ST HIGHEST VALUE IS	111.11953 AT (	378935.83,	3851765.00,	141.58,	145.00,	0.00)	DC
	2ND HIGHEST VALUE IS	106.82389 AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC
	3RD HIGHEST VALUE IS	98.72242 AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC
	4TH HIGHEST VALUE IS	98.60040 AT (	378965.00,	3851720.00,	139.37,	145.00,	0.00)	DC
	5TH HIGHEST VALUE IS	97.41407 AT (	378901.88,	3852322.63,	142.58,	146.00,	0.00)	DC
	6TH HIGHEST VALUE IS	95.60155 AT (	378951.14,	3852322.00,	142.68,	145.00,	0.00)	DC
	7TH HIGHEST VALUE IS	93.23375 AT (	378984.90,	3851764.11,	139.85,	145.00,	0.00)	DC
	8TH HIGHEST VALUE IS	87.53516 AT (	379000.41,	3852321.36,	142.76,	142.76,	0.00)	DC
	9TH HIGHEST VALUE IS	85.37972 AT (	378852.62,	3852323.27,	142.50,	146.00,	0.00)	DC
	10TH HIGHEST VALUE IS	84.76659 AT (	378865.00,	3851720.00,	141.49,	146.00,	0.00)	DC

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**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM 8TH-HIGHEST MAX DAILY 1-HR RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF NO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR,	YR,	ZELEV,	ZHILL,	ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	95.49679 AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	2ND HIGHEST VALUE IS	88.92146 AT (	378935.83,	3851765.00,	141.58,	145.00,	0.00)	DC	
	3RD HIGHEST VALUE IS	86.61204 AT (	378901.88,	3852322.63,	142.58,	146.00,	0.00)	DC	
	4TH HIGHEST VALUE IS	84.68337 AT (	378951.14,	3852322.00,	142.68,	145.00,	0.00)	DC	
	5TH HIGHEST VALUE IS	79.20669 AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	
	6TH HIGHEST VALUE IS	77.29313 AT (	378865.00,	3851720.00,	141.49,	146.00,	0.00)	DC	
	7TH HIGHEST VALUE IS	71.60332 AT (	378965.00,	3851720.00,	139.37,	145.00,	0.00)	DC	
	8TH HIGHEST VALUE IS	71.09198 AT (	379000.41,	3852321.36,	142.76,	142.76,	0.00)	DC	
	9TH HIGHEST VALUE IS	69.01631 AT (	378788.62,	3851767.67,	143.30,	146.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	67.22295 AT (	378984.90,	3851764.11,	139.85,	145.00,	0.00)	DC	
SRCGP2	1ST HIGHEST VALUE IS	60.70678 AT (	379065.00,	3852520.00,	140.24,	145.00,	0.00)	DC	
	2ND HIGHEST VALUE IS	59.85079 AT (	379065.00,	3852620.00,	139.25,	145.00,	0.00)	DC	
	3RD HIGHEST VALUE IS	59.03049 AT (	379165.00,	3852520.00,	140.42,	140.42,	0.00)	DC	
	4TH HIGHEST VALUE IS	58.54158 AT (	379165.00,	3852620.00,	138.82,	138.82,	0.00)	DC	
	5TH HIGHEST VALUE IS	58.43918 AT (	379265.00,	3852620.00,	138.00,	143.00,	0.00)	DC	
	6TH HIGHEST VALUE IS	57.72883 AT (	379065.00,	3852720.00,	139.14,	145.00,	0.00)	DC	
	7TH HIGHEST VALUE IS	57.65674 AT (	379265.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	8TH HIGHEST VALUE IS	57.62115 AT (	378865.00,	3851520.00,	140.08,	147.00,	0.00)	DC	
	9TH HIGHEST VALUE IS	57.44659 AT (	379265.00,	3852520.00,	138.75,	142.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	57.22360 AT (	379165.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
SRCGP3	1ST HIGHEST VALUE IS	95.49679 AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	2ND HIGHEST VALUE IS	88.92146 AT (	378935.83,	3851765.00,	141.58,	145.00,	0.00)	DC	
	3RD HIGHEST VALUE IS	86.61204 AT (	378901.88,	3852322.63,	142.58,	146.00,	0.00)	DC	
	4TH HIGHEST VALUE IS	84.68337 AT (	378951.14,	3852322.00,	142.68,	145.00,	0.00)	DC	
	5TH HIGHEST VALUE IS	79.20669 AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	
	6TH HIGHEST VALUE IS	77.29313 AT (	378865.00,	3851720.00,	141.49,	146.00,	0.00)	DC	
	7TH HIGHEST VALUE IS	71.60332 AT (	378965.00,	3851720.00,	139.37,	145.00,	0.00)	DC	

```
                                                                                NO2_2011.ADO
        8TH HIGHEST VALUE IS      71.09198 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
        9TH HIGHEST VALUE IS      69.01631 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
       10TH HIGHEST VALUE IS      67.22295 AT (  378984.90,  3851764.11,   139.85,   145.00,    0.00)  DC

*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                  ***        16:30:01
                                                                                                                   PAGE 271
**MODELOPTs:  RegDFAULT CONC                                          ELEV

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of           14 Warning Message(s)
A Total of         1074 Informational Message(s)

A Total of         8760 Hours Were Processed

A Total of          899 Calm Hours Identified

A Total of          175 Missing Hours Identified (  2.00 Percent)

   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***

   ********   WARNING MESSAGES   ********
CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2
CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3
CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4
MX W441    7257  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103009
MX W441    7258  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103010
MX W441    7259  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103011
MX W441    7260  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103012
MX W441    7261  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103013
MX W441    7262  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103014
MX W441    7263  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103015
MX W441    7264  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103016

   ************************************
   *** AERMOD Finishes Successfully ***
   ************************************
```

Appendix B - Air Quality Impact Evaluation
AERMOD Output Files
Pollutant - NO2
Years - 2007-2011

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d

```
                                                                                    NO2_2007-2011.ADO
 *** Message Summary For AERMOD Model Setup ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            2 Warning Message(s)
A Total of            0 Informational Message(s)


   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


   ********   WARNING MESSAGES   ********
CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

***********************************
*** SETUP Finishes Successfully ***
***********************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                  ***        16:33:27
                                                                                                                   PAGE   1
**MODELOPTs:  RegDFAULT CONC                                          ELEV


                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.
        6. Full Conversion Assumed for NO2.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:   1-HR
    and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);       3 Source Group(s); and    2064 Receptor(s)

**The Model Assumes A Pollutant Type of:  NO2

**Note that special processing requirements apply for the 1-hour NO2 NAAQS - check available guidance.
  Model will process user-specified ranks of daily maximum 1-hour values averaged across the number of years modeled.
  For annual NO2 NAAQS modeling, the multi-year maximum of PERIOD values can be simulated using the MULTYEAR keyword.
  Multi-year PERIOD and 1-hour values should only be done in a single model run using the MULTYEAR option with a
  single multi-year meteorological data file using STARTEND keyword.
```

```
                                                                                    NO2_2007-2011.ADO
**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
        Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
        Model Outputs External File(s) of Maximum Daily 1-hr Values by Day (MAXDAILY Keyword)
        Model Outputs External File(s) of Maximum Daily 1-hr Values by Year (MXDYBYYR Keyword)
        Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.6 MB of RAM.

**Detailed Error/Message File:   MSSilicon_NO2.err
**File for Summary of Results:   MSSilicon_NO2.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                   ***        16:33:27
                                                                                                                    PAGE    2
**MODELOPTs:  RegDFAULT CONC                                                ELEV


                                                  *** POINT SOURCE DATA ***

             NUMBER EMISSION RATE                    BASE     STACK   STACK    STACK     STACK    BLDG   URBAN  CAP/  EMIS RATE
  SOURCE      PART.  (GRAMS/SEC)     X         Y     ELEV.    HEIGHT  TEMP.   EXIT VEL. DIAMETER EXISTS SOURCE HOR   SCALAR
    ID        CATS.                (METERS) (METERS) (METERS) (METERS) (DEG.K)  (M/SEC)  (METERS)                        VARY BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SAF1            0   0.15592E+02  379020.5 3852097.6   143.6    91.44   449.82    19.37     1.93    YES     NO    NO
SAF2            0   0.15592E+02  379019.6 3852052.8   143.2    91.44   449.82    19.37     1.93    YES     NO    NO
SAF3            0   0.15592E+02  379018.2 3851969.8   142.6    91.44   449.82    19.37     1.93    YES     NO    NO
SAF4            0   0.15592E+02  379017.5 3851925.0   142.1    91.44   449.82    19.37     1.93    YES     NO    NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                   ***        16:33:27
                                                                                                                    PAGE    3
**MODELOPTs:  RegDFAULT CONC                                                ELEV


                                                  *** VOLUME SOURCE DATA ***

             NUMBER EMISSION RATE                    BASE    RELEASE    INIT.    INIT.   URBAN  EMISSION RATE
  SOURCE      PART.  (GRAMS/SEC)     X         Y     ELEV.   HEIGHT     SY       SZ     SOURCE  SCALAR VARY
    ID        CATS.                (METERS) (METERS) (METERS) (METERS) (METERS) (METERS)              BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

F1              0   0.20160E+00  378925.8 3852076.8   144.0    20.01     6.97    18.62     NO
F2              0   0.20160E+00  378923.5 3851949.2   143.0    20.01     6.97    18.62     NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                   ***        16:33:27
                                                                                                                    PAGE    4
**MODELOPTs:  RegDFAULT CONC                                                ELEV
```

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
SRCGP1	SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 ,
SRCGP2	SAF1 , SAF2 , SAF3 , SAF4 ,
SRCGP3	F1 , F2 ,

**MODELOPTs: RegDFAULT CONC ELEV

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	16.8,	14.4,	-12.8,	9.6,	2	40.0,	54.1,	84.7,	-214.9,	40.5,
3	40.0,	64.6,	83.9,	-218.9,	9.9,	4	40.0,	73.2,	80.5,	-216.2,	-21.0,
5	40.0,	79.4,	74.5,	-123.2,	45.0,	6	40.0,	83.3,	66.5,	-125.7,	29.4,
7	40.0,	84.7,	56.3,	-124.3,	12.9,	8	40.0,	83.4,	44.5,	-119.2,	-3.9,
9	40.0,	79.7,	31.3,	-110.4,	-20.7,	10	40.0,	82.9,	42.0,	-110.7,	-36.9,
11	40.0,	84.6,	54.1,	-109.0,	-51.9,	12	15.2,	85.4,	92.9,	12.5,	7.1,
13	15.2,	90.8,	93.6,	10.0,	17.2,	14	15.2,	93.5,	91.6,	7.2,	26.8,
15	15.2,	93.2,	86.7,	4.1,	35.6,	16	15.2,	90.2,	79.2,	1.0,	43.3,
17	15.2,	84.4,	69.3,	-2.2,	49.7,	18	10.7,	15.3,	12.4,	-2.3,	-10.4,
19	10.7,	16.8,	14.4,	-1.5,	-9.6,	20	28.0,	118.5,	213.2,	9.6,	-72.6,
21	28.0,	147.6,	207.2,	23.4,	-51.3,	22	28.0,	172.2,	194.8,	36.6,	-28.5,
23	40.0,	79.4,	74.5,	48.6,	-45.0,	24	40.0,	83.3,	66.5,	59.2,	-29.4,
25	40.0,	84.7,	56.3,	68.0,	-12.9,	26	40.0,	83.4,	44.5,	74.7,	3.9,
27	40.0,	79.7,	31.3,	79.1,	20.7,	28	40.0,	82.9,	42.0,	68.8,	36.9,
29	40.0,	84.6,	54.1,	54.9,	51.9,	30	15.2,	85.4,	92.9,	-105.4,	-7.1,
31	15.2,	90.8,	93.6,	-103.6,	-17.2,	32	15.2,	93.5,	91.6,	-98.8,	-26.8,
33	15.2,	93.2,	86.7,	-90.9,	-35.6,	34	15.2,	90.2,	79.2,	-80.2,	-43.3,
35	15.2,	84.4,	69.3,	-67.1,	-49.7,	36	10.7,	15.3,	12.4,	-10.1,	10.4,

SOURCE ID: SAF2

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	17.1,	14.3,	-4.8,	10.9,	2	38.1,	65.7,	84.7,	-172.5,	49.1,
3	40.0,	64.6,	83.9,	-179.7,	31.5,	4	40.0,	73.2,	80.5,	-181.3,	7.1,
5	40.0,	79.5,	74.6,	-177.5,	-17.5,	6	40.0,	83.4,	66.5,	-168.3,	-41.6,
7	40.0,	84.7,	56.3,	-108.1,	54.7,	8	40.0,	83.4,	44.5,	-110.5,	40.0,
9	40.0,	79.7,	31.3,	-109.5,	24.1,	10	40.0,	82.9,	42.0,	-117.6,	7.4,
11	40.0,	84.6,	54.1,	-123.5,	-9.5,	12	40.0,	83.8,	64.6,	-125.6,	-26.1,
13	40.0,	80.4,	73.1,	-123.9,	-41.9,	14	40.0,	74.5,	79.4,	-118.5,	-56.4,
15	10.7,	19.2,	18.2,	-49.2,	12.3,	16	10.7,	18.4,	16.7,	-50.0,	5.1,
17	10.7,	17.1,	14.8,	-49.3,	-2.2,	18	10.7,	15.3,	12.4,	-47.1,	-9.5,
19	10.7,	17.1,	14.3,	-9.5,	-10.9,	20	15.2,	89.3,	77.5,	-77.8,	44.8,
21	28.0,	147.6,	207.2,	-15.8,	-72.9,	22	28.0,	172.2,	194.8,	1.7,	-56.6,
23	28.0,	191.6,	176.6,	19.2,	-38.5,	24	28.0,	205.2,	152.9,	36.0,	-19.3,
25	40.0,	84.7,	56.3,	51.8,	-54.7,	26	40.0,	83.4,	44.5,	66.0,	-40.0,
27	40.0,	79.7,	31.3,	78.2,	-24.1,	28	40.0,	82.9,	42.0,	75.6,	-7.4,
29	40.0,	84.6,	54.1,	69.4,	9.5,	30	40.0,	83.8,	64.6,	61.0,	26.1,
31	40.0,	80.4,	73.1,	50.8,	41.9,	32	40.0,	74.5,	79.4,	39.1,	56.4,

RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE		RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE	
1.	111.62184	(09010612) AT	(380565.00, 3851820.00)	DC	11.	104.95457	(08022409) AT	(377165.00, 3850620.00)	DC
2.	111.38097	(09010612) AT	(380765.00, 3851820.00)	DC	12.	104.57939	(08022409) AT	(377565.00, 3850820.00)	DC
3.	109.25968	(09010613) AT	(380565.00, 3851020.00)	DC	13.	104.56075	(09010613) AT	(380765.00, 3850820.00)	DC
4.	107.98429	(09010613) AT	(380365.00, 3851220.00)	DC	14.	104.31278	(09112109) AT	(377565.00, 3851820.00)	DC
5.	106.86315	(09010612) AT	(380965.00, 3851820.00)	DC	15.	103.95107	(09010612) AT	(380965.00, 3851620.00)	DC
6.	106.35114	(09010613) AT	(380165.00, 3851220.00)	DC	16.	103.63593	(08022409) AT	(377365.00, 3850620.00)	DC
7.	106.32825	(09112109) AT	(377765.00, 3851820.00)	DC	17.	103.48970	(08022409) AT	(376965.00, 3850420.00)	DC
8.	106.18940	(09010613) AT	(380365.00, 3851020.00)	DC	18.	102.83064	(08022409) AT	(377365.00, 3850820.00)	DC
9.	105.63315	(09010612) AT	(380365.00, 3851820.00)	DC	19.	102.68786	(10051907) AT	(377965.00, 3850820.00)	DC
10.	105.39330	(10012810) AT	(380165.00, 3852220.00)	DC	20.	102.64705	(09112109) AT	(377565.00, 3851620.00)	DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/06/13
*** *** 16:33:27
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**MODELOPTs: RegDFAULT CONC ELEV

*** THE MAXIMUM 20 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: SRCGP3 ***
INCLUDING SOURCE(S): F1 , F2 ,

** CONC OF NO2 IN MICROGRAMS/M**3 **

RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE		RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE	
1.	119.77241	(08052122) AT	(378886.76, 3851765.89)	DC	11.	110.48545	(07112803) AT	(378886.76, 3851765.89)	DC
2.	119.31919	(08042305) AT	(378935.83, 3851765.00)	DC	12.	110.27768	(10122422) AT	(378886.76, 3851765.89)	DC
3.	113.60490	(09022307) AT	(378935.83, 3851765.00)	DC	13.	110.15895	(08030904) AT	(378935.83, 3851765.00)	DC
4.	113.19894	(07012006) AT	(378886.76, 3851765.89)	DC	14.	109.07621	(09110424) AT	(378935.83, 3851765.00)	DC
5.	112.77355	(08011221) AT	(378886.76, 3851765.89)	DC	15.	108.87935	(07011005) AT	(378886.76, 3851765.89)	DC
6.	111.97865	(07020819) AT	(378886.76, 3851765.89)	DC	16.	108.79230	(08011821) AT	(378935.83, 3851765.00)	DC
7.	111.11953	(11121707) AT	(378935.83, 3851765.00)	DC	17.	108.79000	(08122822) AT	(378886.76, 3851765.89)	DC
8.	110.79652	(08022504) AT	(378935.83, 3851765.00)	DC	18.	108.76373	(09121103) AT	(378935.83, 3851765.00)	DC
9.	110.71663	(10011221) AT	(378886.76, 3851765.89)	DC	19.	108.31650	(07042904) AT	(378935.83, 3851765.00)	DC
10.	110.52571	(11121706) AT	(378935.83, 3851765.00)	DC	20.	107.55568	(08040701) AT	(378935.83, 3851765.00)	DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/06/13
*** *** 16:33:27
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**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF NO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE						NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	4.56799 AT (	378788.62,	3851767.67,	143.30,	146.00,	0.00)	DC	
	2ND HIGHEST VALUE IS	4.55401 AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	
	3RD HIGHEST VALUE IS	4.23194 AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	

	4TH HIGHEST VALUE IS	4.21892 AT (	378765.00,	3851720.00,	143.24,	143.24,	0.00)	DC	
	5TH HIGHEST VALUE IS	4.10163 AT (	379049.67,	3852320.72,	142.86,	142.86,	0.00)	DC	
	6TH HIGHEST VALUE IS	4.08518 AT (	379000.41,	3852321.36,	142.76,	142.76,	0.00)	DC	
	7TH HIGHEST VALUE IS	4.04208 AT (	379165.00,	3852520.00,	140.42,	140.42,	0.00)	DC	
	8TH HIGHEST VALUE IS	4.01183 AT (	379165.00,	3852620.00,	138.82,	138.82,	0.00)	DC	
	9TH HIGHEST VALUE IS	3.99140 AT (	379265.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	10TH HIGHEST VALUE IS	3.98270 AT (	379165.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
SRCGP2	1ST HIGHEST VALUE IS	3.05634 AT (	379265.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	2ND HIGHEST VALUE IS	3.05610 AT (	379265.00,	3852820.00,	140.30,	140.30,	0.00)	DC	
	3RD HIGHEST VALUE IS	3.02050 AT (	379165.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	4TH HIGHEST VALUE IS	3.00639 AT (	379165.00,	3852820.00,	140.20,	140.20,	0.00)	DC	
	5TH HIGHEST VALUE IS	2.95547 AT (	379265.00,	3852920.00,	139.54,	143.00,	0.00)	DC	
	6TH HIGHEST VALUE IS	2.93775 AT (	379365.00,	3852820.00,	139.31,	139.31,	0.00)	DC	
	7TH HIGHEST VALUE IS	2.92710 AT (	379365.00,	3852720.00,	139.58,	139.58,	0.00)	DC	
	8TH HIGHEST VALUE IS	2.90213 AT (	379165.00,	3852920.00,	139.85,	139.85,	0.00)	DC	
	9TH HIGHEST VALUE IS	2.89538 AT (	379265.00,	3852620.00,	138.00,	143.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	2.88218 AT (	379165.00,	3852620.00,	138.82,	138.82,	0.00)	DC	
SRCGP3	1ST HIGHEST VALUE IS	3.54527 AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	
	2ND HIGHEST VALUE IS	3.41810 AT (	378788.62,	3851767.67,	143.30,	146.00,	0.00)	DC	
	3RD HIGHEST VALUE IS	3.36739 AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	4TH HIGHEST VALUE IS	2.86046 AT (	379000.41,	3852321.36,	142.76,	142.76,	0.00)	DC	
	5TH HIGHEST VALUE IS	2.81282 AT (	378765.00,	3851720.00,	143.24,	143.24,	0.00)	DC	
	6TH HIGHEST VALUE IS	2.79922 AT (	379049.67,	3852320.72,	142.86,	142.86,	0.00)	DC	
	7TH HIGHEST VALUE IS	2.75583 AT (	378951.14,	3852322.00,	142.68,	145.00,	0.00)	DC	
	8TH HIGHEST VALUE IS	2.69693 AT (	378739.55,	3851768.56,	143.30,	147.00,	0.00)	DC	
	9TH HIGHEST VALUE IS	2.66820 AT (	378865.00,	3851720.00,	141.49,	146.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	2.53409 AT (	378901.88,	3852322.63,	142.58,	146.00,	0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/06/13
*** *** 16:33:27
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**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM 1ST-HIGHEST MAX DAILY 1-HR RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF NO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR,	YR,	ZELEV,	ZHILL,	ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	111.34693 AT (	378935.83,	3851765.00,	141.58,	145.00,	0.00)	DC	
	2ND HIGHEST VALUE IS	111.14792 AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	3RD HIGHEST VALUE IS	95.99298 AT (	378901.88,	3852322.63,	142.58,	146.00,	0.00)	DC	
	4TH HIGHEST VALUE IS	95.87090 AT (	378951.14,	3852322.00,	142.68,	145.00,	0.00)	DC	
	5TH HIGHEST VALUE IS	94.91195 AT (	378984.90,	3851764.11,	139.85,	145.00,	0.00)	DC	
	6TH HIGHEST VALUE IS	92.85528 AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	
	7TH HIGHEST VALUE IS	92.05139 AT (	378965.00,	3851720.00,	139.37,	145.00,	0.00)	DC	
	8TH HIGHEST VALUE IS	90.80768 AT (	378865.00,	3851720.00,	141.49,	146.00,	0.00)	DC	
	9TH HIGHEST VALUE IS	87.72599 AT (	379000.41,	3852321.36,	142.76,	142.76,	0.00)	DC	
	10TH HIGHEST VALUE IS	85.55148 AT (	378165.00,	3851020.00,	147.60,	152.80,	0.00)	DC	
SRCGP2	1ST HIGHEST VALUE IS	83.72346 AT (	378165.00,	3851020.00,	147.60,	152.80,	0.00)	DC	
	2ND HIGHEST VALUE IS	82.60756 AT (	378265.00,	3851120.00,	146.95,	150.00,	0.00)	DC	

```
                                                                                NO2_2007-2011.ADO
          3RD HIGHEST VALUE IS      81.74266 AT (  378265.00,  3851020.00,   145.52,   150.00,     0.00)  DC
          4TH HIGHEST VALUE IS      81.00931 AT (  377965.00,  3850820.00,   146.44,   151.00,     0.00)  DC
          5TH HIGHEST VALUE IS      80.93295 AT (  378165.00,  3851120.00,   151.51,   151.51,     0.00)  DC
          6TH HIGHEST VALUE IS      80.86480 AT (  378065.00,  3851020.00,   153.07,   153.07,     0.00)  DC
          7TH HIGHEST VALUE IS      80.53726 AT (  379965.00,  3852220.00,   142.85,   214.80,     0.00)  DC
          8TH HIGHEST VALUE IS      79.74172 AT (  380165.00,  3852220.00,   163.93,   214.80,     0.00)  DC
          9TH HIGHEST VALUE IS      79.02965 AT (  378265.00,  3851220.00,   146.29,   151.00,     0.00)  DC
         10TH HIGHEST VALUE IS      78.50715 AT (  378165.00,  3850820.00,   145.42,   149.00,     0.00)  DC

SRCGP3    1ST HIGHEST VALUE IS     111.34693 AT (  378935.83,  3851765.00,   141.58,   145.00,     0.00)  DC
          2ND HIGHEST VALUE IS     111.14792 AT (  378886.76,  3851765.89,   143.00,   146.00,     0.00)  DC
          3RD HIGHEST VALUE IS      95.99298 AT (  378901.88,  3852322.63,   142.58,   146.00,     0.00)  DC
          4TH HIGHEST VALUE IS      95.87090 AT (  378951.14,  3852322.00,   142.68,   145.00,     0.00)  DC
          5TH HIGHEST VALUE IS      94.91195 AT (  378984.90,  3851764.11,   139.85,   145.00,     0.00)  DC
          6TH HIGHEST VALUE IS      92.85528 AT (  378837.69,  3851766.78,   143.17,   143.17,     0.00)  DC
          7TH HIGHEST VALUE IS      92.05139 AT (  378965.00,  3851720.00,   139.37,   145.00,     0.00)  DC
          8TH HIGHEST VALUE IS      90.80768 AT (  378865.00,  3851720.00,   141.49,   146.00,     0.00)  DC
          9TH HIGHEST VALUE IS      87.72599 AT (  379000.41,  3852321.36,   142.76,   142.76,     0.00)  DC
         10TH HIGHEST VALUE IS      84.16942 AT (  378852.62,  3852323.27,   142.50,   146.00,     0.00)  DC
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                  ***         16:33:27
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 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                    *** THE SUMMARY OF MAXIMUM   8TH-HIGHEST MAX DAILY  1-HR RESULTS AVERAGED OVER   5 YEARS ***

                                 ** CONC OF NO2      IN MICROGRAMS/M**3                          **

                                                                                                        NETWORK
GROUP ID                      AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS      98.24633 AT (  378886.76,  3851765.89,   143.00,   146.00,     0.00)  DC
          2ND HIGHEST VALUE IS      96.15192 AT (  378935.83,  3851765.00,   141.58,   145.00,     0.00)  DC
          3RD HIGHEST VALUE IS      82.70567 AT (  378951.14,  3852322.00,   142.68,   145.00,     0.00)  DC
          4TH HIGHEST VALUE IS      81.09846 AT (  378837.69,  3851766.78,   143.17,   143.17,     0.00)  DC
          5TH HIGHEST VALUE IS      80.19488 AT (  378901.88,  3852322.63,   142.58,   146.00,     0.00)  DC
          6TH HIGHEST VALUE IS      79.64967 AT (  378865.00,  3851720.00,   141.49,   146.00,     0.00)  DC
          7TH HIGHEST VALUE IS      75.38119 AT (  378984.90,  3851764.11,   139.85,   145.00,     0.00)  DC
          8TH HIGHEST VALUE IS      75.14746 AT (  378965.00,  3851720.00,   139.37,   145.00,     0.00)  DC
          9TH HIGHEST VALUE IS      74.87597 AT (  379000.41,  3852321.36,   142.76,   142.76,     0.00)  DC
         10TH HIGHEST VALUE IS      68.35861 AT (  378852.62,  3852323.27,   142.50,   146.00,     0.00)  DC

SRCGP2    1ST HIGHEST VALUE IS      59.21395 AT (  379065.00,  3852520.00,   140.24,   145.00,     0.00)  DC
          2ND HIGHEST VALUE IS      59.20483 AT (  379165.00,  3852520.00,   140.42,   140.42,     0.00)  DC
          3RD HIGHEST VALUE IS      59.17885 AT (  379065.00,  3852620.00,   139.25,   145.00,     0.00)  DC
          4TH HIGHEST VALUE IS      58.33686 AT (  379165.00,  3852620.00,   138.82,   138.82,     0.00)  DC
          5TH HIGHEST VALUE IS      58.26245 AT (  378965.00,  3852620.00,   139.84,   146.00,     0.00)  DC
          6TH HIGHEST VALUE IS      57.68873 AT (  379265.00,  3852520.00,   138.75,   142.00,     0.00)  DC
          7TH HIGHEST VALUE IS      57.51650 AT (  379065.00,  3852720.00,   139.14,   145.00,     0.00)  DC
          8TH HIGHEST VALUE IS      57.36387 AT (  379265.00,  3852620.00,   138.00,   143.00,     0.00)  DC
          9TH HIGHEST VALUE IS      57.15426 AT (  378865.00,  3852620.00,   140.03,   147.00,     0.00)  DC
         10TH HIGHEST VALUE IS      56.81186 AT (  378965.00,  3852520.00,   140.24,   145.00,     0.00)  DC

SRCGP3    1ST HIGHEST VALUE IS      98.24633 AT (  378886.76,  3851765.89,   143.00,   146.00,     0.00)  DC
          2ND HIGHEST VALUE IS      96.15192 AT (  378935.83,  3851765.00,   141.58,   145.00,     0.00)  DC
          3RD HIGHEST VALUE IS      82.70567 AT (  378951.14,  3852322.00,   142.68,   145.00,     0.00)  DC
          4TH HIGHEST VALUE IS      81.09846 AT (  378837.69,  3851766.78,   143.17,   143.17,     0.00)  DC
          5TH HIGHEST VALUE IS      80.19488 AT (  378901.88,  3852322.63,   142.58,   146.00,     0.00)  DC
          6TH HIGHEST VALUE IS      79.64967 AT (  378865.00,  3851720.00,   141.49,   146.00,     0.00)  DC
          7TH HIGHEST VALUE IS      75.38119 AT (  378984.90,  3851764.11,   139.85,   145.00,     0.00)  DC
```

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                                                                                    NO2_2007-2011.ADO
        8TH HIGHEST VALUE IS      75.14746 AT (  378965.00,  3851720.00,   139.37,   145.00,    0.00)  DC
        9TH HIGHEST VALUE IS      74.87597 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
       10TH HIGHEST VALUE IS      68.35861 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC

*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/06/13
                                   ***                                                                  ***        16:33:27
                                                                                                                   PAGE 271
**MODELOPTs:  RegDFAULT CONC                                                ELEV

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of           14 Warning Message(s)
A Total of         6022 Informational Message(s)

A Total of        43824 Hours Were Processed

A Total of         4669 Calm Hours Identified

A Total of         1353 Missing Hours Identified (  3.09 Percent)

   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***

   ********   WARNING MESSAGES   ********
CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
CN W305       3 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3
CN W305       3 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4
CN W305       7 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
CN W305      10 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2
MX W441   42321  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103009
MX W441   42322  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103010
MX W441   42323  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103011
MX W441   42324  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103012
MX W441   42325  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103013
MX W441   42326  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103014
MX W441   42327  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103015
MX W441   42328  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103016

   ************************************
   *** AERMOD Finishes Successfully ***
   ************************************
```

Appendix B - Air Quality Impact Evaluation – AERMOD Output Files – PM10

Air Quality Impact Evaluation – AERMOD Output Files

Pollutant – PM_{10}

Years – 2007 through 2011

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d


```
ME STARTING
   SURFFILE "..\Met Data\KTUP_12354\KTUP_07.SFC"
   PROFFILE "..\Met Data\KTUP_12354\KTUP_07.PFL"
   SURFDATA 93862 2007 TUPELO
   UAIRDATA 3940 2007 JACKSON/THOMPSON_FIELD
   PROFBASE 104.0 METERS
ME FINISHED
**
****************************************
** AERMOD Output Pathway
****************************************
**
**
OU STARTING
   RECTABLE ALLAVE 1ST-2ND 6TH
   RECTABLE 24 1ST-2ND 6TH
   MAXTABLE ALLAVE 20
** Auto-Generated Plotfiles
   PLOTFILE 24 SRCGP1 1ST MSSILICON_PM10.AD\24H1G001.PLT 31
   PLOTFILE 24 SRCGP1 2ND MSSILICON_PM10.AD\24H2G000.PLT 32
   PLOTFILE 24 SRCGP1 6TH MSSILICON_PM10.AD\24H6G000.PLT 33
   PLOTFILE ANNUAL SRCGP1 MSSILICON_PM10.AD\AN00G000.PLT 34
   SUMMFILE MSSilicon_PM10.sum
OU FINISHED

  *** Message Summary For AERMOD Model Setup ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            1 Warning Message(s)
 A Total of            0 Informational Message(s)

    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***

    ********   WARNING MESSAGES   ********
 ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

 ***********************************
 *** SETUP Finishes Successfully ***
 ***********************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        13:29:31
                                                                                                                       PAGE   1
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F
```

```
**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates ANNUAL Averages

**This Run Includes:     14 Source(s);       1 Source Group(s); and    3416 Receptor(s)

**The Model Assumes A Pollutant Type of:  PM_10

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                              ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.1 MB of RAM.

**Detailed Error/Message File:   MSSilicon_PM10.err
**File for Summary of Results:   MSSilicon_PM10.sum
```


**MODELOPTs: RegDFAULT CONC   ELEV

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.43973E+00	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.43973E+00	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.43973E+00	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.43973E+00	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	
RM1	0	0.97018E-01	378883.4	3852121.0	144.4	12.19	293.15	18.29	1.37	YES	NO	NO	
RM2	0	0.97018E-01	378879.7	3851906.4	141.9	24.38	293.15	18.29	1.37	YES	NO	NO	
PR1	0	0.48500E-01	378833.8	3852062.0	143.3	12.19	293.15	18.29	1.07	YES	NO	NO	
PR2	0	0.48500E-01	378832.2	3851967.1	143.3	24.38	293.15	18.29	1.07	YES	NO	NO	

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.12600E-02	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.12600E-02	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	
CF1	0	0.42839E-02	378898.4	3852065.0	144.1	14.00	5.61	13.02	NO	
CF2	0	0.42839E-02	378896.7	3851961.8	143.5	14.00	5.61	13.02	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
*** *** 13:29:31
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**MODELOPTs: RegDFAULT CONC ELEV

*** AREA SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	COORD (SW CORNER) X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	X-DIM OF AREA (METERS)	Y-DIM OF AREA (METERS)	ORIENT. OF AREA (DEG.)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PA	0	0.21869E-05	379141.7	3851891.2	140.9	9.14	229.66	339.73	-88.50	0.00	NO	
SP	0	0.34927E-05	379217.5	3852026.9	140.8	9.14	166.03	105.72	92.97	0.00	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
*** *** 13:29:31
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**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs								
SRCGP1	SAF1	, SAF2	, SAF3	, SAF4	, F1	, F2	, RM1	, RM2	,
	PR1	, PR2	, CF1	, CF2	, PA	, SP	,		

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
*** *** 13:29:31
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**MODELOPTs: RegDFAULT CONC ELEV

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	16.8,	14.4,	-12.8,	9.6,	2	40.0,	54.1,	84.7,	-214.9,	40.5,
3	40.0,	64.6,	83.9,	-218.9,	9.9,	4	40.0,	73.2,	80.5,	-216.2,	-21.0,
5	40.0,	79.4,	74.5,	-123.2,	45.0,	6	40.0,	83.3,	66.5,	-125.7,	29.4,
7	40.0,	84.7,	56.3,	-124.3,	12.9,	8	40.0,	83.4,	44.5,	-119.2,	-3.9,

```
                                                                                PM10_2007.ADO
      378690.48   3851769.45        7.18326c (07100224)                378641.41   3851770.34        6.09099  (07020124)
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                   ***          13:29:31
                                                                                                                      PAGE 220
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                                 *** THE MAXIMUM   20  24-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  SRCGP1   ***
                                     INCLUDING SOURCE(S):     SAF1        , SAF2        , SAF3        , SAF4        , F1          ,
                 F2          , RM1         , RM2         , PR1         , PR2         , CF1         , CF2         , PA          ,
                 SP          ,

                                          ** CONC OF PM_10    IN MICROGRAMS/M**3                          **

 RANK        CONC    (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE    RANK        CONC    (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
   1.      20.47178 (07100524) AT ( 378671.74, 3852133.81)  DC       11.      16.07485b(07090424) AT ( 378765.00, 3851620.00)  DC
   2.      20.02812 (07100524) AT ( 378665.00, 3852120.00)  DC       12.      16.07327c(07080924) AT ( 379363.47, 3852190.55)  DC
   3.      18.36711 (07100524) AT ( 378690.40, 3852172.49)  DC       13.      15.92886b(07091924) AT ( 378765.00, 3851620.00)  DC
   4.      18.30041 (07100524) AT ( 378653.08, 3852095.12)  DC       14.      15.86436c(07072724) AT ( 379276.91, 3852287.28)  DC
   5.      17.69559b(07060524) AT ( 379351.65, 3852096.74)  DC       15.      15.85411m(07081624) AT ( 379357.56, 3852143.64)  DC
   6.      17.69547 (07100524) AT ( 378565.00, 3852120.00)  DC       16.      15.80067b(07090424) AT ( 378765.00, 3851420.00)  DC
   7.      17.60786b(07060524) AT ( 379365.00, 3852120.00)  DC       17.      15.77010c(07072724) AT ( 379319.81, 3852276.55)  DC
   8.      17.33320b(07060524) AT ( 379357.56, 3852143.64)  DC       18.      15.59857b(07090424) AT ( 378765.00, 3851520.00)  DC
   9.      16.34337m(07081624) AT ( 379363.47, 3852190.55)  DC       19.      15.57061c(07080824) AT ( 379234.00, 3852298.00)  DC
  10.      16.07684c(07080824) AT ( 379276.91, 3852287.28)  DC       20.      15.55660c(07080924) AT ( 379369.38, 3852237.46)  DC

  *** RECEPTOR TYPES:  GC = GRIDCART
                       GP = GRIDPOLR
                       DC = DISCCART
                       DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                   ***          13:29:31
                                                                                                                      PAGE 221
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                                   *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***

                                    ** CONC OF PM_10    IN MICROGRAMS/M**3                          **

                                                                                                                NETWORK
 GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 SRCGP1    1ST HIGHEST VALUE IS       3.53139 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS       3.37805 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
           3RD HIGHEST VALUE IS       3.26081 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC
           4TH HIGHEST VALUE IS       3.15331 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
           5TH HIGHEST VALUE IS       3.00421 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
           6TH HIGHEST VALUE IS       2.92709 AT (  378865.00,  3852420.00,   140.56,   147.00,    0.00)  DC
           7TH HIGHEST VALUE IS       2.89146 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
           8TH HIGHEST VALUE IS       2.87943 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
           9TH HIGHEST VALUE IS       2.79603 AT (  378965.00,  3852420.00,   141.11,   145.00,    0.00)  DC
          10TH HIGHEST VALUE IS       2.75124 AT (  378769.35,  3852274.32,   143.00,   143.00,    0.00)  DC

  *** RECEPTOR TYPES:  GC = GRIDCART
                       GP = GRIDPOLR
                       DC = DISCCART
                       DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
```

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                                   ***                                            PM10_2007.ADO                 ***          13:29:31
 **MODELOPTS:  RegDFAULT CONC                                           ELEV                                                 PAGE 222

                                             *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

                                   ** CONC OF PM_10      IN MICROGRAMS/M**3                              **

                                                            DATE                                                                       NETWORK
GROUP ID                                AVERAGE CONC      (YYMMDDHH)             RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1   HIGH   1ST HIGH VALUE IS      20.47178  ON 07100524: AT (  378671.74,  3852133.81,    144.48,    148.00,     0.00)  DC
         HIGH   2ND HIGH VALUE IS      16.07327c ON 07080924: AT (  379363.47,  3852190.55,    140.61,    140.61,     0.00)  DC
         HIGH   6TH HIGH VALUE IS      13.74360  ON 07072824: AT (  379344.60,  3852257.01,    139.95,    139.95,     0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/14/13
                                   ***                                                                    ***        13:29:31
 **MODELOPTS:  RegDFAULT CONC                                           ELEV                                         PAGE 223

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of           0 Fatal Error Message(s)
 A Total of           5 Warning Message(s)
 A Total of        1127 Informational Message(s)

 A Total of        8760 Hours Were Processed

 A Total of         786 Calm Hours Identified

 A Total of         341 Missing Hours Identified (  3.89 Percent)

    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***

    ********   WARNING MESSAGES   ********
 ME W186      384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
 CN W305        3 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3
 CN W305        3 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4
 CN W305        7 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
 CN W305       10 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2

    ************************************
    *** AERMOD Finishes Successfully ***
    ************************************
```

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d


```
ME STARTING
   SURFFILE "..\Met Data\KTUP_12354\KTUP_08.SFC"
   PROFFILE "..\Met Data\KTUP_12354\KTUP_08.PFL"
   SURFDATA 93862 2008 TUPELO
   UAIRDATA 3940 2008 JACKSON/THOMPSON_FIELD
   PROFBASE 104.0 METERS
ME FINISHED
**
****************************************
** AERMOD Output Pathway
****************************************
**
**
OU STARTING
   RECTABLE ALLAVE 1ST-2ND 6TH
   RECTABLE 24 1ST-2ND 6TH
   MAXTABLE ALLAVE 20
** Auto-Generated Plotfiles
   PLOTFILE 24 SRCGP1 1ST MSSILICON_PM10.AD\24H1G001.PLT 31
   PLOTFILE 24 SRCGP1 2ND MSSILICON_PM10.AD\24H2G000.PLT 32
   PLOTFILE 24 SRCGP1 6TH MSSILICON_PM10.AD\24H6G000.PLT 33
   PLOTFILE ANNUAL SRCGP1 MSSILICON_PM10.AD\AN00G000.PLT 34
   SUMMFILE MSSilicon_PM10.sum
OU FINISHED

  *** Message Summary For AERMOD Model Setup ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            1 Warning Message(s)
 A Total of            0 Informational Message(s)


    ******** FATAL ERROR MESSAGES ********
                 ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

 ***********************************
 *** SETUP Finishes Successfully ***
 ***********************************

  *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                    ***                                                                      ***        13:37:13
                                                                                                                        PAGE   1
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F
```

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
1. Stack-tip Downwash.
2. Model Accounts for ELEVated Terrain Effects.
3. Use Calms Processing Routine.
4. Use Missing Data Processing Routine.
5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates 1 Short Term Average(s) of: 24-HR
and Calculates ANNUAL Averages

**This Run Includes: 14 Source(s); 1 Source Group(s); and 3416 Receptor(s)

**The Model Assumes A Pollutant Type of: PM_10

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
Model Outputs Tables of ANNUAL Averages by Receptor
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) = 104.00 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 4.1 MB of RAM.

**Detailed Error/Message File: MSSilicon_PM10.err
**File for Summary of Results: MSSilicon_PM10.sum

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
*** *** 13:37:13
PAGE 2

**MODELOPTS: RegDFAULT CONC ELEV

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.43973E+00	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.43973E+00	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.43973E+00	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.43973E+00	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	
RM1	0	0.97018E-01	378883.4	3852121.0	144.4	12.19	293.15	18.29	1.37	YES	NO	NO	
RM2	0	0.97018E-01	378879.7	3851906.4	141.9	24.38	293.15	18.29	1.37	YES	NO	NO	
PR1	0	0.48500E-01	378833.8	3852062.0	143.3	12.19	293.15	18.29	1.07	YES	NO	NO	
PR2	0	0.48500E-01	378832.2	3851967.1	143.3	24.38	293.15	18.29	1.07	YES	NO	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
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*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.12600E-02	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.12600E-02	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	
CF1	0	0.42839E-02	378898.4	3852065.0	144.1	14.00	5.61	13.02	NO	
CF2	0	0.42839E-02	378896.7	3851961.8	143.5	14.00	5.61	13.02	NO	

*** AREA SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	COORD (SW CORNER) X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	X-DIM OF AREA (METERS)	Y-DIM OF AREA (METERS)	ORIENT. OF AREA (DEG.)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PA	0	0.21869E-05	379141.7	3851891.2	140.9	9.14	229.66	339.73	-88.50	0.00	NO	
SP	0	0.34927E-05	379217.5	3852026.9	140.8	9.14	166.03	105.72	92.97	0.00	NO	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
SRCGP1	SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 , RM1 , RM2 ,
	PR1 , PR2 , CF1 , CF2 , PA , SP ,

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	16.8,	14.4,	-12.8,	9.6,	2	40.0,	54.1,	84.7,	-214.9,	40.5,
3	40.0,	64.6,	83.9,	-218.9,	9.9,	4	40.0,	73.2,	80.5,	-216.2,	-21.0,
5	40.0,	79.4,	74.5,	-123.2,	45.0,	6	40.0,	83.3,	66.5,	-125.7,	29.4,
7	40.0,	84.7,	56.3,	-124.3,	12.9,	8	40.0,	83.4,	44.5,	-119.2,	-3.9,

378690.48 3851769.45 12.59322c (08112824) 378641.41 3851770.34 11.00620b (08092324)

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
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**MODELOPTS: RegDFAULT CONC ELEV

*** THE MAXIMUM 20 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: SRCGP1 ***
INCLUDING SOURCE(S): SAF1 , SAF2 , SAF3 , SAF4 , F1 ,
F2 , RM1 , RM2 , PR1 , PR2 , CF1 , CF2 , PA ,
SP ,

** CONC OF PM_10 IN MICROGRAMS/M**3 **

RANK	CONC (YYMMDDHH)	AT	RECEPTOR (XR,YR)	OF TYPE	RANK	CONC (YYMMDDHH)	AT	RECEPTOR (XR,YR)	OF TYPE
1.	19.02766c(08100524)	AT	(378565.00, 3851620.00)	DC	11.	16.01821c(08101324)	AT	(378709.06, 3852211.17)	DC
2.	17.80658c(08100524)	AT	(378465.00, 3851520.00)	DC	12.	15.99297c(08092124)	AT	(378565.00, 3851620.00)	DC
3.	17.05718c(08100524)	AT	(378565.00, 3851520.00)	DC	13.	15.98817c(08101824)	AT	(378665.00, 3851620.00)	DC
4.	16.89626c(08100524)	AT	(378665.00, 3851720.00)	DC	14.	15.88600c(08100524)	AT	(378665.00, 3851620.00)	DC
5.	16.68321c(08092224)	AT	(378565.00, 3851520.00)	DC	15.	15.86343c(08101824)	AT	(378665.00, 3851520.00)	DC
6.	16.42180c(08100524)	AT	(378465.00, 3851420.00)	DC	16.	15.81065c(08100524)	AT	(378565.00, 3851720.00)	DC
7.	16.36871c(08092224)	AT	(378665.00, 3851720.00)	DC	17.	15.61410c(08092124)	AT	(378665.00, 3851720.00)	DC
8.	16.23599c(08100524)	AT	(378365.00, 3851420.00)	DC	18.	15.56530c(08101824)	AT	(378739.55, 3851768.56)	DC
9.	16.09155c(08092224)	AT	(378565.00, 3851620.00)	DC	19.	15.42966c(08101324)	AT	(378727.72, 3852249.85)	DC
10.	16.04978c(08092224)	AT	(378665.00, 3851620.00)	DC	20.	15.34796c(08100524)	AT	(378365.00, 3851320.00)	DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
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**MODELOPTS: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	2.97951	AT	(378852.62, 3852323.27, 142.50, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.86838	AT	(378837.69, 3851766.78, 143.17, 143.17, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.84663	AT	(378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.83282	AT	(378901.88, 3852322.63, 142.58, 146.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.77603	AT	(378865.00, 3851720.00, 141.49, 146.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	2.76403	AT	(378810.99, 3852298.80, 142.76, 147.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	2.73048	AT	(378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.72214	AT	(378935.83, 3851765.00, 141.58, 145.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.66289	AT	(379000.41, 3852321.36, 142.76, 142.76, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.63950	AT	(378788.62, 3851767.67, 143.30, 146.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13

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                          ***                              PM10_2008.ADO              ***        13:37:13
                                                                                                 PAGE 222
**MODELOPTs:   RegDFAULT CONC                                   ELEV

                                *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

                          ** CONC OF PM_10     IN MICROGRAMS/M**3                          **

                                                     DATE                                                            NETWORK
GROUP ID                           AVERAGE CONC    (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1   HIGH   1ST HIGH VALUE IS      19.02766c ON 08100524: AT (  378565.00,  3851620.00,    142.82,    148.00,     0.00)  DC
         HIGH   2ND HIGH VALUE IS      16.68321c ON 08092224: AT (  378565.00,  3851520.00,    143.13,    149.00,     0.00)  DC
         HIGH   6TH HIGH VALUE IS      13.34591c ON 08091824: AT (  378665.00,  3851720.00,    142.78,    148.00,     0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***    *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/14/13
                                   ***                                                                     ***       13:37:13
                                                                                                                     PAGE 223
**MODELOPTs:   RegDFAULT CONC                                   ELEV

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of          0 Fatal Error Message(s)
A Total of          5 Warning Message(s)
A Total of       1233 Informational Message(s)

A Total of       8784 Hours Were Processed

A Total of        834 Calm Hours Identified

A Total of        399 Missing Hours Identified (  4.54 Percent)

   ******** FATAL ERROR MESSAGES ********
             ***  NONE  ***

   ********   WARNING MESSAGES   ********
ME W186       384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used           0.50
CN W305         1 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF1
CN W305         1 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF2
CN W305        43 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF3
CN W305        43 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF4

   ************************************
   *** AERMOD Finishes Successfully ***
   ************************************
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   PLOTFILE 24 SRCGP1 1ST MSSILICON_PM10.AD\24H1G001.PLT 31
   PLOTFILE 24 SRCGP1 2ND MSSILICON_PM10.AD\24H2G000.PLT 32
   PLOTFILE 24 SRCGP1 6TH MSSILICON_PM10.AD\24H6G000.PLT 33
   PLOTFILE ANNUAL SRCGP1 MSSILICON_PM10.AD\AN00G000.PLT 34
   SUMMFILE MSSilicon_PM10.sum
OU FINISHED

 *** Message Summary For AERMOD Model Setup ***

 --------- Summary of Total Messages --------

A Total of          0 Fatal Error Message(s)
A Total of          1 Warning Message(s)
A Total of          0 Informational Message(s)

   ******** FATAL ERROR MESSAGES ********
              ***   NONE   ***

   ********   WARNING MESSAGES   ********
ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

************************************
*** SETUP Finishes Successfully ***
************************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/14/13
                                   ***                                                                       ***     13:46:41
                                                                                                                     PAGE   1
**MODELOPTS:  RegDFAULT CONC                                          ELEV

                                         ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates ANNUAL Averages

**This Run Includes:     14 Source(s);      1 Source Group(s); and    3416 Receptor(s)

**The Model Assumes A Pollutant Type of:  PM_10

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
```

```
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
        Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
        Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                 ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =       4.1 MB of RAM.

**Detailed Error/Message File:   MSSilicon_PM10.err
**File for Summary of Results:   MSSilicon_PM10.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        13:46:41
                                                                                                                       PAGE   2
**MODELOPTS:  RegDFAULT CONC                                                ELEV

                                             *** POINT SOURCE DATA ***
```

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.43973E+00	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.43973E+00	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.43973E+00	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.43973E+00	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	
RM1	0	0.97018E-01	378883.4	3852121.0	144.4	12.19	293.15	18.29	1.37	YES	NO	NO	
RM2	0	0.97018E-01	378879.7	3851906.4	141.9	24.38	293.15	18.29	1.37	YES	NO	NO	
PR1	0	0.48500E-01	378833.8	3852062.0	143.3	12.19	293.15	18.29	1.07	YES	NO	NO	
PR2	0	0.48500E-01	378832.2	3851967.1	143.3	24.38	293.15	18.29	1.07	YES	NO	NO	

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        13:46:41
                                                                                                                       PAGE   3
**MODELOPTS:  RegDFAULT CONC                                                ELEV

                                             *** VOLUME SOURCE DATA ***
```

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.12600E-02	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.12600E-02	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	
CF1	0	0.42839E-02	378898.4	3852065.0	144.1	14.00	5.61	13.02	NO	
CF2	0	0.42839E-02	378896.7	3851961.8	143.5	14.00	5.61	13.02	NO	

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        13:46:41
                                                                                                                       PAGE   4
**MODELOPTS:  RegDFAULT CONC                                                ELEV

                                             *** AREA SOURCE DATA ***
```

PM10_2009.ADO

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	COORD (SW CORNER) X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	X-DIM OF AREA (METERS)	Y-DIM OF AREA (METERS)	ORIENT. OF AREA (DEG.)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PA	0	0.21869E-05	379141.7	3851891.2	140.9	9.14	229.66	339.73	-88.50	0.00	NO	
SP	0	0.34927E-05	379217.5	3852026.9	140.8	9.14	166.03	105.72	92.97	0.00	NO	

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***          13:46:41
                                                                                                                     PAGE    5
**MODELOPTs:  RegDFAULT CONC                                          ELEV


                                   *** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID                                                  SOURCE IDs


 SRCGP1    SAF1        , SAF2        , SAF3        , SAF4        , F1          , F2          , RM1         , RM2         ,

           PR1         , PR2         , CF1         , CF2         , PA          , SP          ,
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***          13:46:41
                                                                                                                     PAGE    6
**MODELOPTs:  RegDFAULT CONC                                          ELEV


                                   *** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1
 IFV    BH      BW      BL     XADJ    YADJ     IFV    BH      BW      BL     XADJ    YADJ
   1   10.7,   16.8,   14.4,  -12.8,    9.6,      2   40.0,   54.1,   84.7, -214.9,   40.5,
   3   40.0,   64.6,   83.9, -218.9,    9.9,      4   40.0,   73.2,   80.5, -216.2,  -21.0,
   5   40.0,   79.4,   74.5, -123.2,   45.0,      6   40.0,   83.3,   66.5, -125.7,   29.4,
   7   40.0,   84.7,   56.3, -124.3,   12.9,      8   40.0,   83.4,   44.5, -119.2,   -3.9,
   9   40.0,   79.7,   31.3, -110.4,  -20.7,     10   40.0,   82.9,   42.0, -110.7,  -36.9,
  11   40.0,   84.6,   54.1, -109.0,  -51.9,     12   15.2,   85.4,   92.9,   12.5,    7.1,
  13   15.2,   90.8,   93.6,   10.0,   17.2,     14   15.2,   93.5,   91.6,    7.2,   26.8,
  15   15.2,   93.2,   86.7,    4.1,   35.6,     16   15.2,   90.2,   79.2,    1.0,   43.3,
  17   15.2,   84.4,   69.3,   -2.2,   49.7,     18   10.7,   15.3,   12.4,   -2.3,  -10.4,
  19   10.7,   16.8,   14.4,   -1.5,   -9.6,     20   28.0,  118.5,  213.2,    9.6,  -72.6,
  21   28.0,  147.6,  207.2,   23.4,  -51.3,     22   28.0,  172.2,  194.8,   36.6,  -28.5,
  23   40.0,   79.4,   74.5,   48.6,  -45.0,     24   40.0,   83.3,   66.5,   59.2,  -29.4,
  25   40.0,   84.7,   56.3,   68.0,  -12.9,     26   40.0,   83.4,   44.5,   74.7,    3.9,
  27   40.0,   79.7,   31.3,   79.1,   20.7,     28   40.0,   82.9,   42.0,   68.8,   36.9,
  29   40.0,   84.6,   54.1,   54.9,   51.9,     30   15.2,   85.4,   92.9, -105.4,   -7.1,
  31   15.2,   90.8,   93.6, -103.6,  -17.2,     32   15.2,   93.5,   91.6,  -98.8,  -26.8,
  33   15.2,   93.2,   86.7,  -90.9,  -35.6,     34   15.2,   90.2,   79.2,  -80.2,  -43.3,
  35   15.2,   84.4,   69.3,  -67.1,  -49.7,     36   10.7,   15.3,   12.4,  -10.1,   10.4,

SOURCE ID: SAF2
 IFV    BH      BW      BL     XADJ    YADJ     IFV    BH      BW      BL     XADJ    YADJ
   1   10.7,   17.1,   14.3,   -4.8,   10.9,      2   38.1,   65.7,   84.7, -172.5,   49.1,
   3   40.0,   64.6,   83.9, -179.7,   31.5,      4   40.0,   73.2,   80.5, -181.3,    7.1,
   5   40.0,   79.5,   74.6, -177.5,  -17.5,      6   40.0,   83.4,   66.5, -168.3,  -41.6,
   7   40.0,   84.7,   56.3, -108.1,   54.7,      8   40.0,   83.4,   44.5, -110.5,   40.0,
   9   40.0,   79.7,   31.3, -109.5,   24.1,     10   40.0,   82.9,   42.0, -117.6,    7.4,
  11   40.0,   84.6,   54.1, -123.5,   -9.5,     12   40.0,   83.8,   64.6, -125.6,  -26.1,
  13   40.0,   80.4,   73.1, -123.9,  -41.9,     14   40.0,   74.5,   79.4, -118.5,  -56.4,
  15   10.7,   19.2,   18.2,  -49.2,   12.3,     16   10.7,   18.4,   16.7,  -50.0,    5.1,
  17   10.7,   17.1,   14.8,  -49.3,   -2.2,     18   10.7,   15.3,   12.4,  -47.1,   -9.5,
```

```
                                                                    PM10_2009.ADO
            F2           , RM1          , RM2          , PR1          , PR2          , CF1          , CF2          , PA           ,
            SP           ,

                                     ** CONC OF PM_10     IN MICROGRAMS/M**3                              **

RANK        CONC     (YYMMDDHH) AT       RECEPTOR (XR,YR) OF TYPE    RANK        CONC     (YYMMDDHH) AT       RECEPTOR (XR,YR) OF TYPE
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  1.      15.99585c(09091824) AT ( 378653.08, 3852095.12)  DC      11.      14.45758c(09092324) AT ( 378665.00, 3852120.00)  DC
  2.      15.93801c(09092524) AT ( 378739.55, 3851768.56)  DC      12.      14.45744c(09092524) AT ( 378788.62, 3851767.67)  DC
  3.      15.21338c(09091824) AT ( 378634.42, 3852056.44)  DC      13.      14.29539c(09061224) AT ( 379365.00, 3851920.00)  DC
  4.      14.98806c(09092324) AT ( 378690.40, 3852172.49)  DC      14.      14.29536c(09062124) AT ( 379335.25, 3851904.90)  DC
  5.      14.94492 (09082424) AT ( 378765.00, 3851620.00)  DC      15.      14.23396c(09092524) AT ( 378665.00, 3851720.00)  DC
  6.      14.79394c(09102024) AT ( 379065.00, 3852420.00)  DC      16.      14.17843 (09081624) AT ( 378852.62, 3852323.27)  DC
  7.      14.77547c(09092324) AT ( 378671.74, 3852133.81)  DC      17.      14.17804c(09061224) AT ( 379335.25, 3851904.90)  DC
  8.      14.76764c(09092524) AT ( 378690.48, 3851769.45)  DC      18.      14.16953c(09091824) AT ( 378615.76, 3852017.76)  DC
  9.      14.67389c(09091824) AT ( 378665.00, 3852120.00)  DC      19.      13.98088c(09061224) AT ( 379565.00, 3851920.00)  DC
 10.      14.64708c(09061224) AT ( 379337.54, 3851953.91)  DC      20.      13.93468c(09092524) AT ( 378765.00, 3851720.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        13:46:41
                                                                                                                       PAGE 221
**MODELOPTs:  RegDFAULT CONC                                                   ELEV

                              *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER    1 YEARS ***

                               ** CONC OF PM_10     IN MICROGRAMS/M**3                              **

                                                                                                             NETWORK
GROUP ID                         AVERAGE CONC               RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1      1ST HIGHEST VALUE IS       3.24678 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
            2ND HIGHEST VALUE IS       3.24135 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
            3RD HIGHEST VALUE IS       3.07452 AT (  379098.93,  3852320.09,   142.51,   142.51,    0.00)  DC
            4TH HIGHEST VALUE IS       2.98925 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
            5TH HIGHEST VALUE IS       2.90150 AT (  379148.19,  3852319.45,   140.88,   140.88,    0.00)  DC
            6TH HIGHEST VALUE IS       2.85876 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
            7TH HIGHEST VALUE IS       2.82764 AT (  379065.00,  3852420.00,   141.14,   141.14,    0.00)  DC
            8TH HIGHEST VALUE IS       2.75365 AT (  379165.00,  3852320.00,   140.38,   143.00,    0.00)  DC
            9TH HIGHEST VALUE IS       2.73510 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
           10TH HIGHEST VALUE IS       2.70627 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        13:46:41
                                                                                                                       PAGE 222
**MODELOPTs:  RegDFAULT CONC                                                   ELEV

                                       *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

                               ** CONC OF PM_10     IN MICROGRAMS/M**3                              **

                                               DATE                                                                  NETWORK
GROUP ID                         AVERAGE CONC   (YYMMDDHH)            RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)   OF TYPE  GRID-ID
```

```
SRCGP1   HIGH   1ST HIGH VALUE IS      15.99585c ON 09091824: AT (  378653.08,  3852095.12,   145.77,   145.77,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      14.45758c ON 09092324: AT (  378665.00,  3852120.00,   144.91,   148.00,    0.00)  DC
         HIGH   6TH HIGH VALUE IS      12.06192c ON 09080624: AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***        13:46:41
                                                                                                                    PAGE 223
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            5 Warning Message(s)
 A Total of         1096 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of          916 Calm Hours Identified

 A Total of          180 Missing Hours Identified (  2.05 Percent)

    ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***

    ********   WARNING MESSAGES   ********
 ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4
 CN W305       7 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
 CN W305       7 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3

    ************************************
    *** AERMOD Finishes Successfully ***
    ************************************
```

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d


```
ME STARTING
   SURFFILE "..\Met Data\KTUP_12354\KTUP_10.SFC"
   PROFFILE "..\Met Data\KTUP_12354\KTUP_10.PFL"
   SURFDATA 93862 2010 TUPELO
   UAIRDATA 3940 2010 JACKSON/THOMPSON_FIELD
   PROFBASE 104.0 METERS
ME FINISHED
**
****************************************
** AERMOD Output Pathway
****************************************
**
**
OU STARTING
   RECTABLE ALLAVE 1ST-2ND 6TH
   RECTABLE 24 1ST-2ND 6TH
   MAXTABLE ALLAVE 20
** Auto-Generated Plotfiles
   PLOTFILE 24 SRCGP1 1ST MSSILICON_PM10.AD\24H1G001.PLT 31
   PLOTFILE 24 SRCGP1 2ND MSSILICON_PM10.AD\24H2G000.PLT 32
   PLOTFILE 24 SRCGP1 6TH MSSILICON_PM10.AD\24H6G000.PLT 33
   PLOTFILE ANNUAL SRCGP1 MSSILICON_PM10.AD\AN00G000.PLT 34
   SUMMFILE MSSilicon_PM10.sum
OU FINISHED

 *** Message Summary For AERMOD Model Setup ***

 --------- Summary of Total Messages --------

A Total of          0 Fatal Error Message(s)
A Total of          1 Warning Message(s)
A Total of          0 Informational Message(s)

    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***

    ********   WARNING MESSAGES   ********
ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

************************************
*** SETUP Finishes Successfully ***
************************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        13:53:42
                                                                                                                       PAGE   1
**MODELOPTs:  RegDFAULT CONC                                      ELEV

                                     ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F
```

```
**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates ANNUAL Averages

**This Run Includes:     14 Source(s);       1 Source Group(s); and    3416 Receptor(s)

**The Model Assumes A Pollutant Type of:  PM_10

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.1 MB of RAM.

**Detailed Error/Message File:   MSSilicon_PM10.err
**File for Summary of Results:   MSSilicon_PM10.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                   ***        13:53:42
                                                                                                                    PAGE   2
**MODELOPTs:  RegDFAULT CONC                                                ELEV


                                                *** POINT SOURCE DATA ***

              NUMBER EMISSION RATE                          BASE     STACK   STACK    STACK     STACK    BLDG   URBAN  CAP/  EMIS RATE
  SOURCE       PART.  (GRAMS/SEC)      X        Y           ELEV.    HEIGHT  TEMP.   EXIT VEL. DIAMETER EXISTS SOURCE HOR  SCALAR
   ID          CATS.                 (METERS) (METERS)     (METERS) (METERS) (DEG.K)  (M/SEC)  (METERS)                      VARY BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SAF1            0   0.43973E+00  379020.5 3852097.6   143.6    91.44   449.82    19.37     1.93    YES     NO    NO
SAF2            0   0.43973E+00  379019.6 3852052.8   143.2    91.44   449.82    19.37     1.93    YES     NO    NO
SAF3            0   0.43973E+00  379018.2 3851969.8   142.6    91.44   449.82    19.37     1.93    YES     NO    NO
SAF4            0   0.43973E+00  379017.5 3851925.0   142.1    91.44   449.82    19.37     1.93    YES     NO    NO
RM1             0   0.97018E-01  378883.4 3852121.0   144.4    12.19   293.15    18.29     1.37    YES     NO    NO
RM2             0   0.97018E-01  378879.7 3851906.4   141.9    24.38   293.15    18.29     1.37    YES     NO    NO
PR1             0   0.48500E-01  378833.8 3852062.0   143.3    12.19   293.15    18.29     1.07    YES     NO    NO
PR2             0   0.48500E-01  378832.2 3851967.1   143.3    24.38   293.15    18.29     1.07    YES     NO    NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                   ***        13:53:42
```

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.12600E-02	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.12600E-02	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	
CF1	0	0.42839E-02	378898.4	3852065.0	144.1	14.00	5.61	13.02	NO	
CF2	0	0.42839E-02	378896.7	3851961.8	143.5	14.00	5.61	13.02	NO	

*** AREA SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	COORD (SW CORNER) X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	X-DIM OF AREA (METERS)	Y-DIM OF AREA (METERS)	ORIENT. OF AREA (DEG.)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PA	0	0.21869E-05	379141.7	3851891.2	140.9	9.14	229.66	339.73	-88.50	0.00	NO	
SP	0	0.34927E-05	379217.5	3852026.9	140.8	9.14	166.03	105.72	92.97	0.00	NO	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
SRCGP1	SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 , RM1 , RM2 , PR1 , PR2 , CF1 , CF2 , PA , SP ,

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	16.8,	14.4,	-12.8,	9.6,	2	40.0,	54.1,	84.7,	-214.9,	40.5,
3	40.0,	64.6,	83.9,	-218.9,	9.9,	4	40.0,	73.2,	80.5,	-216.2,	-21.0,
5	40.0,	79.4,	74.5,	-123.2,	45.0,	6	40.0,	83.3,	66.5,	-125.7,	29.4,
7	40.0,	84.7,	56.3,	-124.3,	12.9,	8	40.0,	83.4,	44.5,	-119.2,	-3.9,

```
                                                                                                PM10_2010.ADO
      378690.48   3851769.45       11.11691c (10082524)                378641.41   3851770.34        9.56915c (10063024)
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***          08/14/13
                                   ***                                                                   ***             13:53:42
                                                                                                                         PAGE 220
 **MODELOPTs:  RegDFAULT CONC                                                ELEV

                              *** THE MAXIMUM   20  24-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  SRCGP1   ***
                                  INCLUDING SOURCE(S):     SAF1        , SAF2        , SAF3        , SAF4        , F1          ,
                 F2          , RM1         , RM2         , PR1         , PR2         , CF1         , CF2         , PA          ,
                 SP          ,

                                        ** CONC OF PM_10    IN MICROGRAMS/M**3                          **

 RANK        CONC    (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE    RANK        CONC    (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    1.      16.83282 (10070424) AT ( 378810.99, 3852298.80)  DC       11.      13.77590b(10092524) AT ( 378641.41, 3851770.34)  DC
    2.      16.11098 (10070424) AT ( 378852.62, 3852323.27)  DC       12.      13.70082b(10070524) AT ( 378769.35, 3852274.32)  DC
    3.      15.34893 (10070424) AT ( 378765.00, 3852420.00)  DC       13.      13.65805 (10070424) AT ( 378865.00, 3852420.00)  DC
    4.      15.07553 (10070424) AT ( 378765.00, 3852320.00)  DC       14.      13.64517c(10092924) AT ( 378665.00, 3851520.00)  DC
    5.      14.64919 (10070424) AT ( 378769.35, 3852274.32)  DC       15.      13.61108c(10090124) AT ( 378810.99, 3852298.80)  DC
    6.      14.16047c(10090424) AT ( 378765.00, 3851620.00)  DC       16.      13.57669c(10062424) AT ( 379276.91, 3852287.28)  DC
    7.      14.02338b(10092524) AT ( 378690.48, 3851769.45)  DC       17.      13.55921b(10092524) AT ( 378565.00, 3851720.00)  DC
    8.      13.95532c(10083124) AT ( 378852.62, 3852323.27)  DC       18.      13.50228c(10083124) AT ( 378810.99, 3852298.80)  DC
    9.      13.79924c(10090124) AT ( 378852.62, 3852323.27)  DC       19.      13.49770b(10092524) AT ( 378665.00, 3851720.00)  DC
   10.      13.78288 (10083024) AT ( 378810.99, 3852298.80)  DC       20.      13.36607b(10092524) AT ( 378739.55, 3851768.56)  DC

  *** RECEPTOR TYPES:  GC = GRIDCART
                       GP = GRIDPOLR
                       DC = DISCCART
                       DP = DISCPOLR
  *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***          08/14/13
                                    ***                                                                   ***             13:53:42
                                                                                                                         PAGE 221
 **MODELOPTs:  RegDFAULT CONC                                                ELEV

                                   *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***

                                    ** CONC OF PM_10    IN MICROGRAMS/M**3                          **

GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  NETWORK GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1     1ST HIGHEST VALUE IS       3.24964 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
           2ND HIGHEST VALUE IS       3.22817 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
           3RD HIGHEST VALUE IS       3.07132 AT (  379098.93,  3852320.09,   142.51,   142.51,    0.00)  DC
           4TH HIGHEST VALUE IS       3.00698 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
           5TH HIGHEST VALUE IS       3.00620 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
           6TH HIGHEST VALUE IS       3.00309 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
           7TH HIGHEST VALUE IS       2.95422 AT (  379148.19,  3852319.45,   140.88,   140.88,    0.00)  DC
           8TH HIGHEST VALUE IS       2.88245 AT (  379065.00,  3852420.00,   141.14,   141.14,    0.00)  DC
           9TH HIGHEST VALUE IS       2.87563 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
          10TH HIGHEST VALUE IS       2.80520 AT (  379165.00,  3852320.00,   140.38,   143.00,    0.00)  DC

  *** RECEPTOR TYPES:  GC = GRIDCART
                       GP = GRIDPOLR
                       DC = DISCCART
                       DP = DISCPOLR
  *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***          08/14/13
                                                                                                                         Page 202
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                               ***                               PM10_2010.ADO                   ***         13:53:42
 **MODELOPTs:  RegDFAULT CONC                                       ELEV                                      PAGE 222

                                         *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

                                ** CONC OF PM_10     IN MICROGRAMS/M**3                           **

                                                     DATE                                                            NETWORK
GROUP ID                            AVERAGE CONC    (YYMMDDHH)           RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)   OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    HIGH   1ST HIGH VALUE IS      16.83282  ON 10070424: AT (  378810.99,  3852298.80,    142.76,    147.00,     0.00)  DC
          HIGH   2ND HIGH VALUE IS      13.95532c ON 10083124: AT (  378852.62,  3852323.27,    142.50,    146.00,     0.00)  DC
          HIGH   6TH HIGH VALUE IS      12.08196  ON 10121524: AT (  378810.99,  3852298.80,    142.76,    147.00,     0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/14/13
                                  ***                                                                   ***         13:53:42
                                                                                                                    PAGE 223
 **MODELOPTs:  RegDFAULT CONC                                       ELEV

 *** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

 A Total of          0 Fatal Error Message(s)
 A Total of          5 Warning Message(s)
 A Total of       1492 Informational Message(s)

 A Total of       8760 Hours Were Processed

 A Total of       1234 Calm Hours Identified

 A Total of        258 Missing Hours Identified (  2.95 Percent)

   ******** FATAL ERROR MESSAGES ********
            ***  NONE  ***

   ********   WARNING MESSAGES   ********
 ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used           0.50
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF1
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF2
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF3
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF4

   ************************************
   *** AERMOD Finishes Successfully ***
   ************************************
```

```
   PLOTFILE 24 SRCGP1 1ST MSSILICON_PM10.AD\24H1G001.PLT 31
   PLOTFILE 24 SRCGP1 2ND MSSILICON_PM10.AD\24H2G000.PLT 32
   PLOTFILE 24 SRCGP1 6TH MSSILICON_PM10.AD\24H6G000.PLT 33
   PLOTFILE ANNUAL SRCGP1 MSSILICON_PM10.AD\AN00G000.PLT 34
   SUMMFILE MSSilicon_PM10.sum
OU FINISHED

 *** Message Summary For AERMOD Model Setup ***

 --------- Summary of Total Messages --------

A Total of          0 Fatal Error Message(s)
A Total of          1 Warning Message(s)
A Total of          0 Informational Message(s)

   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***

   ********  WARNING MESSAGES   ********
ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

************************************
*** SETUP Finishes Successfully ***
************************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                        ***        14:00:46
                                                                                                                         PAGE   1
**MODELOPTs:  RegDFAULT CONC                                          ELEV

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates ANNUAL Averages

**This Run Includes:     14 Source(s);       1 Source Group(s); and     3416 Receptor(s)

**The Model Assumes A Pollutant Type of:  PM_10

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
```

PM10_2011.ADO

```
Model Outputs Tables of ANNUAL Averages by Receptor
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                              ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.1 MB of RAM.

**Detailed Error/Message File:   MSSilicon_PM10.err
**File for Summary of Results:   MSSilicon_PM10.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***          14:00:46
                                                                                                                     PAGE   2
**MODELOPTs:  RegDFAULT CONC                                          ELEV


                                        *** POINT SOURCE DATA ***

              NUMBER EMISSION RATE                    BASE     STACK   STACK    STACK     STACK    BLDG   URBAN  CAP/  EMIS RATE
  SOURCE       PART.  (GRAMS/SEC)     X         Y     ELEV.    HEIGHT  TEMP.   EXIT VEL.  DIAMETER EXISTS SOURCE HOR  SCALAR
    ID         CATS.                (METERS) (METERS) (METERS) (METERS) (DEG.K)  (M/SEC)  (METERS)                     VARY BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SAF1            0   0.43973E+00  379020.5 3852097.6   143.6    91.44   449.82    19.37     1.93    YES     NO    NO
SAF2            0   0.43973E+00  379019.6 3852052.8   143.2    91.44   449.82    19.37     1.93    YES     NO    NO
SAF3            0   0.43973E+00  379018.2 3851969.8   142.6    91.44   449.82    19.37     1.93    YES     NO    NO
SAF4            0   0.43973E+00  379017.5 3851925.0   142.1    91.44   449.82    19.37     1.93    YES     NO    NO
RM1             0   0.97018E-01  378883.4 3852121.0   144.4    12.19   293.15    18.29     1.37    YES     NO    NO
RM2             0   0.97018E-01  378879.7 3851906.4   141.9    24.38   293.15    18.29     1.37    YES     NO    NO
PR1             0   0.48500E-01  378833.8 3852062.0   143.3    12.19   293.15    18.29     1.07    YES     NO    NO
PR2             0   0.48500E-01  378832.2 3851967.1   143.3    24.38   293.15    18.29     1.07    YES     NO    NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***          14:00:46
                                                                                                                     PAGE   3
**MODELOPTs:  RegDFAULT CONC                                          ELEV


                                        *** VOLUME SOURCE DATA ***

              NUMBER EMISSION RATE                    BASE    RELEASE    INIT.    INIT.   URBAN  EMISSION RATE
  SOURCE       PART.  (GRAMS/SEC)     X         Y     ELEV.   HEIGHT     SY       SZ     SOURCE  SCALAR VARY
    ID         CATS.                (METERS) (METERS) (METERS) (METERS) (METERS) (METERS)            BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

F1              0   0.12600E-02  378925.8 3852076.8   144.0    20.01     6.97    18.62     NO
F2              0   0.12600E-02  378923.5 3851949.2   143.0    20.01     6.97    18.62     NO
CF1             0   0.42839E-02  378898.4 3852065.0   144.1    14.00     5.61    13.02     NO
CF2             0   0.42839E-02  378896.7 3851961.8   143.5    14.00     5.61    13.02     NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***          14:00:46
                                                                                                                     PAGE   4
**MODELOPTs:  RegDFAULT CONC                                          ELEV


                                        *** AREA SOURCE DATA ***
```

PM10_2011.ADO

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	COORD (SW CORNER) X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	X-DIM OF AREA (METERS)	Y-DIM OF AREA (METERS)	ORIENT. OF AREA (DEG.)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PA	0	0.21869E-05	379141.7	3851891.2	140.9	9.14	229.66	339.73	-88.50	0.00	NO	
SP	0	0.34927E-05	379217.5	3852026.9	140.8	9.14	166.03	105.72	92.97	0.00	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/14/13 14:00:46 PAGE 5

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

SRCGP1 SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 , RM1 , RM2 ,
PR1 , PR2 , CF1 , CF2 , PA , SP ,

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/14/13 14:00:46 PAGE 6

**MODELOPTs: RegDFAULT CONC ELEV

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	16.8,	14.4,	-12.8,	9.6,	2	40.0,	54.1,	84.7,	-214.9,	40.5,
3	40.0,	64.6,	83.9,	-218.9,	9.9,	4	40.0,	73.2,	80.5,	-216.2,	-21.0,
5	40.0,	79.4,	74.5,	-123.2,	45.0,	6	40.0,	83.3,	66.5,	-125.7,	29.4,
7	40.0,	84.7,	56.3,	-124.3,	12.9,	8	40.0,	83.4,	44.5,	-119.2,	-3.9,
9	40.0,	79.7,	31.3,	-110.4,	-20.7,	10	40.0,	82.9,	42.0,	-110.7,	-36.9,
11	40.0,	84.6,	54.1,	-109.0,	-51.9,	12	15.2,	85.4,	92.9,	12.5,	7.1,
13	15.2,	90.8,	93.6,	10.0,	17.2,	14	15.2,	93.5,	91.6,	7.2,	26.8,
15	15.2,	93.2,	86.7,	4.1,	35.6,	16	15.2,	90.2,	79.2,	1.0,	43.3,
17	15.2,	84.4,	69.3,	-2.2,	49.7,	18	10.7,	15.3,	12.4,	-2.3,	-10.4,
19	10.7,	16.8,	14.4,	-1.5,	-9.6,	20	28.0,	118.5,	213.2,	9.6,	-72.6,
21	28.0,	147.6,	207.2,	23.4,	-51.3,	22	28.0,	172.2,	194.8,	36.6,	-28.5,
23	40.0,	79.4,	74.5,	48.6,	-45.0,	24	40.0,	83.3,	66.5,	59.2,	-29.4,
25	40.0,	84.7,	56.3,	68.0,	-12.9,	26	40.0,	83.4,	44.5,	74.7,	3.9,
27	40.0,	79.7,	31.3,	79.1,	20.7,	28	40.0,	82.9,	42.0,	68.8,	36.9,
29	40.0,	84.6,	54.1,	54.9,	51.9,	30	15.2,	85.4,	92.9,	-105.4,	-7.1,
31	15.2,	90.8,	93.6,	-103.6,	-17.2,	32	15.2,	93.5,	91.6,	-98.8,	-26.8,
33	15.2,	93.2,	86.7,	-90.9,	-35.6,	34	15.2,	90.2,	79.2,	-80.2,	-43.3,
35	15.2,	84.4,	69.3,	-67.1,	-49.7,	36	10.7,	15.3,	12.4,	-10.1,	10.4,

SOURCE ID: SAF2

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	17.1,	14.3,	-4.8,	10.9,	2	38.1,	65.7,	84.7,	-172.5,	49.1,
3	40.0,	64.6,	83.9,	-179.7,	31.5,	4	40.0,	73.2,	80.5,	-181.3,	7.1,
5	40.0,	79.5,	74.6,	-177.5,	-17.5,	6	40.0,	83.4,	66.5,	-168.3,	-41.6,
7	40.0,	84.7,	56.3,	-108.1,	54.7,	8	40.0,	83.4,	44.5,	-110.5,	40.0,
9	40.0,	79.7,	31.3,	-109.5,	24.1,	10	40.0,	82.9,	42.0,	-117.6,	7.4,
11	40.0,	84.6,	54.1,	-123.5,	-9.5,	12	40.0,	83.8,	64.6,	-125.6,	-26.1,
13	40.0,	80.4,	73.1,	-123.9,	-41.9,	14	40.0,	74.5,	79.4,	-118.5,	-56.4,
15	10.7,	19.2,	18.2,	-49.2,	12.3,	16	10.7,	18.4,	16.7,	-50.0,	5.1,
17	10.7,	17.1,	14.8,	-49.3,	-2.2,	18	10.7,	15.3,	12.4,	-47.1,	-9.5,

PM10_2011.ADO

```
F2          , RM1         , RM2         , PR1         , PR2         , CF1         , CF2         , PA          ,
SP          ,
```

** CONC OF PM_10 IN MICROGRAMS/M**3 **

RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (XR,YR)	OF TYPE	RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (XR,YR)	OF TYPE
1.	14.63243c	(11102024)	AT	(379365.00, 3851920.00)	DC	11.	13.59761	(11102624)	AT	(379000.41, 3852321.36)	DC
2.	14.50404c	(11102024)	AT	(379335.25, 3851904.90)	DC	12.	13.58789b	(11080124)	AT	(378739.55, 3851768.56)	DC
3.	14.45562	(11091924)	AT	(378852.62, 3852323.27)	DC	13.	13.49072c	(11082224)	AT	(378739.55, 3851768.56)	DC
4.	14.26402c	(11102024)	AT	(379337.54, 3851953.91)	DC	14.	13.41751	(11071724)	AT	(378634.42, 3852056.44)	DC
5.	14.04920c	(11100724)	AT	(378709.06, 3852211.17)	DC	15.	13.37165	(11071724)	AT	(378615.76, 3852017.76)	DC
6.	13.98338c	(11100724)	AT	(378665.00, 3852220.00)	DC	16.	13.32455	(11100824)	AT	(378709.06, 3852211.17)	DC
7.	13.88855b	(11081524)	AT	(378765.00, 3851620.00)	DC	17.	13.32382c	(11102024)	AT	(379465.00, 3851920.00)	DC
8.	13.80101	(11071624)	AT	(378690.40, 3852172.49)	DC	18.	13.30773	(11091924)	AT	(378901.88, 3852322.63)	DC
9.	13.73639c	(11060124)	AT	(378665.00, 3851620.00)	DC	19.	13.28593	(11071624)	AT	(378709.06, 3852211.17)	DC
10.	13.66256b	(11081524)	AT	(378665.00, 3851520.00)	DC	20.	13.27944c	(11060124)	AT	(378739.55, 3851768.56)	DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/14/13 14:00:46 PAGE 221

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	3.58842 AT	(379049.67, 3852320.72, 142.86, 142.86, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.49938 AT	(379000.41, 3852321.36, 142.76, 142.76, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.43813 AT	(379098.93, 3852320.09, 142.51, 142.51, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.26066 AT	(379148.19, 3852319.45, 140.88, 140.88, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.10982 AT	(379065.00, 3852420.00, 141.14, 141.14, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.09441 AT	(379165.00, 3852320.00, 140.38, 143.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.06218 AT	(378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.04313 AT	(379165.00, 3852420.00, 141.26, 141.26, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.96918 AT	(379191.10, 3852308.73, 140.53, 143.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.78183 AT	(378739.55, 3851768.56, 143.30, 147.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/14/13 14:00:46 PAGE 222

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID

```
SRCGP1   HIGH   1ST HIGH VALUE IS      14.63243c ON 11102024: AT (  379365.00,  3851920.00,   134.02,   141.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      13.49072c ON 11082224: AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
         HIGH   6TH HIGH VALUE IS      12.06413c ON 11082224: AT (  378665.00,  3851620.00,   143.02,   143.02,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***        14:00:46
                                                                                                                   PAGE 223
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of           13 Warning Message(s)
 A Total of         1074 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of          899 Calm Hours Identified

 A Total of          175 Missing Hours Identified (  2.00 Percent)

    ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***

    ********   WARNING MESSAGES   ********
 ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4
 MX W441    7257  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103009
 MX W441    7258  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103010
 MX W441    7259  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103011
 MX W441    7260  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103012
 MX W441    7261  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103013
 MX W441    7262  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103014
 MX W441    7263  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103015
 MX W441    7264  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103016

    ************************************
    *** AERMOD Finishes Successfully ***
    ************************************
```

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d

```
   PLOTFILE 24 SRCGP1 1ST MSSILICON_PM10.AD\24H1G001.PLT 31
   PLOTFILE 24 SRCGP1 2ND MSSILICON_PM10.AD\24H2G000.PLT 32
   PLOTFILE 24 SRCGP1 6TH MSSILICON_PM10.AD\24H6G000.PLT 33
   PLOTFILE ANNUAL SRCGP1 MSSILICON_PM10.AD\AN00G000.PLT 34
   SUMMFILE MSSilicon_PM10.sum
OU FINISHED

 *** Message Summary For AERMOD Model Setup ***

 --------- Summary of Total Messages --------

A Total of          0 Fatal Error Message(s)
A Total of          1 Warning Message(s)
A Total of          0 Informational Message(s)

   ******** FATAL ERROR MESSAGES ********
              ***   NONE   ***

   ********   WARNING MESSAGES   ********
ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

************************************
*** SETUP Finishes Successfully ***
************************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        14:07:41
                                                                                                                       PAGE   1
**MODELOPTS:  RegDFAULT CONC                                               ELEV

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates ANNUAL Averages

**This Run Includes:     14 Source(s);      1 Source Group(s); and    3416 Receptor(s)

**The Model Assumes A Pollutant Type of:  PM_10

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
```

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```
Model Outputs Tables of ANNUAL Averages by Receptor
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.1 MB of RAM.

**Detailed Error/Message File:   MSSilicon_PM10.err
**File for Summary of Results:   MSSilicon_PM10.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***          14:07:41
                                                                                                                     PAGE   2
**MODELOPTs:  RegDFAULT CONC                                          ELEV


                                        *** POINT SOURCE DATA ***

              NUMBER EMISSION RATE                    BASE     STACK   STACK    STACK     STACK    BLDG   URBAN  CAP/  EMIS RATE
  SOURCE       PART.  (GRAMS/SEC)     X         Y      ELEV.    HEIGHT  TEMP.   EXIT VEL.  DIAMETER EXISTS SOURCE HOR  SCALAR
   ID          CATS.                (METERS) (METERS) (METERS) (METERS) (DEG.K)  (M/SEC)  (METERS)                     VARY BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SAF1            0   0.43973E+00  379020.5 3852097.6   143.6    91.44   449.82    19.37     1.93    YES     NO    NO
SAF2            0   0.43973E+00  379019.6 3852052.8   143.2    91.44   449.82    19.37     1.93    YES     NO    NO
SAF3            0   0.43973E+00  379018.2 3851969.8   142.6    91.44   449.82    19.37     1.93    YES     NO    NO
SAF4            0   0.43973E+00  379017.5 3851925.0   142.1    91.44   449.82    19.37     1.93    YES     NO    NO
RM1             0   0.97018E-01  378883.4 3852121.0   144.4    12.19   293.15    18.29     1.37    YES     NO    NO
RM2             0   0.97018E-01  378879.7 3851906.4   141.9    24.38   293.15    18.29     1.37    YES     NO    NO
PR1             0   0.48500E-01  378833.8 3852062.0   143.3    12.19   293.15    18.29     1.07    YES     NO    NO
PR2             0   0.48500E-01  378832.2 3851967.1   143.3    24.38   293.15    18.29     1.07    YES     NO    NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***          14:07:41
                                                                                                                     PAGE   3
**MODELOPTs:  RegDFAULT CONC                                          ELEV


                                        *** VOLUME SOURCE DATA ***

              NUMBER EMISSION RATE                    BASE    RELEASE    INIT.    INIT.   URBAN  EMISSION RATE
  SOURCE       PART.  (GRAMS/SEC)     X         Y      ELEV.   HEIGHT     SY       SZ     SOURCE  SCALAR VARY
   ID          CATS.                (METERS) (METERS) (METERS) (METERS) (METERS) (METERS)            BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

F1              0   0.12600E-02  378925.8 3852076.8   144.0    20.01     6.97    18.62     NO
F2              0   0.12600E-02  378923.5 3851949.2   143.0    20.01     6.97    18.62     NO
CF1             0   0.42839E-02  378898.4 3852065.0   144.1    14.00     5.61    13.02     NO
CF2             0   0.42839E-02  378896.7 3851961.8   143.5    14.00     5.61    13.02     NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***          14:07:41
                                                                                                                     PAGE   4
**MODELOPTs:  RegDFAULT CONC                                          ELEV


                                        *** AREA SOURCE DATA ***
```

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SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	COORD (SW CORNER) X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	X-DIM OF AREA (METERS)	Y-DIM OF AREA (METERS)	ORIENT. OF AREA (DEG.)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PA	0	0.21869E-05	379141.7	3851891.2	140.9	9.14	229.66	339.73	-88.50	0.00	NO	
SP	0	0.34927E-05	379217.5	3852026.9	140.8	9.14	166.03	105.72	92.97	0.00	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/14/13 14:07:41 PAGE 5

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
SRCGP1	SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 , RM1 , RM2 ,
	PR1 , PR2 , CF1 , CF2 , PA , SP ,

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/14/13 14:07:41 PAGE 6

**MODELOPTs: RegDFAULT CONC ELEV

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	16.8,	14.4,	-12.8,	9.6,	2	40.0,	54.1,	84.7,	-214.9,	40.5,
3	40.0,	64.6,	83.9,	-218.9,	9.9,	4	40.0,	73.2,	80.5,	-216.2,	-21.0,
5	40.0,	79.4,	74.5,	-123.2,	45.0,	6	40.0,	83.3,	66.5,	-125.7,	29.4,
7	40.0,	84.7,	56.3,	-124.3,	12.9,	8	40.0,	83.4,	44.5,	-119.2,	-3.9,
9	40.0,	79.7,	31.3,	-110.4,	-20.7,	10	40.0,	82.9,	42.0,	-110.7,	-36.9,
11	40.0,	84.6,	54.1,	-109.0,	-51.9,	12	15.2,	85.4,	92.9,	12.5,	7.1,
13	15.2,	90.8,	93.6,	10.0,	17.2,	14	15.2,	93.5,	91.6,	7.2,	26.8,
15	15.2,	93.2,	86.7,	4.1,	35.6,	16	15.2,	90.2,	79.2,	1.0,	43.3,
17	15.2,	84.4,	69.3,	-2.2,	49.7,	18	10.7,	15.3,	12.4,	-2.3,	-10.4,
19	10.7,	16.8,	14.4,	-1.5,	-9.6,	20	28.0,	118.5,	213.2,	9.6,	-72.6,
21	28.0,	147.6,	207.2,	23.4,	-51.3,	22	28.0,	172.2,	194.8,	36.6,	-28.5,
23	40.0,	79.4,	74.5,	48.6,	-45.0,	24	40.0,	83.3,	66.5,	59.2,	-29.4,
25	40.0,	84.7,	56.3,	68.0,	-12.9,	26	40.0,	83.4,	44.5,	74.7,	3.9,
27	40.0,	79.7,	31.3,	79.1,	20.7,	28	40.0,	82.9,	42.0,	68.8,	36.9,
29	40.0,	84.6,	54.1,	54.9,	51.9,	30	15.2,	85.4,	92.9,	-105.4,	-7.1,
31	15.2,	90.8,	93.6,	-103.6,	-17.2,	32	15.2,	93.5,	91.6,	-98.8,	-26.8,
33	15.2,	93.2,	86.7,	-90.9,	-35.6,	34	15.2,	90.2,	79.2,	-80.2,	-43.3,
35	15.2,	84.4,	69.3,	-67.1,	-49.7,	36	10.7,	15.3,	12.4,	-10.1,	10.4,

SOURCE ID: SAF2

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	17.1,	14.3,	-4.8,	10.9,	2	38.1,	65.7,	84.7,	-172.5,	49.1,
3	40.0,	64.6,	83.9,	-179.7,	31.5,	4	40.0,	73.2,	80.5,	-181.3,	7.1,
5	40.0,	79.5,	74.6,	-177.5,	-17.5,	6	40.0,	83.4,	66.5,	-168.3,	-41.6,
7	40.0,	84.7,	56.3,	-108.1,	54.7,	8	40.0,	83.4,	44.5,	-110.5,	40.0,
9	40.0,	79.7,	31.3,	-109.5,	24.1,	10	40.0,	82.9,	42.0,	-117.6,	7.4,
11	40.0,	84.6,	54.1,	-123.5,	-9.5,	12	40.0,	83.8,	64.6,	-125.6,	-26.1,
13	40.0,	80.4,	73.1,	-123.9,	-41.9,	14	40.0,	74.5,	79.4,	-118.5,	-56.4,
15	10.7,	19.2,	18.2,	-49.2,	12.3,	16	10.7,	18.4,	16.7,	-50.0,	5.1,
17	10.7,	17.1,	14.8,	-49.3,	-2.2,	18	10.7,	15.3,	12.4,	-47.1,	-9.5,

```
F2          , RM1         , RM2         , PR1         , PR2         , CF1         , CF2         , PA          ,
SP          ,
```

** CONC OF PM_10 IN MICROGRAMS/M**3 **

RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (XR,YR)	OF TYPE	RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (XR,YR)	OF TYPE
1.	20.47178	(07100524)	AT	(378671.74, 3852133.81)	DC	11.	17.05718c	(08100524)	AT	(378565.00, 3851520.00)	DC
2.	20.02812	(07100524)	AT	(378665.00, 3852120.00)	DC	12.	16.89626c	(08100524)	AT	(378665.00, 3851720.00)	DC
3.	19.02766c	(08100524)	AT	(378565.00, 3851620.00)	DC	13.	16.83282	(10070424)	AT	(378810.99, 3852298.80)	DC
4.	18.36711	(07100524)	AT	(378690.40, 3852172.49)	DC	14.	16.68321c	(08092224)	AT	(378565.00, 3851520.00)	DC
5.	18.30041	(07100524)	AT	(378653.08, 3852095.12)	DC	15.	16.42180c	(08100524)	AT	(378465.00, 3851420.00)	DC
6.	17.80658c	(08100524)	AT	(378465.00, 3851520.00)	DC	16.	16.36871c	(08092224)	AT	(378665.00, 3851720.00)	DC
7.	17.69559b	(07060524)	AT	(379351.65, 3852096.74)	DC	17.	16.34337m	(07081624)	AT	(379363.47, 3852190.55)	DC
8.	17.69547	(07100524)	AT	(378565.00, 3852120.00)	DC	18.	16.23599c	(08100524)	AT	(378365.00, 3851420.00)	DC
9.	17.60786b	(07060524)	AT	(379365.00, 3852120.00)	DC	19.	16.11098	(10070424)	AT	(378852.62, 3852323.27)	DC
10.	17.33320b	(07060524)	AT	(379357.56, 3852143.64)	DC	20.	16.09155c	(08092224)	AT	(378565.00, 3851620.00)	DC

```
*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR
*** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                  ***                                                                  ***        14:07:41
                                                                                                                  PAGE 221
**MODELOPTs:  RegDFAULT CONC                                                  ELEV

                                  *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   5 YEARS ***

                                   ** CONC OF PM_10    IN MICROGRAMS/M**3                          **
```

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	3.13258	AT (379000.41, 3852321.36, 142.76, 142.76, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.10133	AT (379049.67, 3852320.72, 142.86, 142.86, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.98844	AT (378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.94628	AT (379098.93, 3852320.09, 142.51, 142.51, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.81021	AT (379148.19, 3852319.45, 140.88, 140.88, 0.00)	DC	
	6TH HIGHEST VALUE IS	2.76146	AT (378901.88, 3852322.63, 142.58, 146.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	2.74859	AT (378788.62, 3851767.67, 143.30, 146.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.73688	AT (378837.69, 3851766.78, 143.17, 143.17, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.72436	AT (379065.00, 3852420.00, 141.14, 141.14, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.67262	AT (379165.00, 3852320.00, 140.38, 143.00, 0.00)	DC	

```
*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR
*** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                  ***                                                                  ***        14:07:41
                                                                                                                  PAGE 222
**MODELOPTs:  RegDFAULT CONC                                                  ELEV

                                                  *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

                                   ** CONC OF PM_10    IN MICROGRAMS/M**3                          **
```

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID

```
SRCGP1   HIGH   1ST HIGH VALUE IS      20.47178  ON 07100524: AT (  378671.74,  3852133.81,   144.48,   148.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      16.68321c ON 08092224: AT (  378565.00,  3851520.00,   143.13,   149.00,    0.00)  DC
         HIGH   6TH HIGH VALUE IS      14.03573b ON 07080324: AT (  378765.00,  3851620.00,   141.28,   147.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***        14:07:41
                                                                                                                   PAGE 223
 **MODELOPTS:  RegDFAULT CONC                                          ELEV

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of           13 Warning Message(s)
 A Total of         6022 Informational Message(s)

 A Total of        43824 Hours Were Processed

 A Total of         4669 Calm Hours Identified

 A Total of         1353 Missing Hours Identified (  3.09 Percent)

    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***

    ********   WARNING MESSAGES   ********
 ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
 CN W305       3 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3
 CN W305       3 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4
 CN W305       7 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
 CN W305      10 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2
 MX W441   42321  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103009
 MX W441   42322  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103010
 MX W441   42323  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103011
 MX W441   42324  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103012
 MX W441   42325  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103013
 MX W441   42326  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103014
 MX W441   42327  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103015
 MX W441   42328  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103016

    ************************************
    *** AERMOD Finishes Successfully ***
    ************************************
```

Appendix B - Air Quality Impact Evaluation – AERMOD Output Files – $PM_{2.5}$

Air Quality Impact Evaluation – AERMOD Output Files

Pollutant – $PM_{2.5}$

Years – 2007 through 2011

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d


```
ME STARTING
   SURFFILE "..\Met Data\KTUP_12354\KTUP_07.SFC"
   PROFFILE "..\Met Data\KTUP_12354\KTUP_07.PFL"
   SURFDATA 93862 2007 TUPELO
   UAIRDATA 3940 2007 JACKSON/THOMPSON_FIELD
   PROFBASE 104.0 METERS
ME FINISHED
**
****************************************
** AERMOD Output Pathway
****************************************
**
**
OU STARTING
   RECTABLE ALLAVE 1ST-2ND 8TH
   RECTABLE 24 1ST-2ND 8TH
   MAXTABLE ALLAVE 20
** Auto-Generated Plotfiles
   PLOTFILE 24 SRCGP1 1ST MSSILICON_PM25.AD\24H1G001.PLT 31
   PLOTFILE 24 SRCGP1 2ND MSSILICON_PM25.AD\24H2G000.PLT 32
   PLOTFILE 24 SRCGP1 8TH MSSILICON_PM25.AD\24H8G000.PLT 33
   PLOTFILE ANNUAL SRCGP1 MSSILICON_PM25.AD\AN00G000.PLT 34
   SUMMFILE MSSilicon_PM25.sum
OU FINISHED

 *** Message Summary For AERMOD Model Setup ***

 --------- Summary of Total Messages --------

 A Total of          0 Fatal Error Message(s)
 A Total of          1 Warning Message(s)
 A Total of          0 Informational Message(s)

   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***

   ********   WARNING MESSAGES   ********
 ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

 ************************************
 *** SETUP Finishes Successfully ***
 ************************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        11:50:46
                                                                                                                      PAGE   1
 **MODELOPTs:  RegDFAULT CONC                                      ELEV

                                   ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F
```

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
1. Stack-tip Downwash.
2. Model Accounts for ELEVated Terrain Effects.
3. Use Calms Processing Routine.
4. Use Missing Data Processing Routine.
5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates 1 Short Term Average(s) of: 24-HR
and Calculates ANNUAL Averages

**This Run Includes: 14 Source(s); 1 Source Group(s); and 3416 Receptor(s)

**The Model Assumes A Pollutant Type of: PM-2.5

**Note that special processing requirements apply for the 24-hour PM2.5 NAAQS - check available guidance.
Model will process user-specified ranks of high 24-hour values averaged across the number of years modeled, and
the multi-year average of individual ANNUAL values, averaged across the number of years modeled.

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
Model Outputs Tables of ANNUAL Averages by Receptor
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) = 104.00 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 4.3 MB of RAM.

**Detailed Error/Message File: MSSilicon_PM25.err
**File for Summary of Results: MSSilicon_PM25.sum

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
*** *** 11:50:46
PAGE 2

**MODELOPTS: RegDFAULT CONC ELEV

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.43973E+00	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.43973E+00	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.43973E+00	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.43973E+00	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	
RM1	0	0.97018E-01	378883.4	3852121.0	144.4	12.19	293.15	18.29	1.37	YES	NO	NO	
RM2	0	0.97018E-01	378879.7	3851906.4	141.9	24.38	293.15	18.29	1.37	YES	NO	NO	

```
                                                                                PM25_2007.ADO
PR1              0   0.48509E-01  378833.8 3852062.0   143.3    12.19   293.15    18.29     1.07    YES     NO    NO
PR2              0   0.48509E-01  378832.2 3851967.1   143.3    24.38   293.15    18.29     1.07    YES     NO    NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***          08/14/13
                                   ***                                                                     ***          11:50:46
                                                                                                                        PAGE    3

**MODELOPTs:  RegDFAULT CONC                                          ELEV


                                          *** VOLUME SOURCE DATA ***

             NUMBER EMISSION RATE                      BASE    RELEASE    INIT.    INIT.   URBAN  EMISSION RATE
  SOURCE      PART.  (GRAMS/SEC)     X         Y      ELEV.   HEIGHT      SY       SZ    SOURCE  SCALAR VARY
   ID         CATS.                (METERS) (METERS) (METERS) (METERS) (METERS) (METERS)            BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

F1               0   0.12600E-02  378925.8 3852076.8   144.0    20.01     6.97    18.62     NO
F2               0   0.12600E-02  378923.5 3851949.2   143.0    20.01     6.97    18.62     NO
CF1              0   0.75599E-03  378898.4 3852065.0   144.1    14.00     5.61    13.02     NO
CF2              0   0.75599E-03  378896.7 3851961.8   143.5    14.00     5.61    13.02     NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***          08/14/13
                                   ***                                                                     ***          11:50:46
                                                                                                                        PAGE    4

**MODELOPTs:  RegDFAULT CONC                                          ELEV


                                          *** AREA SOURCE DATA ***

             NUMBER EMISSION RATE  COORD (SW CORNER)  BASE     RELEASE  X-DIM     Y-DIM    ORIENT.    INIT.   URBAN  EMISSION RATE
  SOURCE      PART.  (GRAMS/SEC      X         Y      ELEV.    HEIGHT  OF AREA  OF AREA   OF AREA    SZ     SOURCE  SCALAR VARY
   ID         CATS.    /METER**2)  (METERS) (METERS) (METERS) (METERS) (METERS) (METERS)   (DEG.)  (METERS)            BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

PA               0   0.39495E-06  379141.7 3851891.2   140.9     9.14   229.66   339.73   -88.50     0.00     NO
SP               0   0.12327E-05  379217.5 3852026.9   140.8     9.14   166.03   105.72    92.97     0.00     NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***          08/14/13
                                   ***                                                                     ***          11:50:46
                                                                                                                        PAGE    5

**MODELOPTs:  RegDFAULT CONC                                          ELEV


                                   *** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID                                                  SOURCE IDs


 SRCGP1    SAF1        , SAF2        , SAF3        , SAF4        , F1          , F2          , RM1         , RM2         ,
           PR1         , PR2         , CF1         , CF2         , PA          , SP          ,
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***          08/14/13
                                   ***                                                                     ***          11:50:46
                                                                                                                        PAGE    6

**MODELOPTs:  RegDFAULT CONC                                          ELEV


                                   *** DIRECTION SPECIFIC BUILDING DIMENSIONS ***


SOURCE ID: SAF1
 IFV    BH      BW      BL     XADJ    YADJ     IFV     BH      BW      BL     XADJ    YADJ
```

```
                                                                                PM25_2007.ADO
      379083.04    3851762.33        3.19379                    379033.97    3851763.22        2.87041
      378984.90    3851764.11        3.43989                    378935.83    3851765.00        4.19190
      378886.76    3851765.89        4.79812                    378837.69    3851766.78        6.02770
      378788.62    3851767.67        5.87999                    378739.55    3851768.56        4.77246
      378690.48    3851769.45        3.46277                    378641.41    3851770.34        2.49202
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***        11:50:46
                                                                                                                   PAGE 220

**MODELOPTS:  RegDFAULT CONC                                          ELEV

                          *** THE MAXIMUM   20  24-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  SRCGP1   ***
                              INCLUDING SOURCE(S):     SAF1        , SAF2        , SAF3        , SAF4        , F1          ,
              F2          , RM1         , RM2         , PR1         , PR2         , CF1         , CF2         , PA          ,
              SP          ,

                                   ** CONC OF PM-2.5   IN MICROGRAMS/M**3                          **

RANK        CONC    (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE    RANK        CONC    (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
   1.       9.41420 (07100524) AT ( 378671.74, 3852133.81)  DC       11.       7.40525m(07100424) AT ( 378665.00, 3852120.00)  DC
   2.       9.03741 (07100524) AT ( 378665.00, 3852120.00)  DC       12.       7.21615c(07040224) AT ( 378951.14, 3852322.00)  DC
   3.       8.45486 (07100524) AT ( 378690.40, 3852172.49)  DC       13.       7.20697 (07121124) AT ( 378810.99, 3852298.80)  DC
   4.       7.86568 (07100524) AT ( 378653.08, 3852095.12)  DC       14.       7.20184m(07090724) AT ( 378852.62, 3852323.27)  DC
   5.       7.77596 (07120924) AT ( 378852.62, 3852323.27)  DC       15.       7.12653m(07120724) AT ( 378810.99, 3852298.80)  DC
   6.       7.55370c(07071624) AT ( 378852.62, 3852323.27)  DC       16.       7.06966c(07122124) AT ( 378727.72, 3852249.85)  DC
   7.       7.54810m(07100424) AT ( 378671.74, 3852133.81)  DC       17.       7.02945c(07040224) AT ( 378965.00, 3852420.00)  DC
   8.       7.53024 (07100524) AT ( 378565.00, 3852120.00)  DC       18.       6.99802c(07121024) AT ( 378852.62, 3852323.27)  DC
   9.       7.52940 (07112024) AT ( 378810.99, 3852298.80)  DC       19.       6.93071 (07091624) AT ( 378788.62, 3851767.67)  DC
  10.       7.48077 (07112024) AT ( 378852.62, 3852323.27)  DC       20.       6.88649c(07100624) AT ( 378709.06, 3852211.17)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***        11:50:46
                                                                                                                   PAGE 221

**MODELOPTS:  RegDFAULT CONC                                          ELEV

                                   *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***

                                   ** CONC OF PM-2.5   IN MICROGRAMS/M**3                          **

                                                                                                          NETWORK
GROUP ID                        AVERAGE CONC                 RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS      1.93973 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
          2ND HIGHEST VALUE IS      1.81112 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC
          3RD HIGHEST VALUE IS      1.66712 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
          4TH HIGHEST VALUE IS      1.53284 AT (  378769.35,  3852274.32,   143.00,   143.00,    0.00)  DC
          5TH HIGHEST VALUE IS      1.51842 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
          6TH HIGHEST VALUE IS      1.48708 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
          7TH HIGHEST VALUE IS      1.47904 AT (  378865.00,  3852420.00,   140.56,   147.00,    0.00)  DC
          8TH HIGHEST VALUE IS      1.40980 AT (  378765.00,  3852320.00,   142.72,   147.00,    0.00)  DC
          9TH HIGHEST VALUE IS      1.40929 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
         10TH HIGHEST VALUE IS      1.30557 AT (  378765.00,  3851720.00,   143.24,   143.24,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
```

```
                                                                                PM25_2007.ADO
                    GP = GRIDPOLR
                    DC = DISCCART
                    DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon. ***        08/14/13
                                  ***                                                            ***        11:50:46
                                                                                                            PAGE 222

 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                        *** THE SUMMARY OF MAXIMUM   1ST-HIGHEST 24-HR RESULTS AVERAGED OVER   1 YEARS ***

                              ** CONC OF PM-2.5   IN MICROGRAMS/M**3                          **
                                                                                                NETWORK
GROUP ID                      AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS      9.41420 AT (  378671.74,  3852133.81,   144.48,   148.00,    0.00)  DC
          2ND HIGHEST VALUE IS      9.03741 AT (  378665.00,  3852120.00,   144.91,   148.00,    0.00)  DC
          3RD HIGHEST VALUE IS      8.45486 AT (  378690.40,  3852172.49,   143.52,   143.52,    0.00)  DC
          4TH HIGHEST VALUE IS      7.86568 AT (  378653.08,  3852095.12,   145.77,   145.77,    0.00)  DC
          5TH HIGHEST VALUE IS      7.77596 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
          6TH HIGHEST VALUE IS      7.53024 AT (  378565.00,  3852120.00,   143.94,   148.00,    0.00)  DC
          7TH HIGHEST VALUE IS      7.52940 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC
          8TH HIGHEST VALUE IS      7.21615 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
          9TH HIGHEST VALUE IS      7.06966 AT (  378727.72,  3852249.85,   143.09,   147.00,    0.00)  DC
         10TH HIGHEST VALUE IS      7.02945 AT (  378965.00,  3852420.00,   141.11,   145.00,    0.00)  DC
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon. ***        08/14/13
                                  ***                                                            ***        11:50:46
                                                                                                            PAGE 223

 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                        *** THE SUMMARY OF MAXIMUM   2ND-HIGHEST 24-HR RESULTS AVERAGED OVER   1 YEARS ***

                              ** CONC OF PM-2.5   IN MICROGRAMS/M**3                          **
                                                                                                NETWORK
GROUP ID                      AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS      7.55370 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
          2ND HIGHEST VALUE IS      7.54810 AT (  378671.74,  3852133.81,   144.48,   148.00,    0.00)  DC
          3RD HIGHEST VALUE IS      7.40525 AT (  378665.00,  3852120.00,   144.91,   148.00,    0.00)  DC
          4TH HIGHEST VALUE IS      7.20697 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC
          5TH HIGHEST VALUE IS      6.74317 AT (  378709.06,  3852211.17,   143.16,   147.00,    0.00)  DC
          6TH HIGHEST VALUE IS      6.67296 AT (  378665.00,  3852220.00,   143.46,   148.00,    0.00)  DC
          7TH HIGHEST VALUE IS      6.65691 AT (  378653.08,  3852095.12,   145.77,   145.77,    0.00)  DC
          8TH HIGHEST VALUE IS      6.60072 AT (  378690.40,  3852172.49,   143.52,   143.52,    0.00)  DC
          9TH HIGHEST VALUE IS      6.50834 AT (  378727.72,  3852249.85,   143.09,   147.00,    0.00)  DC
         10TH HIGHEST VALUE IS      6.47657 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon. ***        08/14/13
                                  ***                                                            ***        11:50:46
                                                                                                            PAGE 224

 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                        *** THE SUMMARY OF MAXIMUM   8TH-HIGHEST 24-HR RESULTS AVERAGED OVER   1 YEARS ***

                              ** CONC OF PM-2.5   IN MICROGRAMS/M**3                          **
```

GROUP ID		AVERAGE CONC		RECEPTOR (XR,	YR,	ZELEV,	ZHILL,	ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	6.62314	AT (	378852.62,	3852323.27,	142.50,	146.00,	0.00)	DC	
	2ND HIGHEST VALUE IS	6.25586	AT (	378810.99,	3852298.80,	142.76,	147.00,	0.00)	DC	
	3RD HIGHEST VALUE IS	6.02770	AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	
	4TH HIGHEST VALUE IS	5.87999	AT (	378788.62,	3851767.67,	143.30,	146.00,	0.00)	DC	
	5TH HIGHEST VALUE IS	5.62411	AT (	378769.35,	3852274.32,	143.00,	143.00,	0.00)	DC	
	6TH HIGHEST VALUE IS	5.56930	AT (	378727.72,	3852249.85,	143.09,	147.00,	0.00)	DC	
	7TH HIGHEST VALUE IS	5.52937	AT (	378901.88,	3852322.63,	142.58,	146.00,	0.00)	DC	
	8TH HIGHEST VALUE IS	5.46230	AT (	378765.00,	3851720.00,	143.24,	143.24,	0.00)	DC	
	9TH HIGHEST VALUE IS	5.38101	AT (	378865.00,	3852420.00,	140.56,	147.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	5.34747	AT (	378709.06,	3852211.17,	143.16,	147.00,	0.00)	DC	

```
*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR
*** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***     08/14/13
                                  ***                                                                     ***     11:50:46
                                                                                                                  PAGE 225
**MODELOPTS:  RegDFAULT CONC                                          ELEV

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of          0 Fatal Error Message(s)
A Total of          5 Warning Message(s)
A Total of       1127 Informational Message(s)

A Total of       8760 Hours Were Processed

A Total of        786 Calm Hours Identified

A Total of        341 Missing Hours Identified (  3.89 Percent)

   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***

   ********   WARNING MESSAGES   ********
ME W186      384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
CN W305        3 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3
CN W305        3 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4
CN W305        7 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
CN W305       10 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2

   ************************************
   *** AERMOD Finishes Successfully ***
   ************************************
```

Appendix B - Air Quality Impact Evaluation
AERMOD Output Files
Pollutant - PM2.5
Year - 2008

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d


```
ME STARTING
   SURFFILE "..\Met Data\KTUP_12354\KTUP_08.SFC"
   PROFFILE "..\Met Data\KTUP_12354\KTUP_08.PFL"
   SURFDATA 93862 2008 TUPELO
   UAIRDATA 3940 2008 JACKSON/THOMPSON_FIELD
   PROFBASE 104.0 METERS
ME FINISHED
**
****************************************
** AERMOD Output Pathway
****************************************
**
**
OU STARTING
   RECTABLE ALLAVE 1ST-2ND 8TH
   RECTABLE 24 1ST-2ND 8TH
   MAXTABLE ALLAVE 20
** Auto-Generated Plotfiles
   PLOTFILE 24 SRCGP1 1ST MSSILICON_PM25.AD\24H1G001.PLT 31
   PLOTFILE 24 SRCGP1 2ND MSSILICON_PM25.AD\24H2G000.PLT 32
   PLOTFILE 24 SRCGP1 8TH MSSILICON_PM25.AD\24H8G000.PLT 33
   PLOTFILE ANNUAL SRCGP1 MSSILICON_PM25.AD\AN00G000.PLT 34
   SUMMFILE MSSilicon_PM25.sum
OU FINISHED

  *** Message Summary For AERMOD Model Setup ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            1 Warning Message(s)
 A Total of            0 Informational Message(s)


    ******** FATAL ERROR MESSAGES ********
                 ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

 ************************************
 *** SETUP Finishes Successfully ***
 ************************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                  ***                                                                  ***        11:59:14
                                                                                                                  PAGE   1

 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F
```

```
**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates ANNUAL Averages

**This Run Includes:     14 Source(s);      1 Source Group(s); and    3416 Receptor(s)

**The Model Assumes A Pollutant Type of:  PM-2.5

**Note that special processing requirements apply for the 24-hour PM2.5 NAAQS - check available guidance.
  Model will process user-specified ranks of high 24-hour values averaged across the number of years modeled, and
  the multi-year average of individual ANNUAL values, averaged across the number of years modeled.

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.3 MB of RAM.

**Detailed Error/Message File:   MSSilicon_PM25.err
**File for Summary of Results:   MSSilicon_PM25.sum
```


**MODELOPTS: RegDFAULT CONC   ELEV

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.43973E+00	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.43973E+00	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.43973E+00	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.43973E+00	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	
RM1	0	0.97018E-01	378883.4	3852121.0	144.4	12.19	293.15	18.29	1.37	YES	NO	NO	
RM2	0	0.97018E-01	378879.7	3851906.4	141.9	24.38	293.15	18.29	1.37	YES	NO	NO	

PR1	0	0.48509E-01	378833.8	3852062.0	143.3	12.19	293.15	18.29	1.07	YES	NO	NO
PR2	0	0.48509E-01	378832.2	3851967.1	143.3	24.38	293.15	18.29	1.07	YES	NO	NO

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
*** *** 11:59:14
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**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.12600E-02	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.12600E-02	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	
CF1	0	0.75599E-03	378898.4	3852065.0	144.1	14.00	5.61	13.02	NO	
CF2	0	0.75599E-03	378896.7	3851961.8	143.5	14.00	5.61	13.02	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
*** *** 11:59:14
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**MODELOPTs: RegDFAULT CONC ELEV

*** AREA SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	COORD (SW CORNER) X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	X-DIM OF AREA (METERS)	Y-DIM OF AREA (METERS)	ORIENT. OF AREA (DEG.)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PA	0	0.39495E-06	379141.7	3851891.2	140.9	9.14	229.66	339.73	-88.50	0.00	NO	
SP	0	0.12327E-05	379217.5	3852026.9	140.8	9.14	166.03	105.72	92.97	0.00	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
*** *** 11:59:14
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**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

SRCGP1 SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 , RM1 , RM2 ,
PR1 , PR2 , CF1 , CF2 , PA , SP ,

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
*** *** 11:59:14
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**MODELOPTs: RegDFAULT CONC ELEV

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV BH BW BL XADJ YADJ IFV BH BW BL XADJ YADJ

```
                                                                                                PM25_2008.ADO
        379083.04    3851762.33        3.14067                        379033.97    3851763.22        3.33248
        378984.90    3851764.11        3.54664                        378935.83    3851765.00        4.20266
        378886.76    3851765.89        5.29270                        378837.69    3851766.78        5.83911
        378788.62    3851767.67        5.11244                        378739.55    3851768.56        5.09078
        378690.48    3851769.45        5.47221                        378641.41    3851770.34        5.34419
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        11:59:14
                                                                                                                       PAGE 220
 **MODELOPTs:  RegDFAULT CONC                                                    ELEV

                                 *** THE MAXIMUM   20  24-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  SRCGP1   ***
                                     INCLUDING SOURCE(S):     SAF1        , SAF2        , SAF3        , SAF4        , F1          ,
                F2          , RM1         , RM2         , PR1         , PR2         , CF1         , CF2         , PA          ,
                SP          ,

                                          ** CONC OF PM-2.5   IN MICROGRAMS/M**3                          **

RANK        CONC    (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE    RANK        CONC    (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
   1.       7.78942c(08101324) AT ( 378709.06, 3852211.17)  DC       11.       7.19340 (08042424) AT ( 378765.00, 3852320.00)  DC
   2.       7.69904c(08101824) AT ( 378739.55, 3851768.56)  DC       12.       7.16854c(08092224) AT ( 378565.00, 3851620.00)  DC
   3.       7.57112c(08101324) AT ( 378727.72, 3852249.85)  DC       13.       7.16448c(08100524) AT ( 378465.00, 3851520.00)  DC
   4.       7.47741c(08092224) AT ( 378641.41, 3851770.34)  DC       14.       7.15864c(08101824) AT ( 378665.00, 3851720.00)  DC
   5.       7.37257c(08090724) AT ( 378837.69, 3851766.78)  DC       15.       7.13739c(08092224) AT ( 378690.48, 3851769.45)  DC
   6.       7.36242c(08101824) AT ( 378690.48, 3851769.45)  DC       16.       7.13169c(08092224) AT ( 378665.00, 3851720.00)  DC
   7.       7.31503c(08100524) AT ( 378565.00, 3851620.00)  DC       17.       7.06105c(08100524) AT ( 378565.00, 3851720.00)  DC
   8.       7.28219c(08101824) AT ( 378665.00, 3851620.00)  DC       18.       7.03774c(08032524) AT ( 378852.62, 3852323.27)  DC
   9.       7.27762 (08042424) AT ( 378769.35, 3852274.32)  DC       19.       6.92942c(08090724) AT ( 378865.00, 3851720.00)  DC
  10.       7.21609 (08042424) AT ( 378810.99, 3852298.80)  DC       20.       6.85936 (08010624) AT ( 378852.62, 3852323.27)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        11:59:14
                                                                                                                       PAGE 221
 **MODELOPTs:  RegDFAULT CONC                                                    ELEV

                                   *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***

                                    ** CONC OF PM-2.5   IN MICROGRAMS/M**3                          **

                                                                                                                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS       1.66094 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
          2ND HIGHEST VALUE IS       1.56392 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC
          3RD HIGHEST VALUE IS       1.38462 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
          4TH HIGHEST VALUE IS       1.37717 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
          5TH HIGHEST VALUE IS       1.32835 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
          6TH HIGHEST VALUE IS       1.32775 AT (  378769.35,  3852274.32,   143.00,   143.00,    0.00)  DC
          7TH HIGHEST VALUE IS       1.26813 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
          8TH HIGHEST VALUE IS       1.23296 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC
          9TH HIGHEST VALUE IS       1.23006 AT (  378765.00,  3852320.00,   142.72,   147.00,    0.00)  DC
         10TH HIGHEST VALUE IS       1.22012 AT (  378865.00,  3852420.00,   140.56,   147.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
```

```
                                                                                    PM25_2008.ADO
                    GP = GRIDPOLR
                    DC = DISCCART
                    DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                  ***                                                                      ***        11:59:14
                                                                                                                      PAGE 222
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                         *** THE SUMMARY OF MAXIMUM   1ST-HIGHEST 24-HR RESULTS AVERAGED OVER   1 YEARS ***

                                 ** CONC OF PM-2.5   IN MICROGRAMS/M**3                          **

                                                                                                   NETWORK
GROUP ID                      AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS       7.78942 AT (  378709.06,  3852211.17,   143.16,   147.00,    0.00)  DC
          2ND HIGHEST VALUE IS       7.69904 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
          3RD HIGHEST VALUE IS       7.57112 AT (  378727.72,  3852249.85,   143.09,   147.00,    0.00)  DC
          4TH HIGHEST VALUE IS       7.47741 AT (  378641.41,  3851770.34,   142.78,   148.00,    0.00)  DC
          5TH HIGHEST VALUE IS       7.37257 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
          6TH HIGHEST VALUE IS       7.36242 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
          7TH HIGHEST VALUE IS       7.31503 AT (  378565.00,  3851620.00,   142.82,   148.00,    0.00)  DC
          8TH HIGHEST VALUE IS       7.28219 AT (  378665.00,  3851620.00,   143.02,   143.02,    0.00)  DC
          9TH HIGHEST VALUE IS       7.27762 AT (  378769.35,  3852274.32,   143.00,   143.00,    0.00)  DC
         10TH HIGHEST VALUE IS       7.21609 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                  ***                                                                      ***        11:59:14
                                                                                                                      PAGE 223
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                         *** THE SUMMARY OF MAXIMUM   2ND-HIGHEST 24-HR RESULTS AVERAGED OVER   1 YEARS ***

                                 ** CONC OF PM-2.5   IN MICROGRAMS/M**3                          **

                                                                                                   NETWORK
GROUP ID                      AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS       7.16854 AT (  378565.00,  3851620.00,   142.82,   148.00,    0.00)  DC
          2ND HIGHEST VALUE IS       7.13739 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
          3RD HIGHEST VALUE IS       7.13169 AT (  378665.00,  3851720.00,   142.78,   148.00,    0.00)  DC
          4TH HIGHEST VALUE IS       6.85936 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
          5TH HIGHEST VALUE IS       6.76696 AT (  378641.41,  3851770.34,   142.78,   148.00,    0.00)  DC
          6TH HIGHEST VALUE IS       6.51267 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC
          7TH HIGHEST VALUE IS       6.41139 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
          8TH HIGHEST VALUE IS       6.32325 AT (  378465.00,  3851520.00,   144.52,   149.00,    0.00)  DC
          9TH HIGHEST VALUE IS       6.24928 AT (  378690.40,  3852172.49,   143.52,   143.52,    0.00)  DC
         10TH HIGHEST VALUE IS       6.23084 AT (  378727.72,  3852249.85,   143.09,   147.00,    0.00)  DC
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                  ***                                                                      ***        11:59:14
                                                                                                                      PAGE 224
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                         *** THE SUMMARY OF MAXIMUM   8TH-HIGHEST 24-HR RESULTS AVERAGED OVER   1 YEARS ***

                                 ** CONC OF PM-2.5   IN MICROGRAMS/M**3                          **
```

GROUP ID		AVERAGE CONC		RECEPTOR (XR,	YR,	ZELEV,	ZHILL,	ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	5.92020	AT (	378810.99,	3852298.80,	142.76,	147.00,	0.00)	DC	
	2ND HIGHEST VALUE IS	5.88282	AT (	378852.62,	3852323.27,	142.50,	146.00,	0.00)	DC	
	3RD HIGHEST VALUE IS	5.83911	AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	
	4TH HIGHEST VALUE IS	5.57711	AT (	378665.00,	3851720.00,	142.78,	148.00,	0.00)	DC	
	5TH HIGHEST VALUE IS	5.47221	AT (	378690.48,	3851769.45,	143.30,	147.00,	0.00)	DC	
	6TH HIGHEST VALUE IS	5.40296	AT (	378865.00,	3851720.00,	141.49,	146.00,	0.00)	DC	
	7TH HIGHEST VALUE IS	5.34419	AT (	378641.41,	3851770.34,	142.78,	148.00,	0.00)	DC	
	8TH HIGHEST VALUE IS	5.29270	AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	9TH HIGHEST VALUE IS	5.17721	AT (	378769.35,	3852274.32,	143.00,	143.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	5.11244	AT (	378788.62,	3851767.67,	143.30,	146.00,	0.00)	DC	

```
*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR
```

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        11:59:14
                                                                                                                       PAGE 225
**MODELOPTs:  RegDFAULT CONC                                           ELEV
```

```
*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of          0 Fatal Error Message(s)
A Total of          5 Warning Message(s)
A Total of       1233 Informational Message(s)

A Total of       8784 Hours Were Processed

A Total of        834 Calm Hours Identified

A Total of        399 Missing Hours Identified (  4.54 Percent)

   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***

   ********   WARNING MESSAGES   ********
ME W186    384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
CN W305      1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
CN W305      1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2
CN W305     43 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3
CN W305     43 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4

   ************************************
   *** AERMOD Finishes Successfully ***
   ************************************
```

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d


```
   PLOTFILE 24 SRCGP1 1ST MSSILICON_PM25.AD\24H1G001.PLT 31
   PLOTFILE 24 SRCGP1 2ND MSSILICON_PM25.AD\24H2G000.PLT 32
   PLOTFILE 24 SRCGP1 8TH MSSILICON_PM25.AD\24H8G000.PLT 33
   PLOTFILE ANNUAL SRCGP1 MSSILICON_PM25.AD\AN00G000.PLT 34
   SUMMFILE MSSilicon_PM25.sum
OU FINISHED

  *** Message Summary For AERMOD Model Setup ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            1 Warning Message(s)
 A Total of            0 Informational Message(s)


    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

 ************************************
 *** SETUP Finishes Successfully ***
 ************************************

  *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                   ***        12:07:08
                                                                                                                    PAGE   1
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

 **Model Assumes No FLAGPOLE Receptor Heights.

 **Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates ANNUAL Averages

 **This Run Includes:     14 Source(s);       1 Source Group(s); and    3416 Receptor(s)

 **The Model Assumes A Pollutant Type of:  PM-2.5

 **Note that special processing requirements apply for the 24-hour PM2.5 NAAQS - check available guidance.
   Model will process user-specified ranks of high 24-hour values averaged across the number of years modeled, and
   the multi-year average of individual ANNUAL values, averaged across the number of years modeled.
```

```
**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
        Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
        Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.3 MB of RAM.

**Detailed Error/Message File:   MSSilicon_PM25.err
**File for Summary of Results:   MSSilicon_PM25.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                        ***        12:07:08
                                                                                                                          PAGE   2
**MODELOPTs:  RegDFAULT CONC                                           ELEV
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.43973E+00	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.43973E+00	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.43973E+00	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.43973E+00	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	
RM1	0	0.97018E-01	378883.4	3852121.0	144.4	12.19	293.15	18.29	1.37	YES	NO	NO	
RM2	0	0.97018E-01	378879.7	3851906.4	141.9	24.38	293.15	18.29	1.37	YES	NO	NO	
PR1	0	0.48509E-01	378833.8	3852062.0	143.3	12.19	293.15	18.29	1.07	YES	NO	NO	
PR2	0	0.48509E-01	378832.2	3851967.1	143.3	24.38	293.15	18.29	1.07	YES	NO	NO	

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                        ***        12:07:08
                                                                                                                          PAGE   3
**MODELOPTs:  RegDFAULT CONC                                           ELEV
```

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.12600E-02	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.12600E-02	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	
CF1	0	0.75599E-03	378898.4	3852065.0	144.1	14.00	5.61	13.02	NO	
CF2	0	0.75599E-03	378896.7	3851961.8	143.5	14.00	5.61	13.02	NO	

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                        ***        12:07:08
                                                                                                                          PAGE   4
**MODELOPTs:  RegDFAULT CONC                                           ELEV
```

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*** AREA SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	COORD (SW CORNER) X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	X-DIM OF AREA (METERS)	Y-DIM OF AREA (METERS)	ORIENT. OF AREA (DEG.)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PA	0	0.39495E-06	379141.7	3851891.2	140.9	9.14	229.66	339.73	-88.50	0.00	NO	
SP	0	0.12327E-05	379217.5	3852026.9	140.8	9.14	166.03	105.72	92.97	0.00	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
*** *** 12:07:08
PAGE 5

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
SRCGP1	SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 , RM1 , RM2 ,
	PR1 , PR2 , CF1 , CF2 , PA , SP ,

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
*** *** 12:07:08
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**MODELOPTs: RegDFAULT CONC ELEV

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	16.8,	14.4,	-12.8,	9.6,	2	40.0,	54.1,	84.7,	-214.9,	40.5,
3	40.0,	64.6,	83.9,	-218.9,	9.9,	4	40.0,	73.2,	80.5,	-216.2,	-21.0,
5	40.0,	79.4,	74.5,	-123.2,	45.0,	6	40.0,	83.3,	66.5,	-125.7,	29.4,
7	40.0,	84.7,	56.3,	-124.3,	12.9,	8	40.0,	83.4,	44.5,	-119.2,	-3.9,
9	40.0,	79.7,	31.3,	-110.4,	-20.7,	10	40.0,	82.9,	42.0,	-110.7,	-36.9,
11	40.0,	84.6,	54.1,	-109.0,	-51.9,	12	15.2,	85.4,	92.9,	12.5,	7.1,
13	15.2,	90.8,	93.6,	10.0,	17.2,	14	15.2,	93.5,	91.6,	7.2,	26.8,
15	15.2,	93.2,	86.7,	4.1,	35.6,	16	15.2,	90.2,	79.2,	1.0,	43.3,
17	15.2,	84.4,	69.3,	-2.2,	49.7,	18	10.7,	15.3,	12.4,	-2.3,	-10.4,
19	10.7,	16.8,	14.4,	-1.5,	-9.6,	20	28.0,	118.5,	213.2,	9.6,	-72.6,
21	28.0,	147.6,	207.2,	23.4,	-51.3,	22	28.0,	172.2,	194.8,	36.6,	-28.5,
23	40.0,	79.4,	74.5,	48.6,	-45.0,	24	40.0,	83.3,	66.5,	59.2,	-29.4,
25	40.0,	84.7,	56.3,	68.0,	-12.9,	26	40.0,	83.4,	44.5,	74.7,	3.9,
27	40.0,	79.7,	31.3,	79.1,	20.7,	28	40.0,	82.9,	42.0,	68.8,	36.9,
29	40.0,	84.6,	54.1,	54.9,	51.9,	30	15.2,	85.4,	92.9,	-105.4,	-7.1,
31	15.2,	90.8,	93.6,	-103.6,	-17.2,	32	15.2,	93.5,	91.6,	-98.8,	-26.8,
33	15.2,	93.2,	86.7,	-90.9,	-35.6,	34	15.2,	90.2,	79.2,	-80.2,	-43.3,
35	15.2,	84.4,	69.3,	-67.1,	-49.7,	36	10.7,	15.3,	12.4,	-10.1,	10.4,

SOURCE ID: SAF2

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	17.1,	14.3,	-4.8,	10.9,	2	38.1,	65.7,	84.7,	-172.5,	49.1,
3	40.0,	64.6,	83.9,	-179.7,	31.5,	4	40.0,	73.2,	80.5,	-181.3,	7.1,
5	40.0,	79.5,	74.6,	-177.5,	-17.5,	6	40.0,	83.4,	66.5,	-168.3,	-41.6,
7	40.0,	84.7,	56.3,	-108.1,	54.7,	8	40.0,	83.4,	44.5,	-110.5,	40.0,
9	40.0,	79.7,	31.3,	-109.5,	24.1,	10	40.0,	82.9,	42.0,	-117.6,	7.4,

```
*** THE MAXIMUM   20  24-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  SRCGP1   ***
    INCLUDING SOURCE(S):     SAF1        , SAF2        , SAF3        , SAF4        , F1          ,
F2          , RM1         , RM2         , PR1         , PR2         , CF1         , CF2         , PA          ,
SP          ,

                    ** CONC OF PM-2.5   IN MICROGRAMS/M**3                    **

RANK        CONC    (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE    RANK        CONC    (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
   1.       7.41529c(09091824) AT ( 378653.08, 3852095.12)  DC       11.       6.78573c(09092324) AT ( 378690.40, 3852172.49)  DC
   2.       7.38761 (09081624) AT ( 378852.62, 3852323.27)  DC       12.       6.76941c(09091824) AT ( 378665.00, 3852120.00)  DC
   3.       7.35214c(09112824) AT ( 379000.41, 3852321.36)  DC       13.       6.74391c(09082324) AT ( 378739.55, 3851768.56)  DC
   4.       7.27175 (09112324) AT ( 378810.99, 3852298.80)  DC       14.       6.72165c(09112024) AT ( 378565.00, 3851620.00)  DC
   5.       7.15178c(09112024) AT ( 378690.48, 3851769.45)  DC       15.       6.71138 (09081324) AT ( 378690.48, 3851769.45)  DC
   6.       7.12366c(09092524) AT ( 378739.55, 3851768.56)  DC       16.       6.70530c(09092524) AT ( 378665.00, 3851720.00)  DC
   7.       7.12160 (09112324) AT ( 378852.62, 3852323.27)  DC       17.       6.66101c(09110724) AT ( 379000.41, 3852321.36)  DC
   8.       7.04110c(09112024) AT ( 378665.00, 3851720.00)  DC       18.       6.64691c(09112824) AT ( 379049.67, 3852320.72)  DC
   9.       7.02214c(09092524) AT ( 378690.48, 3851769.45)  DC       19.       6.59040c(09112824) AT ( 379065.00, 3852420.00)  DC
  10.       6.99180 (09082424) AT ( 378739.55, 3851768.56)  DC       20.       6.57657c(09082324) AT ( 378690.48, 3851769.45)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        12:07:08
                                                                                                                       PAGE 221
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                                   *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***

                                    ** CONC OF PM-2.5   IN MICROGRAMS/M**3                    **

                                                                                                          NETWORK
GROUP ID                        AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS      1.61600 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
          2ND HIGHEST VALUE IS      1.53385 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
          3RD HIGHEST VALUE IS      1.52001 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
          4TH HIGHEST VALUE IS      1.45797 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
          5TH HIGHEST VALUE IS      1.44130 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
          6TH HIGHEST VALUE IS      1.38160 AT (  378665.00,  3851720.00,   142.78,   148.00,    0.00)  DC
          7TH HIGHEST VALUE IS      1.33459 AT (  379098.93,  3852320.09,   142.51,   142.51,    0.00)  DC
          8TH HIGHEST VALUE IS      1.33447 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
          9TH HIGHEST VALUE IS      1.30935 AT (  379065.00,  3852420.00,   141.14,   141.14,    0.00)  DC
         10TH HIGHEST VALUE IS      1.28933 AT (  378641.41,  3851770.34,   142.78,   148.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        12:07:08
                                                                                                                       PAGE 222
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                                *** THE SUMMARY OF MAXIMUM   1ST-HIGHEST 24-HR RESULTS AVERAGED OVER   1 YEARS ***
```

PM25_2009.ADO

```
                    ** CONC OF PM-2.5   IN MICROGRAMS/M**3                    **

                                                                                                NETWORK
GROUP ID                      AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1     1ST HIGHEST VALUE IS      7.41529 AT (  378653.08,  3852095.12,   145.77,   145.77,    0.00)  DC
           2ND HIGHEST VALUE IS      7.38761 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
           3RD HIGHEST VALUE IS      7.35214 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
           4TH HIGHEST VALUE IS      7.27175 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC
           5TH HIGHEST VALUE IS      7.15178 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
           6TH HIGHEST VALUE IS      7.12366 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
           7TH HIGHEST VALUE IS      7.04110 AT (  378665.00,  3851720.00,   142.78,   148.00,    0.00)  DC
           8TH HIGHEST VALUE IS      6.78573 AT (  378690.40,  3852172.49,   143.52,   143.52,    0.00)  DC
           9TH HIGHEST VALUE IS      6.76941 AT (  378665.00,  3852120.00,   144.91,   148.00,    0.00)  DC
          10TH HIGHEST VALUE IS      6.72165 AT (  378565.00,  3851620.00,   142.82,   148.00,    0.00)  DC
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***          12:07:08
                                                                                                                     PAGE 223
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                         *** THE SUMMARY OF MAXIMUM   2ND-HIGHEST 24-HR RESULTS AVERAGED OVER   1 YEARS ***

                    ** CONC OF PM-2.5   IN MICROGRAMS/M**3                    **

                                                                                                NETWORK
GROUP ID                      AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1     1ST HIGHEST VALUE IS      7.12160 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS      7.02214 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
           3RD HIGHEST VALUE IS      6.99180 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
           4TH HIGHEST VALUE IS      6.70530 AT (  378665.00,  3851720.00,   142.78,   148.00,    0.00)  DC
           5TH HIGHEST VALUE IS      6.66101 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
           6TH HIGHEST VALUE IS      6.47018 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC
           7TH HIGHEST VALUE IS      6.38578 AT (  378653.08,  3852095.12,   145.77,   145.77,    0.00)  DC
           8TH HIGHEST VALUE IS      6.23931 AT (  378665.00,  3852120.00,   144.91,   148.00,    0.00)  DC
           9TH HIGHEST VALUE IS      6.23759 AT (  378727.72,  3852249.85,   143.09,   147.00,    0.00)  DC
          10TH HIGHEST VALUE IS      6.19405 AT (  378665.00,  3851620.00,   143.02,   143.02,    0.00)  DC
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***          12:07:08
                                                                                                                     PAGE 224
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                         *** THE SUMMARY OF MAXIMUM   8TH-HIGHEST 24-HR RESULTS AVERAGED OVER   1 YEARS ***

                    ** CONC OF PM-2.5   IN MICROGRAMS/M**3                    **

                                                                                                NETWORK
GROUP ID                      AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1     1ST HIGHEST VALUE IS      6.05503 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
           2ND HIGHEST VALUE IS      5.91760 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
           3RD HIGHEST VALUE IS      5.90976 AT (  378665.00,  3851720.00,   142.78,   148.00,    0.00)  DC
           4TH HIGHEST VALUE IS      5.54218 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
           5TH HIGHEST VALUE IS      5.38173 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
           6TH HIGHEST VALUE IS      5.31776 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
           7TH HIGHEST VALUE IS      5.31397 AT (  378665.00,  3851620.00,   143.02,   143.02,    0.00)  DC
           8TH HIGHEST VALUE IS      5.27120 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
           9TH HIGHEST VALUE IS      5.22957 AT (  378641.41,  3851770.34,   142.78,   148.00,    0.00)  DC
          10TH HIGHEST VALUE IS      5.21285 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
```

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d


```
ME STARTING
   SURFFILE "..\Met Data\KTUP_12354\KTUP_10.SFC"
   PROFFILE "..\Met Data\KTUP_12354\KTUP_10.PFL"
   SURFDATA 93862 2010 TUPELO
   UAIRDATA 3940 2010 JACKSON/THOMPSON_FIELD
   PROFBASE 104.0 METERS
ME FINISHED
**
****************************************
** AERMOD Output Pathway
****************************************
**
**
OU STARTING
   RECTABLE ALLAVE 1ST-2ND 8TH
   RECTABLE 24 1ST-2ND 8TH
   MAXTABLE ALLAVE 20
** Auto-Generated Plotfiles
   PLOTFILE 24 SRCGP1 1ST MSSILICON_PM25.AD\24H1G001.PLT 31
   PLOTFILE 24 SRCGP1 2ND MSSILICON_PM25.AD\24H2G000.PLT 32
   PLOTFILE 24 SRCGP1 8TH MSSILICON_PM25.AD\24H8G000.PLT 33
   PLOTFILE ANNUAL SRCGP1 MSSILICON_PM25.AD\AN00G000.PLT 34
   SUMMFILE MSSilicon_PM25.sum
OU FINISHED


  *** Message Summary For AERMOD Model Setup ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            1 Warning Message(s)
 A Total of            0 Informational Message(s)


    ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

 ***********************************
 *** SETUP Finishes Successfully ***
 ***********************************

  *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***        12:14:34
                                                                                                                   PAGE   1
 **MODELOPTS:  RegDFAULT CONC                                          ELEV

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F
```

PM25_2010.ADO

```
**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates ANNUAL Averages

**This Run Includes:     14 Source(s);       1 Source Group(s); and    3416 Receptor(s)

**The Model Assumes A Pollutant Type of:  PM-2.5

**Note that special processing requirements apply for the 24-hour PM2.5 NAAQS - check available guidance.
  Model will process user-specified ranks of high 24-hour values averaged across the number of years modeled, and
  the multi-year average of individual ANNUAL values, averaged across the number of years modeled.

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.3 MB of RAM.

**Detailed Error/Message File:   MSSilicon_PM25.err
**File for Summary of Results:   MSSilicon_PM25.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***        12:14:34
                                                                                                                   PAGE   2
**MODELOPTs:  RegDEFAULT CONC                                                ELEV
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.43973E+00	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.43973E+00	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.43973E+00	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.43973E+00	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	
RM1	0	0.97018E-01	378883.4	3852121.0	144.4	12.19	293.15	18.29	1.37	YES	NO	NO	
RM2	0	0.97018E-01	378879.7	3851906.4	141.9	24.38	293.15	18.29	1.37	YES	NO	NO	

```
                                                                                                                PM25_2010.ADO
PR1              0   0.48509E-01  378833.8 3852062.0   143.3    12.19   293.15    18.29     1.07    YES     NO    NO
PR2              0   0.48509E-01  378832.2 3851967.1   143.3    24.38   293.15    18.29     1.07    YES     NO    NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        12:14:34
                                                                                                                       PAGE   3
**MODELOPTs:  RegDFAULT CONC                                                  ELEV


                                                  *** VOLUME SOURCE DATA ***

              NUMBER EMISSION RATE                     BASE    RELEASE    INIT.    INIT.   URBAN  EMISSION RATE
  SOURCE       PART.  (GRAMS/SEC)     X         Y      ELEV.   HEIGHT      SY       SZ     SOURCE  SCALAR VARY
    ID         CATS.                (METERS) (METERS) (METERS) (METERS) (METERS) (METERS)              BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

F1               0   0.12600E-02  378925.8 3852076.8   144.0    20.01     6.97    18.62     NO
F2               0   0.12600E-02  378923.5 3851949.2   143.0    20.01     6.97    18.62     NO
CF1              0   0.75599E-03  378898.4 3852065.0   144.1    14.00     5.61    13.02     NO
CF2              0   0.75599E-03  378896.7 3851961.8   143.5    14.00     5.61    13.02     NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        12:14:34
                                                                                                                       PAGE   4
**MODELOPTs:  RegDFAULT CONC                                                  ELEV


                                                  *** AREA SOURCE DATA ***

              NUMBER EMISSION RATE  COORD (SW CORNER)  BASE     RELEASE  X-DIM     Y-DIM    ORIENT.    INIT.   URBAN  EMISSION RATE
  SOURCE       PART.  (GRAMS/SEC      X         Y      ELEV.    HEIGHT  OF AREA   OF AREA   OF AREA     SZ     SOURCE  SCALAR VARY
    ID         CATS.   /METER**2)   (METERS) (METERS) (METERS) (METERS) (METERS)  (METERS)   (DEG.)  (METERS)              BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

PA               0   0.39495E-06  379141.7 3851891.2   140.9     9.14   229.66   339.73    -88.50     0.00     NO
SP               0   0.12327E-05  379217.5 3852026.9   140.8     9.14   166.03   105.72     92.97     0.00     NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        12:14:34
                                                                                                                       PAGE   5
**MODELOPTs:  RegDFAULT CONC                                                  ELEV


                                          *** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID                                                  SOURCE IDs


 SRCGP1    SAF1        , SAF2        , SAF3        , SAF4        , F1          , F2          , RM1         , RM2         ,

           PR1         , PR2         , CF1         , CF2         , PA          , SP          ,
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        12:14:34
                                                                                                                       PAGE   6
**MODELOPTs:  RegDFAULT CONC                                                  ELEV


                                          *** DIRECTION SPECIFIC BUILDING DIMENSIONS ***


SOURCE ID: SAF1
 IFV    BH      BW      BL     XADJ    YADJ     IFV    BH      BW      BL     XADJ    YADJ
```

```
                                                                                PM25_2010.ADO
        379083.04    3851762.33        3.45673                    379033.97    3851763.22        3.64467
        378984.90    3851764.11        3.61425                    378935.83    3851765.00        3.93120
        378886.76    3851765.89        4.16144                    378837.69    3851766.78        4.58570
        378788.62    3851767.67        4.89100                    378739.55    3851768.56        5.65270
        378690.48    3851769.45        5.45168                    378641.41    3851770.34        4.81730
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***          12:14:34
                                                                                                                     PAGE 220
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                                 *** THE MAXIMUM   20  24-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  SRCGP1   ***
                                     INCLUDING SOURCE(S):     SAF1         , SAF2         , SAF3         , SAF4         , F1           ,
                 F2            , RM1          , RM2          , PR1          , PR2          , CF1          , CF2          , PA           ,
                 SP            ,

                                          ** CONC OF PM-2.5   IN MICROGRAMS/M**3                          **

 RANK        CONC    (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE    RANK        CONC    (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    1.       8.21559 (10070424) AT ( 378810.99, 3852298.80)  DC       11.       6.85903c(10090424) AT ( 378765.00, 3851720.00)  DC
    2.       7.82241 (10083024) AT ( 378810.99, 3852298.80)  DC       12.       6.85208c(10090424) AT ( 378788.62, 3851767.67)  DC
    3.       7.41179 (10070424) AT ( 378769.35, 3852274.32)  DC       13.       6.83559 (10070624) AT ( 378810.99, 3852298.80)  DC
    4.       7.38154 (10083024) AT ( 378765.00, 3852320.00)  DC       14.       6.79552 (10070424) AT ( 378765.00, 3852420.00)  DC
    5.       7.36773 (10083024) AT ( 378769.35, 3852274.32)  DC       15.       6.79291b(10100524) AT ( 378690.48, 3851769.45)  DC
    6.       7.32343c(10083124) AT ( 378810.99, 3852298.80)  DC       16.       6.69348b(10070524) AT ( 378769.35, 3852274.32)  DC
    7.       7.25490 (10070424) AT ( 378765.00, 3852320.00)  DC       17.       6.67804c(10090424) AT ( 378739.55, 3851768.56)  DC
    8.       7.19472 (10070424) AT ( 378852.62, 3852323.27)  DC       18.       6.65179b(10100524) AT ( 378665.00, 3851720.00)  DC
    9.       7.05176c(10090124) AT ( 378810.99, 3852298.80)  DC       19.       6.60369c(10092924) AT ( 378739.55, 3851768.56)  DC
   10.       7.02991c(10083124) AT ( 378852.62, 3852323.27)  DC       20.       6.59176b(10080424) AT ( 378951.14, 3852322.00)  DC

  *** RECEPTOR TYPES:  GC = GRIDCART
                       GP = GRIDPOLR
                       DC = DISCCART
                       DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***          12:14:34
                                                                                                                     PAGE 221
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                                 *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***

                                  ** CONC OF PM-2.5   IN MICROGRAMS/M**3                          **

                                                                                                                NETWORK
 GROUP ID                        AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 SRCGP1     1ST HIGHEST VALUE IS       1.61143 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
            2ND HIGHEST VALUE IS       1.54799 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
            3RD HIGHEST VALUE IS       1.54508 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
            4TH HIGHEST VALUE IS       1.50379 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
            5TH HIGHEST VALUE IS       1.49242 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
            6TH HIGHEST VALUE IS       1.41757 AT (  378665.00,  3851720.00,   142.78,   148.00,    0.00)  DC
            7TH HIGHEST VALUE IS       1.40941 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
            8TH HIGHEST VALUE IS       1.36565 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
            9TH HIGHEST VALUE IS       1.31895 AT (  379065.00,  3852420.00,   141.14,   141.14,    0.00)  DC
           10TH HIGHEST VALUE IS       1.31411 AT (  379098.93,  3852320.09,   142.51,   142.51,    0.00)  DC

  *** RECEPTOR TYPES:  GC = GRIDCART
```

```
                                                                                    PM25_2010.ADO
                    GP = GRIDPOLR
                    DC = DISCCART
                    DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                  ***                                                                      ***        12:14:34
                                                                                                                      PAGE 222
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                        *** THE SUMMARY OF MAXIMUM   1ST-HIGHEST 24-HR RESULTS AVERAGED OVER   1 YEARS ***

                                 ** CONC OF PM-2.5   IN MICROGRAMS/M**3                          **

                                                                                                   NETWORK
GROUP ID                      AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS       8.21559 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC
          2ND HIGHEST VALUE IS       7.41179 AT (  378769.35,  3852274.32,   143.00,   143.00,    0.00)  DC
          3RD HIGHEST VALUE IS       7.38154 AT (  378765.00,  3852320.00,   142.72,   147.00,    0.00)  DC
          4TH HIGHEST VALUE IS       7.19472 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
          5TH HIGHEST VALUE IS       6.85903 AT (  378765.00,  3851720.00,   143.24,   143.24,    0.00)  DC
          6TH HIGHEST VALUE IS       6.85208 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
          7TH HIGHEST VALUE IS       6.79552 AT (  378765.00,  3852420.00,   141.72,   148.00,    0.00)  DC
          8TH HIGHEST VALUE IS       6.79291 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
          9TH HIGHEST VALUE IS       6.67804 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
         10TH HIGHEST VALUE IS       6.65179 AT (  378665.00,  3851720.00,   142.78,   148.00,    0.00)  DC
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                  ***                                                                      ***        12:14:34
                                                                                                                      PAGE 223
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                        *** THE SUMMARY OF MAXIMUM   2ND-HIGHEST 24-HR RESULTS AVERAGED OVER   1 YEARS ***

                                 ** CONC OF PM-2.5   IN MICROGRAMS/M**3                          **

                                                                                                   NETWORK
GROUP ID                      AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS       7.82241 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC
          2ND HIGHEST VALUE IS       7.36773 AT (  378769.35,  3852274.32,   143.00,   143.00,    0.00)  DC
          3RD HIGHEST VALUE IS       7.25490 AT (  378765.00,  3852320.00,   142.72,   147.00,    0.00)  DC
          4TH HIGHEST VALUE IS       7.02991 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
          5TH HIGHEST VALUE IS       6.60369 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
          6TH HIGHEST VALUE IS       6.19571 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
          7TH HIGHEST VALUE IS       6.05730 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
          8TH HIGHEST VALUE IS       6.05049 AT (  378727.72,  3852249.85,   143.09,   147.00,    0.00)  DC
          9TH HIGHEST VALUE IS       6.04071 AT (  378765.00,  3852420.00,   141.72,   148.00,    0.00)  DC
         10TH HIGHEST VALUE IS       6.02154 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                  ***                                                                      ***        12:14:34
                                                                                                                      PAGE 224
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                        *** THE SUMMARY OF MAXIMUM   8TH-HIGHEST 24-HR RESULTS AVERAGED OVER   1 YEARS ***

                                 ** CONC OF PM-2.5   IN MICROGRAMS/M**3                          **
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PM25_2010.ADO

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GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  NETWORK GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS       5.65270 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
          2ND HIGHEST VALUE IS       5.50231 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
          3RD HIGHEST VALUE IS       5.45417 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
          4TH HIGHEST VALUE IS       5.45168 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
          5TH HIGHEST VALUE IS       5.43278 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC
          6TH HIGHEST VALUE IS       5.33717 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
          7TH HIGHEST VALUE IS       5.32808 AT (  378665.00,  3851720.00,   142.78,   148.00,    0.00)  DC
          8TH HIGHEST VALUE IS       5.27280 AT (  378769.35,  3852274.32,   143.00,   143.00,    0.00)  DC
          9TH HIGHEST VALUE IS       4.95176 AT (  378765.00,  3852320.00,   142.72,   147.00,    0.00)  DC
         10TH HIGHEST VALUE IS       4.94841 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                   ***        12:14:34
                                                                                                                    PAGE 225
 **MODELOPTs:  RegDFAULT CONC                                                    ELEV

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            5 Warning Message(s)
 A Total of         1492 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of         1234 Calm Hours Identified

 A Total of          258 Missing Hours Identified (  2.95 Percent)

    ******** FATAL ERROR MESSAGES ********
                 ***  NONE  ***

    ********   WARNING MESSAGES   ********
 ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4

    ************************************
    *** AERMOD Finishes Successfully ***
    ************************************
```

```
   PLOTFILE 24 SRCGP1 1ST MSSILICON_PM25.AD\24H1G001.PLT 31
   PLOTFILE 24 SRCGP1 2ND MSSILICON_PM25.AD\24H2G000.PLT 32
   PLOTFILE 24 SRCGP1 8TH MSSILICON_PM25.AD\24H8G000.PLT 33
   PLOTFILE ANNUAL SRCGP1 MSSILICON_PM25.AD\AN00G000.PLT 34
   SUMMFILE MSSilicon_PM25.sum
OU FINISHED

 *** Message Summary For AERMOD Model Setup ***

 --------- Summary of Total Messages --------

A Total of          0 Fatal Error Message(s)
A Total of          1 Warning Message(s)
A Total of          0 Informational Message(s)

   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***

   ********  WARNING MESSAGES  ********
ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

************************************
*** SETUP Finishes Successfully ***
************************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                       ***        12:28:01
                                                                                                                        PAGE   1
**MODELOPTs:  RegDFAULT CONC                                                  ELEV

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates ANNUAL Averages

**This Run Includes:     14 Source(s);      1 Source Group(s); and    3416 Receptor(s)

**The Model Assumes A Pollutant Type of:  PM-2.5

**Note that special processing requirements apply for the 24-hour PM2.5 NAAQS - check available guidance.
  Model will process user-specified ranks of high 24-hour values averaged across the number of years modeled, and
  the multi-year average of individual ANNUAL values, averaged across the number of years modeled.
```

```
**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
        Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
        Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.3 MB of RAM.

**Detailed Error/Message File:   MSSilicon_PM25.err
**File for Summary of Results:   MSSilicon_PM25.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***          12:28:01
                                                                                                                     PAGE    2
**MODELOPTs:  RegDFAULT CONC                                          ELEV
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.43973E+00	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.43973E+00	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.43973E+00	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.43973E+00	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	
RM1	0	0.97018E-01	378883.4	3852121.0	144.4	12.19	293.15	18.29	1.37	YES	NO	NO	
RM2	0	0.97018E-01	378879.7	3851906.4	141.9	24.38	293.15	18.29	1.37	YES	NO	NO	
PR1	0	0.48509E-01	378833.8	3852062.0	143.3	12.19	293.15	18.29	1.07	YES	NO	NO	
PR2	0	0.48509E-01	378832.2	3851967.1	143.3	24.38	293.15	18.29	1.07	YES	NO	NO	

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***          12:28:01
                                                                                                                     PAGE    3
**MODELOPTs:  RegDFAULT CONC                                          ELEV
```

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.12600E-02	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.12600E-02	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	
CF1	0	0.75599E-03	378898.4	3852065.0	144.1	14.00	5.61	13.02	NO	
CF2	0	0.75599E-03	378896.7	3851961.8	143.5	14.00	5.61	13.02	NO	

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                  ***          12:28:01
                                                                                                                     PAGE    4
**MODELOPTs:  RegDFAULT CONC                                          ELEV
```

PM25_2011.ADO

*** AREA SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	COORD (SW CORNER) X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	X-DIM OF AREA (METERS)	Y-DIM OF AREA (METERS)	ORIENT. OF AREA (DEG.)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PA	0	0.39495E-06	379141.7	3851891.2	140.9	9.14	229.66	339.73	-88.50	0.00	NO	
SP	0	0.12327E-05	379217.5	3852026.9	140.8	9.14	166.03	105.72	92.97	0.00	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/14/13 12:28:01 PAGE 5

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
SRCGP1	SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 , RM1 , RM2 ,
	PR1 , PR2 , CF1 , CF2 , PA , SP ,

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/14/13 12:28:01 PAGE 6

**MODELOPTs: RegDFAULT CONC ELEV

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	16.8,	14.4,	-12.8,	9.6,	2	40.0,	54.1,	84.7,	-214.9,	40.5,
3	40.0,	64.6,	83.9,	-218.9,	9.9,	4	40.0,	73.2,	80.5,	-216.2,	-21.0,
5	40.0,	79.4,	74.5,	-123.2,	45.0,	6	40.0,	83.3,	66.5,	-125.7,	29.4,
7	40.0,	84.7,	56.3,	-124.3,	12.9,	8	40.0,	83.4,	44.5,	-119.2,	-3.9,
9	40.0,	79.7,	31.3,	-110.4,	-20.7,	10	40.0,	82.9,	42.0,	-110.7,	-36.9,
11	40.0,	84.6,	54.1,	-109.0,	-51.9,	12	15.2,	85.4,	92.9,	12.5,	7.1,
13	15.2,	90.8,	93.6,	10.0,	17.2,	14	15.2,	93.5,	91.6,	7.2,	26.8,
15	15.2,	93.2,	86.7,	4.1,	35.6,	16	15.2,	90.2,	79.2,	1.0,	43.3,
17	15.2,	84.4,	69.3,	-2.2,	49.7,	18	10.7,	15.3,	12.4,	-2.3,	-10.4,
19	10.7,	16.8,	14.4,	-1.5,	-9.6,	20	28.0,	118.5,	213.2,	9.6,	-72.6,
21	28.0,	147.6,	207.2,	23.4,	-51.3,	22	28.0,	172.2,	194.8,	36.6,	-28.5,
23	40.0,	79.4,	74.5,	48.6,	-45.0,	24	40.0,	83.3,	66.5,	59.2,	-29.4,
25	40.0,	84.7,	56.3,	68.0,	-12.9,	26	40.0,	83.4,	44.5,	74.7,	3.9,
27	40.0,	79.7,	31.3,	79.1,	20.7,	28	40.0,	82.9,	42.0,	68.8,	36.9,
29	40.0,	84.6,	54.1,	54.9,	51.9,	30	15.2,	85.4,	92.9,	-105.4,	-7.1,
31	15.2,	90.8,	93.6,	-103.6,	-17.2,	32	15.2,	93.5,	91.6,	-98.8,	-26.8,
33	15.2,	93.2,	86.7,	-90.9,	-35.6,	34	15.2,	90.2,	79.2,	-80.2,	-43.3,
35	15.2,	84.4,	69.3,	-67.1,	-49.7,	36	10.7,	15.3,	12.4,	-10.1,	10.4,

SOURCE ID: SAF2

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	17.1,	14.3,	-4.8,	10.9,	2	38.1,	65.7,	84.7,	-172.5,	49.1,
3	40.0,	64.6,	83.9,	-179.7,	31.5,	4	40.0,	73.2,	80.5,	-181.3,	7.1,
5	40.0,	79.5,	74.6,	-177.5,	-17.5,	6	40.0,	83.4,	66.5,	-168.3,	-41.6,
7	40.0,	84.7,	56.3,	-108.1,	54.7,	8	40.0,	83.4,	44.5,	-110.5,	40.0,
9	40.0,	79.7,	31.3,	-109.5,	24.1,	10	40.0,	82.9,	42.0,	-117.6,	7.4,

```
                          *** THE MAXIMUM   20  24-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  SRCGP1   ***
                              INCLUDING SOURCE(S):      SAF1        , SAF2          , SAF3        , SAF4          , F1          ,
         F2            , RM1          , RM2          , PR1          , PR2          , CF1          , CF2          , PA          ,
         SP            ,

                                    ** CONC OF PM-2.5    IN MICROGRAMS/M**3                                 **

RANK        CONC     (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE     RANK        CONC     (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  1.       7.76864 (11091924) AT ( 378852.62, 3852323.27)  DC       11.       6.65205 (11091924) AT ( 378810.99, 3852298.80)  DC
  2.       7.18882 (11102624) AT ( 379000.41, 3852321.36)  DC       12.       6.62180 (11091824) AT ( 378810.99, 3852298.80)  DC
  3.       7.03812 (11071624) AT ( 378690.40, 3852172.49)  DC       13.       6.60148 (11100824) AT ( 378709.06, 3852211.17)  DC
  4.       6.84050 (11110624) AT ( 378810.99, 3852298.80)  DC       14.       6.55801c(11060124) AT ( 378665.00, 3851720.00)  DC
  5.       6.77702 (11071624) AT ( 378709.06, 3852211.17)  DC       15.       6.52579c(11121424) AT ( 378951.14, 3852322.00)  DC
  6.       6.74035c(11060124) AT ( 378690.48, 3851769.45)  DC       16.       6.41077c(11031724) AT ( 379000.41, 3852321.36)  DC
  7.       6.74014 (11110624) AT ( 378852.62, 3852323.27)  DC       17.       6.40924c(11011024) AT ( 378597.10, 3851979.08)  DC
  8.       6.73330b(11080124) AT ( 378739.55, 3851768.56)  DC       18.       6.39448m(11050924) AT ( 379000.41, 3852321.36)  DC
  9.       6.67618 (11120624) AT ( 378837.69, 3851766.78)  DC       19.       6.36035 (11071624) AT ( 378665.00, 3852220.00)  DC
 10.       6.67616 (11091824) AT ( 378852.62, 3852323.27)  DC       20.       6.30475c(11100224) AT ( 378788.62, 3851767.67)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                   ***        12:28:01
                                                                                                                    PAGE 221
**MODELOPTs:  RegDFAULT CONC                                              ELEV

                                  *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER    1 YEARS ***

                                 ** CONC OF PM-2.5    IN MICROGRAMS/M**3                               **

                                                                                                     NETWORK
GROUP ID                       AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1    1ST HIGHEST VALUE IS      1.85554 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
          2ND HIGHEST VALUE IS      1.78280 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
          3RD HIGHEST VALUE IS      1.66575 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
          4TH HIGHEST VALUE IS      1.55564 AT (  379098.93,  3852320.09,   142.51,   142.51,    0.00)  DC
          5TH HIGHEST VALUE IS      1.51277 AT (  379065.00,  3852420.00,   141.14,   141.14,    0.00)  DC
          6TH HIGHEST VALUE IS      1.39922 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
          7TH HIGHEST VALUE IS      1.37803 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
          8TH HIGHEST VALUE IS      1.32817 AT (  379148.19,  3852319.45,   140.88,   140.88,    0.00)  DC
          9TH HIGHEST VALUE IS      1.32582 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
         10TH HIGHEST VALUE IS      1.32074 AT (  378665.00,  3851720.00,   142.78,   148.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                   ***        12:28:01
                                                                                                                    PAGE 222
**MODELOPTs:  RegDFAULT CONC                                              ELEV

                         *** THE SUMMARY OF MAXIMUM   1ST-HIGHEST 24-HR RESULTS AVERAGED OVER    1 YEARS ***
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PM25_2011.ADO

```
                    ** CONC OF PM-2.5   IN MICROGRAMS/M**3                    **

GROUP ID                        AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  NETWORK GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1     1ST HIGHEST VALUE IS      7.76864 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS      7.18882 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
           3RD HIGHEST VALUE IS      7.03812 AT (  378690.40,  3852172.49,   143.52,   143.52,    0.00)  DC
           4TH HIGHEST VALUE IS      6.84050 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC
           5TH HIGHEST VALUE IS      6.77702 AT (  378709.06,  3852211.17,   143.16,   147.00,    0.00)  DC
           6TH HIGHEST VALUE IS      6.74035 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
           7TH HIGHEST VALUE IS      6.73330 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
           8TH HIGHEST VALUE IS      6.67618 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
           9TH HIGHEST VALUE IS      6.55801 AT (  378665.00,  3851720.00,   142.78,   148.00,    0.00)  DC
          10TH HIGHEST VALUE IS      6.52579 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
  *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                   ***        12:28:01
                                                                                                                    PAGE 223
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                         *** THE SUMMARY OF MAXIMUM   2ND-HIGHEST 24-HR RESULTS AVERAGED OVER   1 YEARS ***

                    ** CONC OF PM-2.5   IN MICROGRAMS/M**3                    **

GROUP ID                        AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  NETWORK GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1     1ST HIGHEST VALUE IS      6.74014 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS      6.65205 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC
           3RD HIGHEST VALUE IS      6.60148 AT (  378709.06,  3852211.17,   143.16,   147.00,    0.00)  DC
           4TH HIGHEST VALUE IS      6.41077 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
           5TH HIGHEST VALUE IS      6.28647 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
           6TH HIGHEST VALUE IS      6.25091 AT (  378665.00,  3851720.00,   142.78,   148.00,    0.00)  DC
           7TH HIGHEST VALUE IS      6.24225 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
           8TH HIGHEST VALUE IS      6.22773 AT (  378665.00,  3852220.00,   143.46,   148.00,    0.00)  DC
           9TH HIGHEST VALUE IS      6.22057 AT (  378690.40,  3852172.49,   143.52,   143.52,    0.00)  DC
          10TH HIGHEST VALUE IS      6.12903 AT (  378615.76,  3852017.76,   146.48,   146.48,    0.00)  DC
  *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                   ***        12:28:01
                                                                                                                    PAGE 224
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

                         *** THE SUMMARY OF MAXIMUM   8TH-HIGHEST 24-HR RESULTS AVERAGED OVER   1 YEARS ***

                    ** CONC OF PM-2.5   IN MICROGRAMS/M**3                    **

GROUP ID                        AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  NETWORK GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1     1ST HIGHEST VALUE IS      5.67484 AT (  378690.48,  3851769.45,   143.30,   147.00,    0.00)  DC
           2ND HIGHEST VALUE IS      5.57288 AT (  378665.00,  3851720.00,   142.78,   148.00,    0.00)  DC
           3RD HIGHEST VALUE IS      5.53582 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
           4TH HIGHEST VALUE IS      5.51569 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
           5TH HIGHEST VALUE IS      5.51393 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
           6TH HIGHEST VALUE IS      5.38388 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
           7TH HIGHEST VALUE IS      5.37556 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
           8TH HIGHEST VALUE IS      5.01633 AT (  378641.41,  3851770.34,   142.78,   148.00,    0.00)  DC
           9TH HIGHEST VALUE IS      5.00946 AT (  378665.00,  3851620.00,   143.02,   143.02,    0.00)  DC
          10TH HIGHEST VALUE IS      4.88769 AT (  379098.93,  3852320.09,   142.51,   142.51,    0.00)  DC
```

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d


```
   PLOTFILE 24 SRCGP1 1ST MSSILICON_PM25.AD\24H1G001.PLT 31
   PLOTFILE 24 SRCGP1 2ND MSSILICON_PM25.AD\24H2G000.PLT 32
   PLOTFILE 24 SRCGP1 8TH MSSILICON_PM25.AD\24H8G000.PLT 33
   PLOTFILE ANNUAL SRCGP1 MSSILICON_PM25.AD\AN00G000.PLT 34
   SUMMFILE MSSilicon_PM25.sum
OU FINISHED

 *** Message Summary For AERMOD Model Setup ***

 --------- Summary of Total Messages --------

A Total of          0 Fatal Error Message(s)
A Total of          1 Warning Message(s)
A Total of          0 Informational Message(s)

   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***

   ********   WARNING MESSAGES   ********
ME W186     384 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

************************************
*** SETUP Finishes Successfully ***
************************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                      ***        12:38:37
                                                                                                                       PAGE   1
**MODELOPTs:  RegDFAULT CONC                                                ELEV

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates ANNUAL Averages

**This Run Includes:     14 Source(s);       1 Source Group(s); and     3416 Receptor(s)

**The Model Assumes A Pollutant Type of:  PM-2.5

**Note that special processing requirements apply for the 24-hour PM2.5 NAAQS - check available guidance.
  Model will process user-specified ranks of high 24-hour values averaged across the number of years modeled, and
  the multi-year average of individual ANNUAL values, averaged across the number of years modeled.
```

```
**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
        Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
        Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =      0.0
                 Emission Units = GRAMS/SEC                                 ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.3 MB of RAM.

**Detailed Error/Message File:   MSSilicon_PM25.err
**File for Summary of Results:   MSSilicon_PM25.sum
 *** AERMOD - VERSION  12345 ***    *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                    ***                                                                       ***        12:38:37
                                                                                                                         PAGE   2
**MODELOPTs:   RegDFAULT CONC                                              ELEV
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.43973E+00	379020.5	3852097.6	143.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF2	0	0.43973E+00	379019.6	3852052.8	143.2	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF3	0	0.43973E+00	379018.2	3851969.8	142.6	91.44	449.82	19.37	1.93	YES	NO	NO	
SAF4	0	0.43973E+00	379017.5	3851925.0	142.1	91.44	449.82	19.37	1.93	YES	NO	NO	
RM1	0	0.97018E-01	378883.4	3852121.0	144.4	12.19	293.15	18.29	1.37	YES	NO	NO	
RM2	0	0.97018E-01	378879.7	3851906.4	141.9	24.38	293.15	18.29	1.37	YES	NO	NO	
PR1	0	0.48509E-01	378833.8	3852062.0	143.3	12.19	293.15	18.29	1.07	YES	NO	NO	
PR2	0	0.48509E-01	378832.2	3851967.1	143.3	24.38	293.15	18.29	1.07	YES	NO	NO	

```
 *** AERMOD - VERSION  12345 ***    *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                    ***                                                                       ***        12:38:37
                                                                                                                         PAGE   3
**MODELOPTs:   RegDFAULT CONC                                              ELEV
```

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.12600E-02	378925.8	3852076.8	144.0	20.01	6.97	18.62	NO	
F2	0	0.12600E-02	378923.5	3851949.2	143.0	20.01	6.97	18.62	NO	
CF1	0	0.75599E-03	378898.4	3852065.0	144.1	14.00	5.61	13.02	NO	
CF2	0	0.75599E-03	378896.7	3851961.8	143.5	14.00	5.61	13.02	NO	

```
 *** AERMOD - VERSION  12345 ***    *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                    ***                                                                       ***        12:38:37
                                                                                                                         PAGE   4
**MODELOPTs:   RegDFAULT CONC                                              ELEV
```

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*** AREA SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	COORD (SW CORNER) X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	X-DIM OF AREA (METERS)	Y-DIM OF AREA (METERS)	ORIENT. OF AREA (DEG.)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PA	0	0.39495E-06	379141.7	3851891.2	140.9	9.14	229.66	339.73	-88.50	0.00	NO	
SP	0	0.12327E-05	379217.5	3852026.9	140.8	9.14	166.03	105.72	92.97	0.00	NO	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
SRCGP1	SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 , RM1 , RM2 ,
	PR1 , PR2 , CF1 , CF2 , PA , SP ,

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	16.8,	14.4,	-12.8,	9.6,	2	40.0,	54.1,	84.7,	-214.9,	40.5,
3	40.0,	64.6,	83.9,	-218.9,	9.9,	4	40.0,	73.2,	80.5,	-216.2,	-21.0,
5	40.0,	79.4,	74.5,	-123.2,	45.0,	6	40.0,	83.3,	66.5,	-125.7,	29.4,
7	40.0,	84.7,	56.3,	-124.3,	12.9,	8	40.0,	83.4,	44.5,	-119.2,	-3.9,
9	40.0,	79.7,	31.3,	-110.4,	-20.7,	10	40.0,	82.9,	42.0,	-110.7,	-36.9,
11	40.0,	84.6,	54.1,	-109.0,	-51.9,	12	15.2,	85.4,	92.9,	12.5,	7.1,
13	15.2,	90.8,	93.6,	10.0,	17.2,	14	15.2,	93.5,	91.6,	7.2,	26.8,
15	15.2,	93.2,	86.7,	4.1,	35.6,	16	15.2,	90.2,	79.2,	1.0,	43.3,
17	15.2,	84.4,	69.3,	-2.2,	49.7,	18	10.7,	15.3,	12.4,	-2.3,	-10.4,
19	10.7,	16.8,	14.4,	-1.5,	-9.6,	20	28.0,	118.5,	213.2,	9.6,	-72.6,
21	28.0,	147.6,	207.2,	23.4,	-51.3,	22	28.0,	172.2,	194.8,	36.6,	-28.5,
23	40.0,	79.4,	74.5,	48.6,	-45.0,	24	40.0,	83.3,	66.5,	59.2,	-29.4,
25	40.0,	84.7,	56.3,	68.0,	-12.9,	26	40.0,	83.4,	44.5,	74.7,	3.9,
27	40.0,	79.7,	31.3,	79.1,	20.7,	28	40.0,	82.9,	42.0,	68.8,	36.9,
29	40.0,	84.6,	54.1,	54.9,	51.9,	30	15.2,	85.4,	92.9,	-105.4,	-7.1,
31	15.2,	90.8,	93.6,	-103.6,	-17.2,	32	15.2,	93.5,	91.6,	-98.8,	-26.8,
33	15.2,	93.2,	86.7,	-90.9,	-35.6,	34	15.2,	90.2,	79.2,	-80.2,	-43.3,
35	15.2,	84.4,	69.3,	-67.1,	-49.7,	36	10.7,	15.3,	12.4,	-10.1,	10.4,

SOURCE ID: SAF2

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	17.1,	14.3,	-4.8,	10.9,	2	38.1,	65.7,	84.7,	-172.5,	49.1,
3	40.0,	64.6,	83.9,	-179.7,	31.5,	4	40.0,	73.2,	80.5,	-181.3,	7.1,
5	40.0,	79.5,	74.6,	-177.5,	-17.5,	6	40.0,	83.4,	66.5,	-168.3,	-41.6,
7	40.0,	84.7,	56.3,	-108.1,	54.7,	8	40.0,	83.4,	44.5,	-110.5,	40.0,
9	40.0,	79.7,	31.3,	-109.5,	24.1,	10	40.0,	82.9,	42.0,	-117.6,	7.4,

```
                   *** THE MAXIMUM  20  24-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  SRCGP1   ***
                       INCLUDING SOURCE(S):      SAF1         , SAF2         , SAF3         , SAF4         , F1           ,
        F2           , RM1          , RM2          , PR1          , PR2          , CF1          , CF2          , PA           ,
        SP           ,

                             ** CONC OF PM-2.5    IN MICROGRAMS/M**3                                **

RANK        CONC     (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE    RANK        CONC     (YYMMDDHH) AT      RECEPTOR (XR,YR) OF TYPE
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
   1.     9.41420 (07100524) AT ( 378671.74, 3852133.81)  DC       11.      7.57112c(08101324) AT ( 378727.72, 3852249.85)  DC
   2.     9.03741 (07100524) AT ( 378665.00, 3852120.00)  DC       12.      7.55370c(07071624) AT ( 378852.62, 3852323.27)  DC
   3.     8.45486 (07100524) AT ( 378690.40, 3852172.49)  DC       13.      7.54810m(07100424) AT ( 378671.74, 3852133.81)  DC
   4.     8.21559 (10070424) AT ( 378810.99, 3852298.80)  DC       14.      7.53024 (07100524) AT ( 378565.00, 3852120.00)  DC
   5.     7.86568 (07100524) AT ( 378653.08, 3852095.12)  DC       15.      7.52940 (07112024) AT ( 378810.99, 3852298.80)  DC
   6.     7.82241 (10083024) AT ( 378810.99, 3852298.80)  DC       16.      7.48077 (07112024) AT ( 378852.62, 3852323.27)  DC
   7.     7.78942c(08101324) AT ( 378709.06, 3852211.17)  DC       17.      7.47741c(08092224) AT ( 378641.41, 3851770.34)  DC
   8.     7.77596 (07120924) AT ( 378852.62, 3852323.27)  DC       18.      7.41529c(09091824) AT ( 378653.08, 3852095.12)  DC
   9.     7.76864 (11091924) AT ( 378852.62, 3852323.27)  DC       19.      7.41179 (10070424) AT ( 378769.35, 3852274.32)  DC
  10.     7.69904c(08101824) AT ( 378739.55, 3851768.56)  DC       20.      7.40525m(07100424) AT ( 378665.00, 3852120.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                       ***        12:38:37
                                                                                                                        PAGE 221
**MODELOPTs:  RegDFAULT CONC                                           ELEV

                        *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER    5 YEARS ***

                        ** CONC OF PM-2.5    IN MICROGRAMS/M**3                                **

                                                                                                          NETWORK
GROUP ID                        AVERAGE CONC               RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1     1ST HIGHEST VALUE IS       1.49933 AT (  379000.41,   3852321.36,    142.76,    142.76,      0.00)  DC
           2ND HIGHEST VALUE IS       1.47425 AT (  378951.14,   3852322.00,    142.68,    145.00,      0.00)  DC
           3RD HIGHEST VALUE IS       1.43001 AT (  378852.62,   3852323.27,    142.50,    146.00,      0.00)  DC
           4TH HIGHEST VALUE IS       1.41970 AT (  379049.67,   3852320.72,    142.86,    142.86,      0.00)  DC
           5TH HIGHEST VALUE IS       1.41554 AT (  378901.88,   3852322.63,    142.58,    146.00,      0.00)  DC
           6TH HIGHEST VALUE IS       1.34588 AT (  378739.55,   3851768.56,    143.30,    147.00,      0.00)  DC
           7TH HIGHEST VALUE IS       1.33905 AT (  378788.62,   3851767.67,    143.30,    146.00,      0.00)  DC
           8TH HIGHEST VALUE IS       1.28043 AT (  378810.99,   3852298.80,    142.76,    147.00,      0.00)  DC
           9TH HIGHEST VALUE IS       1.26980 AT (  379098.93,   3852320.09,    142.51,    142.51,      0.00)  DC
          10TH HIGHEST VALUE IS       1.23279 AT (  378690.48,   3851769.45,    143.30,    147.00,      0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/14/13
                                   ***                                                                       ***        12:38:37
                                                                                                                        PAGE 222
**MODELOPTs:  RegDFAULT CONC                                           ELEV

                   *** THE SUMMARY OF MAXIMUM   1ST-HIGHEST 24-HR RESULTS AVERAGED OVER    5 YEARS ***
```

PM25_2007-2011.ADO

** CONC OF PM-2.5 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	7.43293 AT	(378852.62, 3852323.27, 142.50, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	7.41466 AT	(378810.99, 3852298.80, 142.76, 147.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	6.74520 AT	(378739.55, 3851768.56, 143.30, 147.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	6.66763 AT	(378690.40, 3852172.49, 143.52, 143.52, 0.00)	DC	
	5TH HIGHEST VALUE IS	6.65275 AT	(378690.48, 3851769.45, 143.30, 147.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	6.63474 AT	(378665.00, 3852120.00, 144.91, 148.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	6.63233 AT	(378709.06, 3852211.17, 143.16, 147.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	6.60680 AT	(379000.41, 3852321.36, 142.76, 142.76, 0.00)	DC	
	9TH HIGHEST VALUE IS	6.60267 AT	(378671.74, 3852133.81, 144.48, 148.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	6.59522 AT	(378769.35, 3852274.32, 143.00, 143.00, 0.00)	DC	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
*** *** 12:38:37
PAGE 223

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM 2ND-HIGHEST 24-HR RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF PM-2.5 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	7.06094 AT	(378852.62, 3852323.27, 142.50, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	6.93286 AT	(378810.99, 3852298.80, 142.76, 147.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	6.20092 AT	(378690.48, 3851769.45, 143.30, 147.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	6.18827 AT	(378769.35, 3852274.32, 143.00, 143.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	6.14887 AT	(378739.55, 3851768.56, 143.30, 147.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	6.10974 AT	(378727.72, 3852249.85, 143.09, 147.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	6.09287 AT	(379000.41, 3852321.36, 142.76, 142.76, 0.00)	DC	
	8TH HIGHEST VALUE IS	6.05361 AT	(378709.06, 3852211.17, 143.16, 147.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	5.97458 AT	(378665.00, 3851720.00, 142.78, 148.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	5.95972 AT	(378765.00, 3852320.00, 142.72, 147.00, 0.00)	DC	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/14/13
*** *** 12:38:37
PAGE 224

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM 8TH-HIGHEST 24-HR RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF PM-2.5 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	5.67690 AT	(378852.62, 3852323.27, 142.50, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	5.51613 AT	(378810.99, 3852298.80, 142.76, 147.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	5.39387 AT	(378739.55, 3851768.56, 143.30, 147.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	5.22331 AT	(378690.48, 3851769.45, 143.30, 147.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.18245 AT	(378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	5.14816 AT	(378665.00, 3851720.00, 142.78, 148.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	5.12350 AT	(378769.35, 3852274.32, 143.00, 143.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	5.11548 AT	(379000.41, 3852321.36, 142.76, 142.76, 0.00)	DC	
	9TH HIGHEST VALUE IS	5.11517 AT	(378901.88, 3852322.63, 142.58, 146.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	5.09507 AT	(378788.62, 3851767.67, 143.30, 146.00, 0.00)	DC	

Appendix B - Air Quality Impact Evaluation – AERMOD Output Files – SO_2

Air Quality Impact Evaluation – AERMOD Output Files

Pollutant – SO_2

Years – 2007 through 2011

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d


```
************************************
*** SETUP Finishes Successfully ***
************************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                        ***        15:59:35
                                                                                                                         PAGE   1
**MODELOPTs:  RegDFAULT CONC                                        ELEV

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  3 Short Term Average(s) of:   1-HR   3-HR  24-HR
    and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);      3 Source Group(s); and     3416 Receptor(s)

**The Model Assumes A Pollutant Type of:  SO2

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
        Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
        Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =    104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      5.9 MB of RAM.

**Detailed Error/Message File:   MSSilicon_SO2.err
**File for Summary of Results:   MSSilicon_SO2.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                        ***        15:59:35
                                                                                                                         PAGE   2
**MODELOPTs:  RegDFAULT CONC                                        ELEV
```

SO2_2007.ADO

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.17879E+02	379020.5	3852097.6	143.6	91.44	449.82	20.18	1.93	YES	NO	NO	
SAF2	0	0.17879E+02	379019.6	3852052.8	143.2	91.44	449.82	20.18	1.93	YES	NO	NO	
SAF3	0	0.17879E+02	379018.1	3851969.8	142.6	91.44	449.82	20.18	1.93	YES	NO	NO	
SAF4	0	0.17879E+02	379017.5	3851925.0	142.1	91.44	449.82	20.18	1.93	YES	NO	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/07/13 15:59:35 PAGE 3

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.15120E-02	378925.8	3852076.8	144.0	19.99	6.97	9.31	NO	
F2	0	0.15120E-02	378923.5	3851949.2	143.0	19.99	6.97	9.31	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/07/13 15:59:35 PAGE 4

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
SRCGP1	SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 ,
SRCGP2	SAF1 , SAF2 , SAF3 , SAF4 ,
SRCGP3	F1 , F2 ,

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/07/13 15:59:35 PAGE 5

**MODELOPTs: RegDFAULT CONC ELEV

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	16.8,	14.4,	-12.8,	9.5,	2	40.0,	54.1,	84.7,	-214.9,	40.4,
3	40.0,	64.6,	83.9,	-218.9,	9.9,	4	40.0,	73.2,	80.5,	-216.2,	-21.0,
5	40.0,	79.4,	74.5,	-123.2,	45.0,	6	40.0,	83.3,	66.5,	-125.7,	29.4,
7	40.0,	84.7,	56.3,	-124.3,	12.9,	8	40.0,	83.4,	44.5,	-119.2,	-4.0,
9	40.0,	79.7,	31.3,	-110.4,	-20.7,	10	40.0,	82.9,	42.0,	-110.7,	-36.9,
11	40.0,	84.6,	54.1,	-109.0,	-51.9,	12	15.2,	85.4,	92.9,	12.5,	7.0,

```
 10.      0.09776 (07060924) AT ( 378886.76, 3851765.89)  DC       20.      0.09291 (07051724) AT ( 378935.83, 3851765.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                   ***        15:59:35
 **MODELOPTs:  RegDFAULT CONC                                                                                        PAGE 958
                                                                    ELEV

                                   *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***

                                   ** CONC OF SO2      IN MICROGRAMS/M**3                          **

                                                                                                                NETWORK
GROUP ID                        AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1     1ST HIGHEST VALUE IS      4.69303 AT (  378965.00,  3852720.00,   139.70,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS      4.60620 AT (  378965.00,  3852820.00,   139.96,   146.00,    0.00)  DC
           3RD HIGHEST VALUE IS      4.59406 AT (  378965.00,  3852620.00,   139.84,   146.00,    0.00)  DC
           4TH HIGHEST VALUE IS      4.48032 AT (  379065.00,  3852720.00,   139.14,   145.00,    0.00)  DC
           5TH HIGHEST VALUE IS      4.45794 AT (  378865.00,  3852820.00,   141.32,   147.00,    0.00)  DC
           6TH HIGHEST VALUE IS      4.44148 AT (  378865.00,  3852720.00,   139.61,   147.00,    0.00)  DC
           7TH HIGHEST VALUE IS      4.40794 AT (  379065.00,  3852820.00,   140.05,   140.05,    0.00)  DC
           8TH HIGHEST VALUE IS      4.40131 AT (  379065.00,  3852620.00,   139.25,   145.00,    0.00)  DC
           9TH HIGHEST VALUE IS      4.37827 AT (  378965.00,  3852920.00,   139.26,   146.00,    0.00)  DC
          10TH HIGHEST VALUE IS      4.31390 AT (  378865.00,  3852920.00,   142.10,   147.00,    0.00)  DC

SRCGP2     1ST HIGHEST VALUE IS      4.68665 AT (  378965.00,  3852720.00,   139.70,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS      4.60054 AT (  378965.00,  3852820.00,   139.96,   146.00,    0.00)  DC
           3RD HIGHEST VALUE IS      4.58664 AT (  378965.00,  3852620.00,   139.84,   146.00,    0.00)  DC
           4TH HIGHEST VALUE IS      4.47540 AT (  379065.00,  3852720.00,   139.14,   145.00,    0.00)  DC
           5TH HIGHEST VALUE IS      4.45165 AT (  378865.00,  3852820.00,   141.32,   147.00,    0.00)  DC
           6TH HIGHEST VALUE IS      4.43460 AT (  378865.00,  3852720.00,   139.61,   147.00,    0.00)  DC
           7TH HIGHEST VALUE IS      4.40336 AT (  379065.00,  3852820.00,   140.05,   140.05,    0.00)  DC
           8TH HIGHEST VALUE IS      4.39583 AT (  379065.00,  3852620.00,   139.25,   145.00,    0.00)  DC
           9TH HIGHEST VALUE IS      4.37327 AT (  378965.00,  3852920.00,   139.26,   146.00,    0.00)  DC
          10TH HIGHEST VALUE IS      4.30816 AT (  378865.00,  3852920.00,   142.10,   147.00,    0.00)  DC

SRCGP3     1ST HIGHEST VALUE IS      0.02259 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
           2ND HIGHEST VALUE IS      0.01897 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
           3RD HIGHEST VALUE IS      0.01822 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
           4TH HIGHEST VALUE IS      0.01767 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC
           5TH HIGHEST VALUE IS      0.01705 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
           6TH HIGHEST VALUE IS      0.01600 AT (  378852.62,  3852323.27,   142.50,   146.00,    0.00)  DC
           7TH HIGHEST VALUE IS      0.01455 AT (  378935.83,  3851765.00,   141.58,   145.00,    0.00)  DC
           8TH HIGHEST VALUE IS      0.01347 AT (  378810.99,  3852298.80,   142.76,   147.00,    0.00)  DC
           9TH HIGHEST VALUE IS      0.01303 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
          10TH HIGHEST VALUE IS      0.01229 AT (  378865.00,  3852420.00,   140.56,   147.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                   ***        15:59:35
 **MODELOPTs:  RegDFAULT CONC                                                                                        PAGE 959
                                                                    ELEV

                                   *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***
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```
                    ** CONC OF SO2      IN MICROGRAMS/M**3                    **

                                          DATE                                                                    NETWORK
GROUP ID                        AVERAGE CONC     (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1   HIGH   1ST HIGH VALUE IS     109.37159  ON 07123009: AT (  380165.00,  3850920.00,   145.11,   152.00,    0.00)  DC
         HIGH   4TH HIGH VALUE IS      72.18181  ON 07081009: AT (  378965.00,  3851420.00,   138.91,   147.00,    0.00)  DC

SRCGP2   HIGH   1ST HIGH VALUE IS     109.35704  ON 07123009: AT (  380165.00,  3850920.00,   145.11,   152.00,    0.00)  DC
         HIGH   4TH HIGH VALUE IS      72.17144  ON 07081009: AT (  378965.00,  3851420.00,   138.91,   147.00,    0.00)  DC

SRCGP3   HIGH   1ST HIGH VALUE IS       0.37374  ON 07060906: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
         HIGH   4TH HIGH VALUE IS       0.33660  ON 07112408: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                  ***                                                                   ***          15:59:35
 **MODELOPTs:  RegDFAULT CONC                                                ELEV                                      PAGE 960

                                   *** THE SUMMARY OF HIGHEST  3-HR RESULTS ***

                    ** CONC OF SO2      IN MICROGRAMS/M**3                    **

                                          DATE                                                                    NETWORK
GROUP ID                        AVERAGE CONC     (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1   HIGH   1ST HIGH VALUE IS      67.69565  ON 07061812: AT (  379065.00,  3852520.00,   140.24,   145.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      66.24290  ON 07081112: AT (  378865.00,  3851420.00,   139.62,   148.00,    0.00)  DC

SRCGP2   HIGH   1ST HIGH VALUE IS      67.68608  ON 07061812: AT (  379065.00,  3852520.00,   140.24,   145.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      66.23397  ON 07081112: AT (  378865.00,  3851420.00,   139.62,   148.00,    0.00)  DC

SRCGP3   HIGH   1ST HIGH VALUE IS       0.25164  ON 07060906: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS       0.23579  ON 07091521: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                  ***                                                                   ***          15:59:35
 **MODELOPTs:  RegDFAULT CONC                                                ELEV                                      PAGE 961

                                   *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

                    ** CONC OF SO2      IN MICROGRAMS/M**3                    **

                                          DATE                                                                    NETWORK
GROUP ID                        AVERAGE CONC     (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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                                                                                  SO2_2007.ADO
SRCGP1   HIGH   1ST HIGH VALUE IS      26.11076b ON 07090524: AT (  378965.00,  3852620.00,   139.84,   146.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      24.84167c ON 07071624: AT (  378965.00,  3852720.00,   139.70,   146.00,    0.00)  DC

SRCGP2   HIGH   1ST HIGH VALUE IS      26.10571b ON 07090524: AT (  378965.00,  3852620.00,   139.84,   146.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      24.81385c ON 07071624: AT (  378965.00,  3852720.00,   139.70,   146.00,    0.00)  DC

SRCGP3   HIGH   1ST HIGH VALUE IS       0.12083c ON 07021024: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS       0.11381  ON 07102824: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                   ***        15:59:35
                                                                                                                    PAGE 962
 **MODELOPTs:  RegDFAULT CONC                                          ELEV

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            8 Warning Message(s)
 A Total of         1127 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of          786 Calm Hours Identified

 A Total of          341 Missing Hours Identified (  3.89 Percent)

    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***

    ********   WARNING MESSAGES   ********
 CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
 CO W362      25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for     3-hr Ave
 CO W362      25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for    24-hr Ave
 ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used           0.50
 CN W305       3 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF3
 CN W305       3 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF4
 CN W305       7 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF1
 CN W305      10 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF2

    ************************************
    *** AERMOD Finishes Successfully ***
    ************************************
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************************************
*** SETUP Finishes Successfully ***
************************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                       ***        16:03:47
                                                                                                                        PAGE   1
**MODELOPTs:  RegDFAULT CONC                                          ELEV

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  3 Short Term Average(s) of:   1-HR   3-HR  24-HR
    and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);      3 Source Group(s); and    3416 Receptor(s)

**The Model Assumes A Pollutant Type of:  SO2

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      5.9 MB of RAM.

**Detailed Error/Message File:   MSSilicon_SO2.err
**File for Summary of Results:   MSSilicon_SO2.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                       ***        16:03:47
                                                                                                                        PAGE   2
**MODELOPTs:  RegDFAULT CONC                                          ELEV
```

SO2_2008.ADO

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.17879E+02	379020.5	3852097.6	143.6	91.44	449.82	20.18	1.93	YES	NO	NO	
SAF2	0	0.17879E+02	379019.6	3852052.8	143.2	91.44	449.82	20.18	1.93	YES	NO	NO	
SAF3	0	0.17879E+02	379018.1	3851969.8	142.6	91.44	449.82	20.18	1.93	YES	NO	NO	
SAF4	0	0.17879E+02	379017.5	3851925.0	142.1	91.44	449.82	20.18	1.93	YES	NO	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/07/13 16:03:47 PAGE 3

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.15120E-02	378925.8	3852076.8	144.0	19.99	6.97	9.31	NO	
F2	0	0.15120E-02	378923.5	3851949.2	143.0	19.99	6.97	9.31	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/07/13 16:03:47 PAGE 4

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
SRCGP1	SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 ,
SRCGP2	SAF1 , SAF2 , SAF3 , SAF4 ,
SRCGP3	F1 , F2 ,

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/07/13 16:03:47 PAGE 5

**MODELOPTs: RegDFAULT CONC ELEV

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	16.8,	14.4,	-12.8,	9.5,	2	40.0,	54.1,	84.7,	-214.9,	40.4,
3	40.0,	64.6,	83.9,	-218.9,	9.9,	4	40.0,	73.2,	80.5,	-216.2,	-21.0,
5	40.0,	79.4,	74.5,	-123.2,	45.0,	6	40.0,	83.3,	66.5,	-125.7,	29.4,
7	40.0,	84.7,	56.3,	-124.3,	12.9,	8	40.0,	83.4,	44.5,	-119.2,	-4.0,
9	40.0,	79.7,	31.3,	-110.4,	-20.7,	10	40.0,	82.9,	42.0,	-110.7,	-36.9,
11	40.0,	84.6,	54.1,	-109.0,	-51.9,	12	15.2,	85.4,	92.9,	12.5,	7.0,

SO2_2008.ADO

10. 0.09532b(08051624) AT (378984.90, 3851764.11) DC 20. 0.08985c(08101824) AT (378837.69, 3851766.78) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/07/13 16:03:47 PAGE 958

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	3.31609	AT (378865.00, 3852920.00, 142.10, 147.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.28138	AT (378865.00, 3852820.00, 141.32, 147.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.25197	AT (378865.00, 3853020.00, 142.68, 147.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.20648	AT (378965.00, 3852820.00, 139.96, 146.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.18262	AT (378965.00, 3852920.00, 139.26, 146.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.16130	AT (378965.00, 3853020.00, 142.99, 146.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.13687	AT (378765.00, 3852920.00, 143.60, 143.60, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.12455	AT (378865.00, 3853120.00, 143.77, 143.77, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.11630	AT (378765.00, 3853020.00, 143.04, 148.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	3.09495	AT (378865.00, 3852720.00, 139.61, 147.00, 0.00)	DC	
SRCGP2	1ST HIGHEST VALUE IS	3.31158	AT (378865.00, 3852920.00, 142.10, 147.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.27629	AT (378865.00, 3852820.00, 141.32, 147.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.24793	AT (378865.00, 3853020.00, 142.68, 147.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.20195	AT (378965.00, 3852820.00, 139.96, 146.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.17869	AT (378965.00, 3852920.00, 139.26, 146.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.15744	AT (378965.00, 3853020.00, 142.99, 146.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.13216	AT (378765.00, 3852920.00, 143.60, 143.60, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.12086	AT (378865.00, 3853120.00, 143.77, 143.77, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.11211	AT (378765.00, 3853020.00, 143.04, 148.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	3.08945	AT (378965.00, 3852720.00, 139.70, 146.00, 0.00)	DC	
SRCGP3	1ST HIGHEST VALUE IS	0.01898	AT (378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.01640	AT (378901.88, 3852322.63, 142.58, 146.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.01619	AT (378837.69, 3851766.78, 143.17, 143.17, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.01567	AT (378935.83, 3851765.00, 141.58, 145.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.01512	AT (378852.62, 3852323.27, 142.50, 146.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.01463	AT (378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.01423	AT (378788.62, 3851767.67, 143.30, 146.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.01414	AT (378865.00, 3851720.00, 141.49, 146.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.01286	AT (378810.99, 3852298.80, 142.76, 147.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.01221	AT (379000.41, 3852321.36, 142.76, 142.76, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/07/13 16:03:47 PAGE 959

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

```
                    ** CONC OF SO2      IN MICROGRAMS/M**3                    **

                                          DATE                                                                          NETWORK
GROUP ID                          AVERAGE CONC     (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)   OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1   HIGH   1ST HIGH VALUE IS     120.93916  ON 08022409: AT (  377365.00,  3850720.00,   153.30,   153.30,    0.00)  DC
         HIGH   4TH HIGH VALUE IS      72.95127  ON 08110210: AT (  378065.00,  3851120.00,   152.35,   152.35,    0.00)  DC

SRCGP2   HIGH   1ST HIGH VALUE IS     120.92206  ON 08022409: AT (  377365.00,  3850720.00,   153.30,   153.30,    0.00)  DC
         HIGH   4TH HIGH VALUE IS      72.94080  ON 08110210: AT (  378065.00,  3851120.00,   152.35,   152.35,    0.00)  DC

SRCGP3   HIGH   1ST HIGH VALUE IS       0.55124  ON 08040707: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
         HIGH   4TH HIGH VALUE IS       0.40822  ON 08121710: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                  ***                                                                      ***        16:03:47
                                                                                                                      PAGE 960
 **MODELOPTs:  RegDFAULT CONC                                                  ELEV

                                   *** THE SUMMARY OF HIGHEST  3-HR RESULTS ***

                    ** CONC OF SO2      IN MICROGRAMS/M**3                    **

                                          DATE                                                                          NETWORK
GROUP ID                          AVERAGE CONC     (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)   OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1   HIGH   1ST HIGH VALUE IS      65.84044  ON 08102212: AT (  378865.00,  3852620.00,   140.03,   147.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      61.77338  ON 08071712: AT (  378765.00,  3852720.00,   141.84,   148.00,    0.00)  DC

SRCGP2   HIGH   1ST HIGH VALUE IS      65.83060  ON 08102212: AT (  378865.00,  3852620.00,   140.03,   147.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      61.76624  ON 08071712: AT (  378765.00,  3852720.00,   141.84,   148.00,    0.00)  DC

SRCGP3   HIGH   1ST HIGH VALUE IS       0.27681  ON 08121712: AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
         HIGH   2ND HIGH VALUE IS       0.26468  ON 08061106: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                  ***                                                                      ***        16:03:47
                                                                                                                      PAGE 961
 **MODELOPTs:  RegDFAULT CONC                                                  ELEV

                                   *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

                    ** CONC OF SO2      IN MICROGRAMS/M**3                    **

                                          DATE                                                                          NETWORK
GROUP ID                          AVERAGE CONC     (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)   OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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SRCGP1   HIGH   1ST HIGH VALUE IS      26.10084  ON 08060624: AT (  379065.00,  3852820.00,   140.05,   140.05,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      24.92734m ON 08060724: AT (  379065.00,  3852720.00,   139.14,   145.00,    0.00)  DC

SRCGP2   HIGH   1ST HIGH VALUE IS      26.09315  ON 08060624: AT (  379065.00,  3852820.00,   140.05,   140.05,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      24.90964m ON 08060724: AT (  379065.00,  3852720.00,   139.14,   145.00,    0.00)  DC

SRCGP3   HIGH   1ST HIGH VALUE IS       0.12204  ON 08040524: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS       0.11611c ON 08050524: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                   ***        16:03:47
                                                                                                                      PAGE 962
 **MODELOPTs:  RegDFAULT CONC                                                  ELEV

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            8 Warning Message(s)
 A Total of         1233 Informational Message(s)

 A Total of         8784 Hours Were Processed

 A Total of          834 Calm Hours Identified

 A Total of          399 Missing Hours Identified (  4.54 Percent)

    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***

    ********   WARNING MESSAGES   ********
 CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
 CO W362      25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for     3-hr Ave
 CO W362      25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for    24-hr Ave
 ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2
 CN W305      43 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3
 CN W305      43 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4

    ************************************
    *** AERMOD Finishes Successfully ***
    ************************************
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```
A Total of          0 Informational Message(s)

   ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***

   ********   WARNING MESSAGES   ********
CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
CO W362      25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for     3-hr Ave
CO W362      25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for    24-hr Ave
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used         0.50

***********************************
*** SETUP Finishes Successfully ***
***********************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                     ***        16:07:49
                                                                                                                      PAGE   1
**MODELOPTs:  RegDFAULT CONC                                             ELEV

                                           ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  3 Short Term Average(s) of:   1-HR   3-HR  24-HR
    and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);      3 Source Group(s); and    3416 Receptor(s)

**The Model Assumes A Pollutant Type of:  SO2

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
```

```
                                                                                SO2_2009.ADO
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                  ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      5.9 MB of RAM.

**Detailed Error/Message File:   MSSilicon_SO2.err
**File for Summary of Results:   MSSilicon_SO2.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                   ***        16:07:49
                                                                                                                    PAGE    2
**MODELOPTs:  RegDFAULT CONC                                                  ELEV


                                                  *** POINT SOURCE DATA ***

              NUMBER EMISSION RATE                    BASE     STACK   STACK    STACK     STACK    BLDG   URBAN  CAP/  EMIS RATE
  SOURCE       PART.  (GRAMS/SEC)      X         Y     ELEV.    HEIGHT  TEMP.   EXIT VEL. DIAMETER  EXISTS SOURCE HOR   SCALAR
    ID         CATS.                (METERS) (METERS) (METERS) (METERS) (DEG.K)  (M/SEC)  (METERS)                        VARY BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SAF1            0   0.17879E+02  379020.5 3852097.6   143.6    91.44   449.82    20.18     1.93    YES     NO    NO
SAF2            0   0.17879E+02  379019.6 3852052.8   143.2    91.44   449.82    20.18     1.93    YES     NO    NO
SAF3            0   0.17879E+02  379018.1 3851969.8   142.6    91.44   449.82    20.18     1.93    YES     NO    NO
SAF4            0   0.17879E+02  379017.5 3851925.0   142.1    91.44   449.82    20.18     1.93    YES     NO    NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                   ***        16:07:49
                                                                                                                    PAGE    3
**MODELOPTs:  RegDFAULT CONC                                                  ELEV


                                                  *** VOLUME SOURCE DATA ***

              NUMBER EMISSION RATE                    BASE    RELEASE    INIT.    INIT.   URBAN  EMISSION RATE
  SOURCE       PART.  (GRAMS/SEC)      X         Y     ELEV.   HEIGHT      SY       SZ     SOURCE  SCALAR VARY
    ID         CATS.                (METERS) (METERS) (METERS) (METERS) (METERS) (METERS)              BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

F1              0   0.15120E-02  378925.8 3852076.8   144.0    19.99     6.97     9.31     NO
F2              0   0.15120E-02  378923.5 3851949.2   143.0    19.99     6.97     9.31     NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                   ***        16:07:49
                                                                                                                    PAGE    4
**MODELOPTs:  RegDFAULT CONC                                                  ELEV


                                          *** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID                                                  SOURCE IDs


 SRCGP1    SAF1        , SAF2        , SAF3        , SAF4        , F1          , F2          ,

 SRCGP2    SAF1        , SAF2        , SAF3        , SAF4        ,
```

GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	3.38642	AT (	379365.00,	3852820.00,	139.31,	139.31,	0.00)	DC	
	2ND HIGHEST VALUE IS	3.37649	AT (	379265.00,	3852820.00,	140.30,	140.30,	0.00)	DC	
	3RD HIGHEST VALUE IS	3.35200	AT (	379265.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	4TH HIGHEST VALUE IS	3.34600	AT (	379365.00,	3852720.00,	139.58,	139.58,	0.00)	DC	
	5TH HIGHEST VALUE IS	3.31019	AT (	379365.00,	3852920.00,	137.26,	142.00,	0.00)	DC	
	6TH HIGHEST VALUE IS	3.28358	AT (	379265.00,	3852920.00,	139.54,	143.00,	0.00)	DC	
	7TH HIGHEST VALUE IS	3.19852	AT (	379365.00,	3853020.00,	136.56,	143.00,	0.00)	DC	
	8TH HIGHEST VALUE IS	3.15604	AT (	379265.00,	3852620.00,	138.00,	143.00,	0.00)	DC	
	9TH HIGHEST VALUE IS	3.13388	AT (	379265.00,	3853020.00,	138.92,	143.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	3.12995	AT (	379365.00,	3852620.00,	136.37,	213.00,	0.00)	DC	
SRCGP2	1ST HIGHEST VALUE IS	3.38121	AT (	379365.00,	3852820.00,	139.31,	139.31,	0.00)	DC	
	2ND HIGHEST VALUE IS	3.37083	AT (	379265.00,	3852820.00,	140.30,	140.30,	0.00)	DC	
	3RD HIGHEST VALUE IS	3.34559	AT (	379265.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	4TH HIGHEST VALUE IS	3.34075	AT (	379365.00,	3852720.00,	139.58,	139.58,	0.00)	DC	
	5TH HIGHEST VALUE IS	3.30545	AT (	379365.00,	3852920.00,	137.26,	142.00,	0.00)	DC	
	6TH HIGHEST VALUE IS	3.27878	AT (	379265.00,	3852920.00,	139.54,	143.00,	0.00)	DC	
	7TH HIGHEST VALUE IS	3.19427	AT (	379365.00,	3853020.00,	136.56,	143.00,	0.00)	DC	
	8TH HIGHEST VALUE IS	3.14944	AT (	379265.00,	3852620.00,	138.00,	143.00,	0.00)	DC	
	9TH HIGHEST VALUE IS	3.12976	AT (	379265.00,	3853020.00,	138.92,	143.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	3.12530	AT (	379365.00,	3852620.00,	136.37,	213.00,	0.00)	DC	
SRCGP3	1ST HIGHEST VALUE IS	0.01845	AT (	378788.62,	3851767.67,	143.30,	146.00,	0.00)	DC	
	2ND HIGHEST VALUE IS	0.01765	AT (	379049.67,	3852320.72,	142.86,	142.86,	0.00)	DC	
	3RD HIGHEST VALUE IS	0.01728	AT (	379000.41,	3852321.36,	142.76,	142.76,	0.00)	DC	
	4TH HIGHEST VALUE IS	0.01661	AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	
	5TH HIGHEST VALUE IS	0.01577	AT (	378739.55,	3851768.56,	143.30,	147.00,	0.00)	DC	
	6TH HIGHEST VALUE IS	0.01529	AT (	378765.00,	3851720.00,	143.24,	143.24,	0.00)	DC	
	7TH HIGHEST VALUE IS	0.01496	AT (	378951.14,	3852322.00,	142.68,	145.00,	0.00)	DC	
	8TH HIGHEST VALUE IS	0.01462	AT (	379098.93,	3852320.09,	142.51,	142.51,	0.00)	DC	
	9TH HIGHEST VALUE IS	0.01258	AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	0.01235	AT (	378690.48,	3851769.45,	143.30,	147.00,	0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

SO2_2009.ADO

```
                                   ** CONC OF SO2      IN MICROGRAMS/M**3                          **

                                                   DATE                                                                  NETWORK
GROUP ID                           AVERAGE CONC    (YYMMDDHH)            RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)   OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1   HIGH   1ST HIGH VALUE IS     126.33887  ON 09010612: AT (  380665.00,  3851820.00,   162.15,   166.80,    0.00)  DC
         HIGH   4TH HIGH VALUE IS      79.52186  ON 09021111: AT (  379965.00,  3852220.00,   142.85,   214.80,    0.00)  DC

SRCGP2   HIGH   1ST HIGH VALUE IS     126.32044  ON 09010612: AT (  380665.00,  3851820.00,   162.15,   166.80,    0.00)  DC
         HIGH   4TH HIGH VALUE IS      79.51394  ON 09021111: AT (  379965.00,  3852220.00,   142.85,   214.80,    0.00)  DC

SRCGP3   HIGH   1ST HIGH VALUE IS       0.44990  ON 09041507: AT (  378984.90,  3851764.11,   139.85,   145.00,    0.00)  DC
         HIGH   4TH HIGH VALUE IS       0.30311  ON 09083004: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                      ***        16:07:49
                                                                                                                       PAGE 960
 **MODELOPTs:  RegDFAULT CONC                                                   ELEV

                                          *** THE SUMMARY OF HIGHEST  3-HR RESULTS ***

                                   ** CONC OF SO2      IN MICROGRAMS/M**3                          **

                                                   DATE                                                                  NETWORK
GROUP ID                           AVERAGE CONC    (YYMMDDHH)            RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)   OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1   HIGH   1ST HIGH VALUE IS      73.72283  ON 09010615: AT (  380565.00,  3851120.00,   158.96,   212.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      63.13493  ON 09101912: AT (  379165.00,  3852620.00,   138.82,   138.82,    0.00)  DC

SRCGP2   HIGH   1ST HIGH VALUE IS      73.71336  ON 09010615: AT (  380565.00,  3851120.00,   158.96,   212.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      63.12449  ON 09101912: AT (  379165.00,  3852620.00,   138.82,   138.82,    0.00)  DC

SRCGP3   HIGH   1ST HIGH VALUE IS       0.23641  ON 09101406: AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
         HIGH   2ND HIGH VALUE IS       0.20215  ON 09010209: AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                      ***        16:07:49
                                                                                                                       PAGE 961
 **MODELDPTs:  RegDFAULT CONC                                                   ELEV

                                          *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

                                   ** CONC OF SO2      IN MICROGRAMS/M**3                          **

                                                   DATE                                                                  NETWORK
```

SO2_2009.ADO

GROUP ID			AVERAGE CONC	(YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	30.30922c	ON 09061724: AT (	379665.00,	3852020.00,	134.98,	214.80,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	25.45920c	ON 09062024: AT (	379465.00,	3851620.00,	126.20,	145.00,	0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	30.30445c	ON 09061724: AT (	379665.00,	3852020.00,	134.98,	214.80,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	25.45423c	ON 09062024: AT (	379465.00,	3851620.00,	126.20,	145.00,	0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	0.11251c	ON 09112024: AT (	378788.62,	3851767.67,	143.30,	146.00,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	0.10524c	ON 09031624: AT (	378788.62,	3851767.67,	143.30,	146.00,	0.00)	DC	

```
*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR
```

```
*** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/07/13
                                  ***                                                                      ***      16:07:49
                                                                                                                    PAGE 962
**MODELOPTs:  RegDFAULT CONC                                              ELEV
```

```
*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of          0 Fatal Error Message(s)
A Total of          8 Warning Message(s)
A Total of       1096 Informational Message(s)

A Total of       8760 Hours Were Processed

A Total of        916 Calm Hours Identified

A Total of        180 Missing Hours Identified (  2.05 Percent)

   ******** FATAL ERROR MESSAGES ********
            ***  NONE  ***

   ********   WARNING MESSAGES   ********
CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
CO W362      25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for     3-hr Ave
CO W362      25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for    24-hr Ave
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2
CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4
CN W305       7 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
CN W305       7 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3

   ************************************
   *** AERMOD Finishes Successfully ***
   ************************************
```

Appendix B - Air Quality Impact Evaluation AERMOD Output Files
Pollutant - SO2
Year - 2010

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d

```
*************************************
*** SETUP Finishes Successfully ***
*************************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/07/13
                                   ***                                                                      ***      16:13:11
                                                                                                                     PAGE   1
**MODELOPTs:  RegDFAULT CONC                                              ELEV

                                     ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  3 Short Term Average(s) of:   1-HR   3-HR  24-HR
    and Calculates ANNUAL Averages

**This Run Includes:       6 Source(s);       3 Source Group(s); and    3416 Receptor(s)

**The Model Assumes A Pollutant Type of:  SO2

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =    104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =       5.9 MB of RAM.

**Detailed Error/Message File:    MSSilicon_SO2.err
**File for Summary of Results:    MSSilicon_SO2.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/07/13
                                   ***                                                                      ***      16:13:11
                                                                                                                     PAGE   2
**MODELOPTs:  RegDFAULT CONC                                              ELEV
```

SO2_2010.ADO

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.17879E+02	379020.5	3852097.6	143.6	91.44	449.82	20.18	1.93	YES	NO	NO	
SAF2	0	0.17879E+02	379019.6	3852052.8	143.2	91.44	449.82	20.18	1.93	YES	NO	NO	
SAF3	0	0.17879E+02	379018.1	3851969.8	142.6	91.44	449.82	20.18	1.93	YES	NO	NO	
SAF4	0	0.17879E+02	379017.5	3851925.0	142.1	91.44	449.82	20.18	1.93	YES	NO	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/07/13 16:13:11 PAGE 3

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.15120E-02	378925.8	3852076.8	144.0	19.99	6.97	9.31	NO	
F2	0	0.15120E-02	378923.5	3851949.2	143.0	19.99	6.97	9.31	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/07/13 16:13:11 PAGE 4

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
SRCGP1	SAF1 , SAF2 , SAF3 , SAF4 , F1 , F2 ,
SRCGP2	SAF1 , SAF2 , SAF3 , SAF4 ,
SRCGP3	F1 , F2 ,

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** *** *** 08/07/13 16:13:11 PAGE 5

**MODELOPTs: RegDFAULT CONC ELEV

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: SAF1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	10.7,	16.8,	14.4,	-12.8,	9.5,	2	40.0,	54.1,	84.7,	-214.9,	40.4,
3	40.0,	64.6,	83.9,	-218.9,	9.9,	4	40.0,	73.2,	80.5,	-216.2,	-21.0,
5	40.0,	79.4,	74.5,	-123.2,	45.0,	6	40.0,	83.3,	66.5,	-125.7,	29.4,
7	40.0,	84.7,	56.3,	-124.3,	12.9,	8	40.0,	83.4,	44.5,	-119.2,	-4.0,
9	40.0,	79.7,	31.3,	-110.4,	-20.7,	10	40.0,	82.9,	42.0,	-110.7,	-36.9,
11	40.0,	84.6,	54.1,	-109.0,	-51.9,	12	15.2,	85.4,	92.9,	12.5,	7.0,

SO2_2010.ADO

10. 0.09232 (10100224) AT (378837.69, 3851766.78) DC 20. 0.08559c(10111424) AT (378837.69, 3851766.78) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR,	YR,	ZELEV,	ZHILL,	ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	4.02637 AT (	379265.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	2ND HIGHEST VALUE IS	4.01203 AT (	379265.00,	3852820.00,	140.30,	140.30,	0.00)	DC	
	3RD HIGHEST VALUE IS	3.89499 AT (	379365.00,	3852820.00,	139.31,	139.31,	0.00)	DC	
	4TH HIGHEST VALUE IS	3.89225 AT (	379165.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	5TH HIGHEST VALUE IS	3.86248 AT (	379265.00,	3852920.00,	139.54,	143.00,	0.00)	DC	
	6TH HIGHEST VALUE IS	3.86036 AT (	379365.00,	3852720.00,	139.58,	139.58,	0.00)	DC	
	7TH HIGHEST VALUE IS	3.84038 AT (	379165.00,	3852820.00,	140.20,	140.20,	0.00)	DC	
	8TH HIGHEST VALUE IS	3.81495 AT (	379265.00,	3852620.00,	138.00,	143.00,	0.00)	DC	
	9TH HIGHEST VALUE IS	3.78018 AT (	379365.00,	3852920.00,	137.26,	142.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	3.74528 AT (	379165.00,	3852620.00,	138.82,	138.82,	0.00)	DC	
SRCGP2	1ST HIGHEST VALUE IS	4.02048 AT (	379265.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	2ND HIGHEST VALUE IS	4.00658 AT (	379265.00,	3852820.00,	140.30,	140.30,	0.00)	DC	
	3RD HIGHEST VALUE IS	3.89029 AT (	379365.00,	3852820.00,	139.31,	139.31,	0.00)	DC	
	4TH HIGHEST VALUE IS	3.88592 AT (	379165.00,	3852720.00,	140.12,	140.12,	0.00)	DC	
	5TH HIGHEST VALUE IS	3.85761 AT (	379265.00,	3852920.00,	139.54,	143.00,	0.00)	DC	
	6TH HIGHEST VALUE IS	3.85556 AT (	379365.00,	3852720.00,	139.58,	139.58,	0.00)	DC	
	7TH HIGHEST VALUE IS	3.83498 AT (	379165.00,	3852820.00,	140.20,	140.20,	0.00)	DC	
	8TH HIGHEST VALUE IS	3.80896 AT (	379265.00,	3852620.00,	138.00,	143.00,	0.00)	DC	
	9TH HIGHEST VALUE IS	3.77582 AT (	379365.00,	3852920.00,	137.26,	142.00,	0.00)	DC	
	10TH HIGHEST VALUE IS	3.73810 AT (	379165.00,	3852620.00,	138.82,	138.82,	0.00)	DC	
SRCGP3	1ST HIGHEST VALUE IS	0.02007 AT (	378788.62,	3851767.67,	143.30,	146.00,	0.00)	DC	
	2ND HIGHEST VALUE IS	0.01936 AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	
	3RD HIGHEST VALUE IS	0.01719 AT (	379000.41,	3852321.36,	142.76,	142.76,	0.00)	DC	
	4TH HIGHEST VALUE IS	0.01686 AT (	379049.67,	3852320.72,	142.86,	142.86,	0.00)	DC	
	5TH HIGHEST VALUE IS	0.01668 AT (	378765.00,	3851720.00,	143.24,	143.24,	0.00)	DC	
	6TH HIGHEST VALUE IS	0.01664 AT (	378739.55,	3851768.56,	143.30,	147.00,	0.00)	DC	
	7TH HIGHEST VALUE IS	0.01613 AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	8TH HIGHEST VALUE IS	0.01468 AT (	378951.14,	3852322.00,	142.68,	145.00,	0.00)	DC	
	9TH HIGHEST VALUE IS	0.01366 AT (	379098.93,	3852320.09,	142.51,	142.51,	0.00)	DC	
	10TH HIGHEST VALUE IS	0.01282 AT (	378865.00,	3851720.00,	141.49,	146.00,	0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	118.22287	ON 10012810: AT (	380165.00,	3852220.00,	163.93,	214.80,	0.00)	DC	
	HIGH	4TH HIGH VALUE IS	80.96687	ON 10012116: AT (	380065.00,	3852120.00,	143.60,	214.80,	0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	118.20472	ON 10012810: AT (	380165.00,	3852220.00,	163.93,	214.80,	0.00)	DC	
	HIGH	4TH HIGH VALUE IS	80.95948	ON 10012116: AT (	380065.00,	3852120.00,	143.60,	214.80,	0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	0.43488	ON 10022608: AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	
	HIGH	4TH HIGH VALUE IS	0.31566	ON 10111709: AT (	379000.41,	3852321.36,	142.76,	142.76,	0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 16:13:11
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**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF HIGHEST 3-HR RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	67.60268	ON 10062212: AT (	379065.00,	3852620.00,	139.25,	145.00,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	65.68157	ON 10090615: AT (	379065.00,	3852620.00,	139.25,	145.00,	0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	67.59418	ON 10062212: AT (	379065.00,	3852620.00,	139.25,	145.00,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	65.67208	ON 10090615: AT (	379065.00,	3852620.00,	139.25,	145.00,	0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	0.24132	ON 10031803: AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	0.21599	ON 10122509: AT (	378935.83,	3851765.00,	141.58,	145.00,	0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 16:13:11
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**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID

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                                                                                                  SO2_2010.ADO
SRCGP1   HIGH   1ST HIGH VALUE IS      28.77203c ON 10061424: AT (  379665.00,  3852120.00,   130.84,   214.80,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      24.45528  ON 10070324: AT (  379165.00,  3852820.00,   140.20,   140.20,    0.00)  DC

SRCGP2   HIGH   1ST HIGH VALUE IS      28.76742c ON 10061424: AT (  379665.00,  3852120.00,   130.84,   214.80,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      24.45208  ON 10070324: AT (  379165.00,  3852820.00,   140.20,   140.20,    0.00)  DC

SRCGP3   HIGH   1ST HIGH VALUE IS       0.11300  ON 10122524: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS       0.09594  ON 10031724: AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                   ***        16:13:11
                                                                                                                      PAGE 962
 **MODELOPTs:  RegDFAULT CONC                                                  ELEV

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            8 Warning Message(s)
 A Total of         1492 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of         1234 Calm Hours Identified

 A Total of          258 Missing Hours Identified (  2.95 Percent)

    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***

    ********   WARNING MESSAGES   ********
 CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
 CO W362      25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for     3-hr Ave
 CO W362      25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for    24-hr Ave
 ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3
 CN W305       1 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4

    ************************************
    *** AERMOD Finishes Successfully ***
    ************************************
```

*Air Quality Impact Evaluation results are summarized in Tables 5-4a through 5-4d


```
A Total of          0 Informational Message(s)

   ******** FATAL ERROR MESSAGES ********
              ***   NONE   ***

   ********   WARNING MESSAGES   ********
CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
CO W362      25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for     3-hr Ave
CO W362      25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for    24-hr Ave
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

***********************************
*** SETUP Finishes Successfully ***
***********************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                       ***        16:15:47
                                                                                                                        PAGE   1
**MODELOPTS:  RegDFAULT CONC                                            ELEV

                                       ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  3 Short Term Average(s) of:   1-HR   3-HR  24-HR
    and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);       3 Source Group(s); and     3416 Receptor(s)

**The Model Assumes A Pollutant Type of:  SO2

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
```

```
                                                                                SO2_2011.ADO
                                                                b for Both Calm and Missing Hours
**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   104.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      5.9 MB of RAM.

**Detailed Error/Message File:   MSSilicon_SO2.err
**File for Summary of Results:   MSSilicon_SO2.sum
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                  ***          16:15:47
**MODELOPTs:  RegDFAULT CONC                                                    ELEV                                PAGE    2


                                                   *** POINT SOURCE DATA ***

             NUMBER EMISSION RATE                          BASE     STACK   STACK    STACK     STACK    BLDG   URBAN  CAP/  EMIS RATE
  SOURCE      PART.  (GRAMS/SEC)     X          Y          ELEV.    HEIGHT  TEMP.   EXIT VEL. DIAMETER EXISTS SOURCE HOR   SCALAR
   ID         CATS.                (METERS)   (METERS)   (METERS) (METERS) (DEG.K)  (M/SEC)  (METERS)                        VARY BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SAF1            0   0.17879E+02  379020.5 3852097.6   143.6    91.44   449.82    20.18     1.93    YES     NO     NO
SAF2            0   0.17879E+02  379019.6 3852052.8   143.2    91.44   449.82    20.18     1.93    YES     NO     NO
SAF3            0   0.17879E+02  379018.1 3851969.8   142.6    91.44   449.82    20.18     1.93    YES     NO     NO
SAF4            0   0.17879E+02  379017.5 3851925.0   142.1    91.44   449.82    20.18     1.93    YES     NO     NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                  ***          16:15:47
**MODELOPTs:  RegDFAULT CONC                                                    ELEV                                PAGE    3


                                                   *** VOLUME SOURCE DATA ***

             NUMBER EMISSION RATE                          BASE     RELEASE   INIT.    INIT.   URBAN  EMISSION RATE
  SOURCE      PART.  (GRAMS/SEC)     X          Y          ELEV.    HEIGHT    SY       SZ     SOURCE  SCALAR VARY
   ID         CATS.                (METERS)   (METERS)   (METERS) (METERS) (METERS) (METERS)                BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

F1              0   0.15120E-02  378925.8 3852076.8   144.0    19.99     6.97     9.31     NO
F2              0   0.15120E-02  378923.5 3851949.2   143.0    19.99     6.97     9.31     NO
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                   ***                                                                  ***          16:15:47
**MODELOPTs:  RegDFAULT CONC                                                    ELEV                                PAGE    4


                                         *** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID                                                   SOURCE IDs


 SRCGP1    SAF1        , SAF2        , SAF3        , SAF4        , F1          , F2          ,

 SRCGP2    SAF1        , SAF2        , SAF3        , SAF4        ,
```

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	1ST HIGHEST VALUE IS	3.90702 AT	(379365.00, 3852820.00, 139.31, 139.31, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.82824 AT	(379365.00, 3852720.00, 139.58, 139.58, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.80291 AT	(379365.00, 3852920.00, 137.26, 142.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.76763 AT	(379265.00, 3852820.00, 140.30, 140.30, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.75103 AT	(379265.00, 3852720.00, 140.12, 140.12, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.64109 AT	(379365.00, 3853020.00, 136.56, 143.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.62654 AT	(379465.00, 3852920.00, 132.67, 213.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.62257 AT	(379265.00, 3852920.00, 139.54, 143.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.60502 AT	(379465.00, 3853020.00, 135.08, 142.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	3.60405 AT	(379465.00, 3852820.00, 132.83, 214.80, 0.00)	DC	
SRCGP2	1ST HIGHEST VALUE IS	3.90066 AT	(379365.00, 3852820.00, 139.31, 139.31, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.82166 AT	(379365.00, 3852720.00, 139.58, 139.58, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.79724 AT	(379365.00, 3852920.00, 137.26, 142.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.76099 AT	(379265.00, 3852820.00, 140.30, 140.30, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.74340 AT	(379265.00, 3852720.00, 140.12, 140.12, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.63607 AT	(379365.00, 3853020.00, 136.56, 143.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.62157 AT	(379465.00, 3852920.00, 132.67, 213.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.61700 AT	(379265.00, 3852920.00, 139.54, 143.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.60013 AT	(379465.00, 3853020.00, 135.08, 142.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	3.59913 AT	(379465.00, 3852820.00, 132.83, 214.80, 0.00)	DC	
SRCGP3	1ST HIGHEST VALUE IS	0.02022 AT	(379049.67, 3852320.72, 142.86, 142.86, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.01849 AT	(378788.62, 3851767.67, 143.30, 146.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.01833 AT	(379000.41, 3852321.36, 142.76, 142.76, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.01756 AT	(379098.93, 3852320.09, 142.51, 142.51, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.01696 AT	(378837.69, 3851766.78, 143.17, 143.17, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.01551 AT	(378765.00, 3851720.00, 143.24, 143.24, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.01504 AT	(378739.55, 3851768.56, 143.30, 147.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.01446 AT	(378951.14, 3852322.00, 142.68, 145.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.01367 AT	(379065.00, 3852420.00, 141.14, 141.14, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.01321 AT	(378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

SO2_2011.ADO

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	95.45232	ON 11022309: AT (	376365.00,	3851820.00,	157.59,	157.59,	0.00)	DC	
	HIGH	4TH HIGH VALUE IS	74.38220	ON 11032313: AT (	379965.00,	3852120.00,	138.62,	214.80,	0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	95.43696	ON 11022309: AT (	376365.00,	3851820.00,	157.59,	157.59,	0.00)	DC	
	HIGH	4TH HIGH VALUE IS	74.37397	ON 11032313: AT (	379965.00,	3852120.00,	138.62,	214.80,	0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	0.45747	ON 11092207: AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	
	HIGH	4TH HIGH VALUE IS	0.29563	ON 11060306: AT (	378837.69,	3851766.78,	143.17,	143.17,	0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 16:15:47
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**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF HIGHEST 3-HR RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	NETWORK GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	67.80850	ON 11090112: AT (	379265.00,	3852620.00,	138.00,	143.00,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	64.05987	ON 11102515: AT (	379265.00,	3852620.00,	138.00,	143.00,	0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	67.80049	ON 11090112: AT (	379265.00,	3852620.00,	138.00,	143.00,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	64.05107	ON 11102515: AT (	379265.00,	3852620.00,	138.00,	143.00,	0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	0.20878	ON 11102918: AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	0.20788	ON 11102406: AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 16:15:47
PAGE 961

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

DATE NETWORK

SO2_2011.ADO

GROUP ID			AVERAGE CONC	(YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	27.24065c	ON 11052824: AT (	379365.00,	3852820.00,	139.31,	139.31,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	23.30412	ON 11041924: AT (	379465.00,	3852920.00,	132.67,	213.00,	0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	27.23239c	ON 11052824: AT (	379365.00,	3852820.00,	139.31,	139.31,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	23.29544	ON 11041924: AT (	379465.00,	3852920.00,	132.67,	213.00,	0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	0.14029	ON 11120624: AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	0.09480	ON 11112024: AT (	379000.41,	3852321.36,	142.76,	142.76,	0.00)	DC	

```
*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR
```

```
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/07/13
                                   ***                                                                    ***      16:15:47
                                                                                                                   PAGE 962
**MODELOPTS:  RegDFAULT CONC                                              ELEV
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*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of          0 Fatal Error Message(s)
A Total of         16 Warning Message(s)
A Total of       1074 Informational Message(s)

A Total of       8760 Hours Were Processed

A Total of        899 Calm Hours Identified

A Total of        175 Missing Hours Identified (  2.00 Percent)

   ******** FATAL ERROR MESSAGES ********
              ***   NONE   ***

   ********   WARNING MESSAGES   ********
CO W361       25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
CO W362       25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for     3-hr Ave
CO W362       25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for    24-hr Ave
ME W186      221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used           0.50
CN W305        1 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF1
CN W305        1 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF2
CN W305        1 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF3
CN W305        1 WAKFLG:Stack height > or = EPA formula height for SRCID:          SAF4
MX W441     7257  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103009
MX W441     7258  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103010
MX W441     7259  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103011
MX W441     7260  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103012
MX W441     7261  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103013
MX W441     7262  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103014
MX W441     7263  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103015
MX W441     7264  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=     11103016

   ************************************
   *** AERMOD Finishes Successfully ***
   ************************************
```

```
A Total of          0 Informational Message(s)

   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***

   ********   WARNING MESSAGES   ********
CO W361      25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
CO W362      25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for      3-hr Ave
CO W362      25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for     24-hr Ave
ME W186     221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used            0.50

************************************
*** SETUP Finishes Successfully ***
************************************

 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***       08/07/13
                                   ***                                                                    ***       16:19:57
                                                                                                                    PAGE   1
**MODELOPTs:  RegDFAULT CONC                                    ELEV

                                  ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  3 Short Term Average(s) of:   1-HR   3-HR  24-HR
    and Calculates ANNUAL Averages

**This Run Includes:      6 Source(s);       3 Source Group(s); and     3416 Receptor(s)

**The Model Assumes A Pollutant Type of:  SO2

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
```

b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) = 104.00 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 5.9 MB of RAM.

**Detailed Error/Message File: MSSilicon_SO2.err
**File for Summary of Results: MSSilicon_SO2.sum

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 16:19:57
PAGE 2
**MODELOPTs: RegDFAULT CONC ELEV

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
SAF1	0	0.17879E+02	379020.5	3852097.6	143.6	91.44	449.82	20.18	1.93	YES	NO	NO	
SAF2	0	0.17879E+02	379019.6	3852052.8	143.2	91.44	449.82	20.18	1.93	YES	NO	NO	
SAF3	0	0.17879E+02	379018.1	3851969.8	142.6	91.44	449.82	20.18	1.93	YES	NO	NO	
SAF4	0	0.17879E+02	379017.5	3851925.0	142.1	91.44	449.82	20.18	1.93	YES	NO	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 16:19:57
PAGE 3
**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
F1	0	0.15120E-02	378925.8	3852076.8	144.0	19.99	6.97	9.31	NO	
F2	0	0.15120E-02	378923.5	3851949.2	143.0	19.99	6.97	9.31	NO	

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. *** 08/07/13
*** *** 16:19:57
PAGE 4
**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs						
SRCGP1	SAF1	, SAF2	, SAF3	, SAF4	, F1	, F2	,
SRCGP2	SAF1	, SAF2	, SAF3	, SAF4	,		

```
                                                                                    SO2_2007-2011.ADO
                    GP = GRIDPOLR
                    DC = DISCCART
                    DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                  ***                                                                    ***          16:19:57
 **MODELOPTs:  RegDFAULT CONC                                                                                         PAGE 958
                                                                    ELEV

                                 *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   5 YEARS ***

                                  ** CONC OF SO2      IN MICROGRAMS/M**3                          **

GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  NETWORK
                                                                                                              GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

SRCGP1     1ST HIGHEST VALUE IS       3.43074 AT (  379265.00,  3852820.00,   140.30,   140.30,    0.00)  DC
           2ND HIGHEST VALUE IS       3.42672 AT (  379265.00,  3852720.00,   140.12,   140.12,    0.00)  DC
           3RD HIGHEST VALUE IS       3.38692 AT (  379165.00,  3852720.00,   140.12,   140.12,    0.00)  DC
           4TH HIGHEST VALUE IS       3.37503 AT (  379165.00,  3852820.00,   140.20,   140.20,    0.00)  DC
           5TH HIGHEST VALUE IS       3.32197 AT (  379265.00,  3852920.00,   139.54,   143.00,    0.00)  DC
           6TH HIGHEST VALUE IS       3.29869 AT (  379365.00,  3852820.00,   139.31,   139.31,    0.00)  DC
           7TH HIGHEST VALUE IS       3.28260 AT (  379365.00,  3852720.00,   139.58,   139.58,    0.00)  DC
           8TH HIGHEST VALUE IS       3.26214 AT (  379165.00,  3852920.00,   139.85,   139.85,    0.00)  DC
           9TH HIGHEST VALUE IS       3.24385 AT (  379265.00,  3852620.00,   138.00,   143.00,    0.00)  DC
          10TH HIGHEST VALUE IS       3.22917 AT (  379165.00,  3852620.00,   138.82,   138.82,    0.00)  DC

SRCGP2     1ST HIGHEST VALUE IS       3.42603 AT (  379265.00,  3852820.00,   140.30,   140.30,    0.00)  DC
           2ND HIGHEST VALUE IS       3.42153 AT (  379265.00,  3852720.00,   140.12,   140.12,    0.00)  DC
           3RD HIGHEST VALUE IS       3.38146 AT (  379165.00,  3852720.00,   140.12,   140.12,    0.00)  DC
           4TH HIGHEST VALUE IS       3.37032 AT (  379165.00,  3852820.00,   140.20,   140.20,    0.00)  DC
           5TH HIGHEST VALUE IS       3.31783 AT (  379265.00,  3852920.00,   139.54,   143.00,    0.00)  DC
           6TH HIGHEST VALUE IS       3.29448 AT (  379365.00,  3852820.00,   139.31,   139.31,    0.00)  DC
           7TH HIGHEST VALUE IS       3.27826 AT (  379365.00,  3852720.00,   139.58,   139.58,    0.00)  DC
           8TH HIGHEST VALUE IS       3.25807 AT (  379165.00,  3852920.00,   139.85,   139.85,    0.00)  DC
           9TH HIGHEST VALUE IS       3.23848 AT (  379265.00,  3852620.00,   138.00,   143.00,    0.00)  DC
          10TH HIGHEST VALUE IS       3.22294 AT (  379165.00,  3852620.00,   138.82,   138.82,    0.00)  DC

SRCGP3     1ST HIGHEST VALUE IS       0.01747 AT (  378837.69,  3851766.78,   143.17,   143.17,    0.00)  DC
           2ND HIGHEST VALUE IS       0.01670 AT (  378886.76,  3851765.89,   143.00,   146.00,    0.00)  DC
           3RD HIGHEST VALUE IS       0.01648 AT (  378788.62,  3851767.67,   143.30,   146.00,    0.00)  DC
           4TH HIGHEST VALUE IS       0.01561 AT (  379000.41,  3852321.36,   142.76,   142.76,    0.00)  DC
           5TH HIGHEST VALUE IS       0.01516 AT (  378951.14,  3852322.00,   142.68,   145.00,    0.00)  DC
           6TH HIGHEST VALUE IS       0.01486 AT (  379049.67,  3852320.72,   142.86,   142.86,    0.00)  DC
           7TH HIGHEST VALUE IS       0.01409 AT (  378901.88,  3852322.63,   142.58,   146.00,    0.00)  DC
           8TH HIGHEST VALUE IS       0.01368 AT (  378765.00,  3851720.00,   143.24,   143.24,    0.00)  DC
           9TH HIGHEST VALUE IS       0.01313 AT (  378739.55,  3851768.56,   143.30,   147.00,    0.00)  DC
          10TH HIGHEST VALUE IS       0.01303 AT (  378865.00,  3851720.00,   141.49,   146.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  12345 ***   *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***        08/07/13
                                  ***                                                                    ***          16:19:57
 **MODELOPTs:  RegDFAULT CONC                                                                                         PAGE 959
                                                                    ELEV

                                 *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***
```

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	126.33887	ON 09010612: AT (	380665.00, 3851820.00, 162.15, 166.80, 0.00)	DC	
	HIGH	4TH HIGH VALUE IS	95.18269	ON 09112010: AT (	378165.00, 3851020.00, 147.60, 152.80, 0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	126.32044	ON 09010612: AT (	380665.00, 3851820.00, 162.15, 166.80, 0.00)	DC	
	HIGH	4TH HIGH VALUE IS	95.17059	ON 09112010: AT (	378165.00, 3851020.00, 147.60, 152.80, 0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	0.55124	ON 08040707: AT (	378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	
	HIGH	4TH HIGH VALUE IS	0.40822	ON 08121710: AT (	378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***
*** *** 08/07/13
16:19:57
PAGE 960

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF HIGHEST 3-HR RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	73.72283	ON 09010615: AT (	380565.00, 3851120.00, 158.96, 212.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	67.37236	ON 10062212: AT (	379065.00, 3852520.00, 140.24, 145.00, 0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	73.71336	ON 09010615: AT (	380565.00, 3851120.00, 158.96, 212.00, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	67.36100	ON 10062212: AT (	379065.00, 3852520.00, 140.24, 145.00, 0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	0.27681	ON 08121712: AT (	378837.69, 3851766.78, 143.17, 143.17, 0.00)	DC	
	HIGH	2ND HIGH VALUE IS	0.26468	ON 08061106: AT (	378886.76, 3851765.89, 143.00, 146.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***
*** *** 08/07/13
16:19:57
PAGE 961

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

DATE NETWORK

SO2_2007-2011.ADO

GROUP ID			AVERAGE CONC		(YYMMDDHH)		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	GRID-ID
SRCGP1	HIGH	1ST HIGH VALUE IS	30.30922c	ON	09061724:	AT (	379665.00,	3852020.00,	134.98,	214.80,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	28.77203c	ON	10061424:	AT (	379665.00,	3852120.00,	130.84,	214.80,	0.00)	DC	
SRCGP2	HIGH	1ST HIGH VALUE IS	30.30445c	ON	09061724:	AT (	379665.00,	3852020.00,	134.98,	214.80,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	28.76742c	ON	10061424:	AT (	379665.00,	3852120.00,	130.84,	214.80,	0.00)	DC	
SRCGP3	HIGH	1ST HIGH VALUE IS	0.14029	ON	11120624:	AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	
	HIGH	2ND HIGH VALUE IS	0.12204	ON	08040524:	AT (	378886.76,	3851765.89,	143.00,	146.00,	0.00)	DC	

```
*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR
```

```
 *** AERMOD - VERSION  12345 ***    *** U:\IS-User\CameronR\MS Silicon\AERMOD\MSSilicon\MSSilicon\MSSilicon. ***      08/07/13
                                    ***                                                                     ***      16:19:57
                                                                                                                     PAGE 962
**MODELOPTs:  RegDFAULT CONC                                                   ELEV

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of          0 Fatal Error Message(s)
A Total of         16 Warning Message(s)
A Total of       6022 Informational Message(s)

A Total of      43824 Hours Were Processed

A Total of       4669 Calm Hours Identified

A Total of       1353 Missing Hours Identified (  3.09 Percent)

   ******** FATAL ERROR MESSAGES ********
              ***   NONE   ***

   ********   WARNING MESSAGES   ********
CO W361        25 COCARD:Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
CO W362        25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for     3-hr Ave
CO W362        25 COCARD:Multiyear 1h NO2/SO2 processing not applicable for    24-hr Ave
ME W186       221 MEOPEN:THRESH_1MIN 1-min ASOS wind speed threshold used          0.50
CN W305         3 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF3
CN W305         3 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF4
CN W305         7 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF1
CN W305        10 WAKFLG:Stack height > or = EPA formula height for SRCID:         SAF2
MX W441     42321  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103009
MX W441     42322  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103010
MX W441     42323  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103011
MX W441     42324  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103012
MX W441     42325  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103013
MX W441     42326  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103014
MX W441     42327  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103015
MX W441     42328  METQA:Vert Pot Temp Grad abv ZI set to min .005, KURDAT=    11103016

   *************************************
   *** AERMOD Finishes Successfully ***
   *************************************
```

AIR PLANNING BRANCH
RECEIVED
AUG 21 2013
EPA REGION 4
ATLANTA, GA

STATE OF MISSISSIPPI
PHIL BRYANT
GOVERNOR

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
TRUDY D. FISHER, EXECUTIVE DIRECTOR

August 19, 2013

Heather Ceron, Chief
Air Permits Section
U.S. EPA, Region 4
Atlanta Federal Center
61 Forsyth Street SW
Atlanta, Georgia 30303-3104

Dear Ms. Ceron:

Re: Mississippi Silicon LLC
Tishomingo County
Air Ref. No. 2640-00060
PSD Application

Please find enclosed a copy of the above referenced application for your comments.

If you have any questions, please contact Bonnie Morgan of my staff at 601-961-5784.

Sincerely,

Harry M. Wilson III, P.E., DEE
Chief, Environmental Permits Division

Enclosure

64456 PER20130001

OFFICE OF POLLUTION CONTROL
POST OFFICE BOX 2261 • JACKSON, MISSISSIPPI 39225-2261 • TEL: (601) 961-5171 • FAX: (601) 354-6612 • www.deq.state.ms.us

K. Lusky
S. Krivo

STATE OF MISSISSIPPI
PHIL BRYANT
GOVERNOR
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
GARY C. RIKARD, EXECUTIVE DIRECTOR

May 28, 2015

Ms. Beverly H. Banister, Director
Air, Pesticides and Toxics Management Division
U.S. Environmental Protection Agency, Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-8960

In a letter dated July 16, 2014, the Region 4 office of the U.S. Environmental Protection Agency (US EPA) submitted comments regarding modeling performed for Mississippi Silicon LLC (MS Silicon), a new silicon manufacturing facility located near Burnsville, Mississippi in Tishomingo County. The Mississippi Department of Environmental Quality (MDEQ) responded to EPA Region 4 comments in a correspondence to you dated September 4, 2014. The September 4th comments were supplemented with a comprehensive confirmatory modeling report to further support the response to EPA's comments and demonstrate that the MS Silicon facility will not cause or contribute to a modeled exceedance of the National Ambient Air Quality Standard (NAAQS) for nitrogen dioxide (NO_2) and sulfur dioxide (SO_2). The ambient air quality modeling report was prepared in accordance with 40 CFR Part 51, Appendix W - Revisions to the Guideline on Air Quality Models, EPA Memos, and discussions with US EPA Region 4 modeling personnel.

In a conference call with Stan Krivo, of your staff, on Friday, May 22, 2015, Mr. Krivo commented MDEQ's September 4th responses to comments and subsequent comprehensive confirmatory modeling analyses were satisfactory. However, EPA Region 4's original comments, Comments 1, 2, and 3, were not fully resolved. The remaining issues are non-major. If left unaddressed, the issues will be considered unresolved or remaining concerns. EPA Region 4's original comments are restated in bold type followed by MDEQ's response in italics.

1. **Exclusion of Fugitive and Volume Emission Sources**

   According to the November 22, 2013, "Addendum #2 Updated Air Quality Impact Evaluation (Criteria Air Pollutants)," MS Silicon eliminated fugitive emission and volume source emissions because it concluded that their maximum impacts will be close to or within the facilities property boundary. To allow assessment of the appropriateness of this elimination, please provide supporting quantitative information on the number, location, and magnitude of the emissions excluded from the cumulative air quality assessment (e.g., inventory of the eliminated fugitive and volume sources).

ED_002139_00006638-00001

Partially Addressed
- MDEQ's will include fugitive and volume emissions for all nearby emission sources located within the significant impact area (SIA). The modeled emission inventory will also include minor emission sources within the SIA.
- The requested information on the number, location, and magnitude of these emissions excluded from the cumulative air quality assessment (e.g., inventory of eliminated fugitive and volume sources) was not addressed.

MDEQ Response: *In the confirmatory modeling conducted by MDEQ, sources were screened by applying the 20D rule. If the source was not eliminated by the 20D rule, all of the emissions from that source were included in the model. Sources located within the significant impact area were included in the analysis regardless of the 20D comparison.* ***There were no fugitive sources eliminated.***

The modeling parameters for SO_2 Competing Sources and the NOx Off-Site Inventory were summarized in Table 5 and Table 6 of the Modeling Report, respectively.

2. **Use of Actual Emissions**

The MS Silicon modeling used allowable emissions except for the modeling relating to compliance with the one hour sulfur dioxide (SO_2) National Ambient Air Quality Standards (NAAQS) and the one hour nitrogen dioxide (NO_2) NAAQS in the November 2013 Addendum #2, where actual emissions were used. The use of actual emissions in the cumulative NAAQS compliance modeling is not supported by past or current practice nor by 40 CFR Part 51, Appendix W. Please provide a detailed technical explanation why this modelling approach is appropriate and in accordance with the current regulations, guidance, and accepted practice.

Partially Addressed
- All emissions to be used in the new impact assessment will be permit allowable or maximum potential emissions for each emission unit. No actual emissions will be used in this modeling effort.
- Modeled 1-hourly emissions developed from emission records containing only annual TPY values needs to be addressed. Modeled hourly emission rates developed from annual TPY values are generally not appropriate maximum allowable or potential hourly emissions.

MDEQ Response: *The modeling domain for the project extended into Tennessee and Alabama; therefore, the competing source inventory was comprised of sources from three (3) states. Ms Silicon developed the modeling inventory from the source lists provided. MDEQ reviewed the modeling inventory for accuracy and how the appropriate emission rates were developed. Current MDEQ emission data reporting procedure do not require sources to report maximum hourly usage or activity rates; therefore, the maximum 1-hour emission rates were estimated using the pound/hour emission limit established in an existing permit or EPA emission factor information detailed in "AP-42, Fifth Edition, Compilation of Air Pollution Emission Factors."*

3. **Modeled Receptor Grid**

Please confirm that all modeled controlling concentrations and/or concentrations exceeding ambient standards, and concentrations challenging these concentrations (e.g., greater than 90% of the values), have been modeled with 100-meter grid resolution. If this was not the case, please provide information showing the actual grid resolution and explain why this grid resolution is appropriate. Also, please provide and explanation of why the 100-meter grid resolution was not used and discuss any potential differences in outcome from the use of a different grid.

Partially Addressed

- The new MDEQ modeling will include significant impact level (SIL) assessment that will be performed with the receptor grids used for the impact modeling provided in the PSD permit application. MDEQ will select receptors where the MS Silicon project impacts equal or exceed 90% of the applicable SIL for the cumulative NAAQS compliance assessment.
- All cumulative compliance modeled receptors with concentrations equal or greater than 90% of the applicable NAAQS will be modeled with a receptor grid of 100-m resolution. Re-modeling with more refined receptor grids will be performed, as necessary.

MDEQ Response: *The SO_2 receptor grid was 100-meter spacing in all areas of predicted exceedances with the exception of the area that lies between TVA Colbert and MS Silicon. 100-meter spacing was added in this area, however, the additional receptors did not close out the entire area. Because the area is between MS Silicon and TVA Colbert, the two facilities cannot be impacting this area at the same time. Because MS Silicon doesn't impact the area at the times of predicted exceedances, expanding the grid further would not have resulted in any increase in the value of predicted contributions from MS Silicon.*

The initial NO_2 grid was expanded with 100-meter spacing at receptors where predicted exceedances occurred out to ½ the distance of the receptor spacing at the predicted exceedance. This method was chosen because of the computer resource demand due to a large area of predicted impacts from existing sources. While this method did not result in coverage with at least one receptor at 100-meter spacing beyond every predicted exceedance, the coverage was sufficient to determine that the maximum contribution from MS Silicon would be below the significant impact level. As stated in Appendix W, "In designing a receptor network, the emphasis should be placed on receptor resolution and location, not total number of receptors. The selection of receptor sites should be a case-by-case determination taking into consideration the topography, the climatology, monitor sites, and the results of the initial screening procedure." The MDEQ contends that the receptor network used meets Appendix W guidelines.

The confirmatory modeling analysis was complete and successfully demonstrated the MS Silicon facility/project would not cause or contribute to a modeled exceedance of the NAAQS for SO_2 or NO_2.

Thank you for the opportunity to resolve any remaining issues and/or clarify our response. If you have any other questions, please contact me at (601) 961-5073.

Sincerely,

Harry M. Wilson III, P.E., DEE, Chief
Environmental Permits Division
Mississippi Department of Environmental Quality

Cc: Dallas Baker, Director, MDEQ/Air Division
Stanley Krivo, USEPA/Region 4/Air, Pesticides, & Toxics/Modeling

STATE OF MISSISSIPPI
PHIL BRYANT
GOVERNOR
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
GARY C. RIKARD, EXECUTIVE DIRECTOR

March 19, 2015

Ms. Beverly Bannister
Environmental Protection Agency
Region IV
Atlanta Federal Center
61 Forsyth Street
Atlanta, GA 30303-8960

RE: Mississippi Silicon

Dear Beverly,

Enclosed please find one portable hard drive which contains an electronic copy of air modeling regarding Mississippi Silicon, LLC (MS Silicon). MDEQ, pursuant to its primary permitting authority under its EPA approved SIP, issued a Prevention of Significant Determination (PSD) Permit to MS Silicon on November 27, 2013. Since that time, in response to certain Congressional inquiries, MDEQ has worked with EPA to provide responses to the questions which have been raised.

The attached response contains modeling files developed by MDEQ under contract with an independent third party to address the questions on the air quality analysis contained in the permit application. The most appropriate data available should always be selected for use in modeling analyses. Invariably, personal professional judgment will be required in the selection of the appropriate data sets used in the modeling. The additional modeling files are included not to imply that the air quality analysis included in the application was deficient, but solely to satisfy the inquiries related to the permit. The same conclusion is drawn from this modeling as with earlier models, i.e., the project permitted emissions will not cause or contribute to an exceedance of the NAAQS or PSD increments.

In addition to the information provided on the portable hard drive, MDEQ provides the following information in response to an email dated December 12, 2014, in which the Region 4 office of the U.S. Environmental Protection Agency provided additional comments regarding

ED_002139_00006639-00001

MDEQ's September 4, 2014, response to the "MS Silicon Outstanding Air Quality Impact Assessment" questions provided in your correspondence to Maya Rao, Director, Air Division, dated July 16, 2014. EPA Region 4 also commented on MDEQ's response to questions involving plant roads, material handling and storage. Following is MDEQ's response to EPA Region 4 comments. EPA Region 4's original comment is restated in bold type followed by MDEQ's response in italics.

Plant roads, material handling and storage

Best management practices (BMP) are indicated as the methods for controlling emissions from bulldozing storage areas, vehicle road traffic, vehicle transport of raw product, and wind erosion from coal/wood/quartz/slag storage. Please provide a detailed technical justification for the selection of these unusually high control efficiencies for the BMPs which includes an explanation of how the control efficiencies will be reached.

MDEQ Response: *As stated in our September 4, 2014 response, BMP for the various fugitive type emission sources associated with the MS Silicon facility will utilize various practices including a) inclusion of 3-sided windscreen barriers (where technical feasible), b) use of chemical stabilization and/or watering to reduce visible emissions and the development of a fugitive dust control plan to minimize PM emissions. The fugitive dust control plan is to include such control techniques as controlling with water, dust suppressants, wind screens, vehicle speed reduction and vacuuming or sweeping of facility roads, as required. The control efficiency/technology information provided by MS Silicon was based on available guidance on what levels of control (and control efficiencies) can be reasonably anticipated for certain types of emission units and pollutants. This type of information was obtained from federal guidance documents, published literature, permitting agencies, as well as information and analysis discussed in technical reports such as the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook*

(http://wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf). *The WRAP Fugitive Dust Handbook addressed:*

- *Factors affecting fugitive dust emissions*
- *The estimation of uncontrolled fugitive dust emissions*
- *Emission reductions achieved by control techniques for fugitive source categories such as the mineral products industry, materials handling operations, paved/unpaved haul roads, and material storage piles; and*
- *Incorporates available information from both the public (federal, state, and local air quality agencies) and private sectors that address options to reduce fugitive dust emissions.*

The methods for estimation of dust emissions rely primarily on EPA's AP-42 with references to alternative methods adopted by state and local control agencies. A list of fugitive dust control measures that have been implemented by jurisdictions designated by the U.S. EPA as nonattainment for federal PM_{10} standards are presented in the table below:

Source Category	*Control Measure*	*Published PM_{10} Control Efficiency*
Material Handling	*Implement wet suppression*	*50 – 90%*
	3-sided enclosure around storage piles	*75%*
	Covered storage pile with a tarp during high winds	*90%*
Paved Roads	*Sweeping*	*4 – 26%*
	Minimize trackout	*40 – 80%*
	Remove deposits from road as soon as permitted	*>90%*
Unpaved Roads	*Limit vehicle speed to 25 mph*	*44%*
	Apply water	*10 – 74%*
	Apply dust suppressant	*84%*
	Pave surface	*>90%*
Mineral Products Industry	*Cyclone*	*68 – 79%*
	Wet Scrubber	*78 – 98%*
	Fabric Filter	*99 – 99.8%*
	Electrostatic Precipitator	*90 – 99.5%*
Wind Erosion (agricultural, open area, and storage piles)	*Plant trees or shrubs as a wind break*	*25%*
	Create cross-wind ridges	*24 – 93%*
	Erect artificial wind barriers	*4 – 88%*
	Apply dust suppressant or gravel	*84%*
	Revegetate; apply cover crop	*90%*
	Watering	*90%*

To further clarify, the Dust Control Plan will identify the type and location of each fugitive dust source at the facility and describe all of the dust control measures to be implemented. This plan shall include the conditions when specific dust suppression activity will be implemented, the frequency of dust suppression activities, and the records (including, but not limited to, inspections, routine maintenance, list of routine scheduled dust suppression activity - watering, treating, cleaning, etc.) of those dust suppression activities. In the event of excessive dust emissions or spillage, immediate action/clean-up

will be required. After control measures are taken, a follow-up observation shall be performed to ensure the effectiveness of the control measures.

Records and any other supporting documents to demonstrate compliance with the Dust Control Plan must be maintained.

Once submitted, MDEQ will review and approve, conditionally approve, or disapprove the Dust Control Plan. A copy of the Plan will be retained on-site and be made available upon request by MDEQ personnel. The provisions and procedures of the Plan are subject to change should MDEQ find fugitive dust management practices do not meet requirements and/or permitted emission limits are not being met. Any revisions to the Dust Control Plan must be submitted to MDEQ for approval.

If you have any questions about this information or require additional information, please contact me at 601-961-5369.

Sincerely,

Donna J. Hodges
Senior Counsel

DJH:dac

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

JUN 2 2 2015

Ms. Becky Nester
Environmental Permits Division
Mississippi Department of Environmental Quality
Office of Pollution Control
P.O. Box 2261
Jackson, Mississippi 39225

Dear Ms. Nester:

Thank you for the opportunity to review the confirmational Modeling Report prepared by FC&E Engineering, LLC for the Mississippi Department of Environmental Quality (MDEQ). This confirmational information, which was provided to the U.S. Environmental Protection Agency on March 19, 2015, addressed the anticipated ambient air impacts from the proposed new Mississippi Silicon LLC (MS Silicon) manufacturing facility. MDEQ prepared this information after discussions with the EPA and in order to address questions which the EPA raised regarding their 2014 permit decision. Finally, MDEQ provided the EPA with a letter dated May 28, 2015, which further clarified the information submitted in March 2015.

After review of the March 2015 confirmational Modeling Report and subsequent May 2015 letter, we believe that the MDEQ modeling was performed following current regulatory guidance (*i.e.*, 40 CFR 51, Appendix W) and accepted modeling procedure and practices. The EPA believes the totality of information we have reviewed provides an adequate demonstration that the project's emissions will not cause or contribute to any modeled Sulfur Dioxide or Nitrogen Dioxide 1-hour National Ambient Air Quality Standards exceedance.

If you have any questions about these comments or require additional information, please contact me at (404) 562-9077 or Heather Ceron, Chief of the Air Permitting Section, at (404) 562-9185.

Sincerely,

Beverly H. Banister

Beverly H. Banister
Director
Air, Pesticides and Toxics Management Division

cc: Harry Wilson, MDEQ

To: Ken Merrill[kmerrill@kalispeltribe.com]
From: Bray, Dave
Sent: Wed 3/8/2017 10:23:09 PM
Subject: RE: Kalispel Class 1 Redesignation Public Notice

Hi Ken.

Actually, yes, PSD increments can be impacted by emissions from prescribed silvicultural burning. After the minor source baseline date for a pollutant is triggered, all man-made emissions increases consume increment. But there is no burn-by-burn PSD increment review because prescribed burns are not major stationary sources subject to PSD permits.

While increases in prescribed burning emissions after the minor source baseline date can consume some increment, the amount of increment consumed will be minimal, primarily because fires are temporary and the location of burning is constantly changing. The only scenario where increment consumption could be an issue would be where increased prescribed burning constantly impacts the same downwind locations. We've never seen such a situation in any State, even those where burning on National Forest lands near the current Class I areas (National Parks and National Wilderness Areas) has increased.

Dave

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Wednesday, March 08, 2017 2:10 PMi
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: RE: Kalispel Class 1 Redesignation Public Notice

Hi David,
Is there any scenario where the Class 1 area designation could impact prescribed silvicultural burning? I think not but wanted some confirmation.
Thanks --Ken

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 (cell)

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Wednesday, March 08, 2017 12:15 PM
To: Ken Merrill
Cc: Mckelvey, Laura; Khatibi, Mehrdad; Christopher J Lee; natalene.cummings@fcpotawatomi-nsn.gov
Subject: RE: Kalispel Class 1 Redesignation Public Notice

Hi Ken,

Thanks for letting us know.

And as always, feel free to contact me if any questions arise as you move through the procedural steps of the reclassification process.

Dave

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Wednesday, March 08, 2017 12:06 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Cc: Mckelvey, Laura <Mckelvey.Laura@epa.gov>; Khatibi, Mehrdad <khatibi.mehrdad@epa.gov>; Christopher J Lee

<Christopher.Lee@nau.edu>; natalene.cummings@fcpotawatomi-nsn.gov
Subject: Kalispel Class 1 Redesignation Public Notice

Now out of the bag. Thanks for the training and guidance. --Ken

Kenneth R. Merrill
Manager - Water Resources Program
Kalispel Tribe Natural Resources
PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
Ex. 6 (cell)

To: Zach Welcker[ZWelcker@kalispeltribe.com]; Ken Merrill[kmerrill@kalispeltribe.com]
From: Bray, Dave
Sent: Mon 2/26/2018 9:51:47 PM
Subject: RE: Kalispel Class I Designation

Hi Zach,

We were hoping to have our proposed approval published by now as well.

We're still waiting for the "green light" from the OAR Assistant Administrator Bill Wehrum.

Under our delegation from the Administrator, we need to consult with the OAR Assistant Administrator before we propose a revision to a federal implementation plan for any Reservation (which is how we codify the PSD reclassification per the Arizona court decision). We completed that consultation a few weeks ago but it ended with Bill telling Chris Hladick, our new Regional Administrator, to hold off proceeding with the rulemaking until he got back him.

So we're just treading water waiting to hear back from the AA. I ask every week whether we've heard anything but I don't think that our RA wants to ask Bill if he's ready to let us publish our proposal. It may take someone other than me and my manager to rattle the cage and get this moving.

Dave

David C. Bray
Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Zach Welcker [mailto:ZWelcker@kalispeltribe.com]
Sent: Monday, February 26, 2018 1:32 PM
To: Bray, Dave <Bray.Dave@epa.gov>; Ken Merrill <kmerrill@kalispeltribe.com>
Subject: RE: Kalispel Class I Designation

Hi Dave,

What's the status of our Class I request? We were under the impression that EPA's decision would be in the FR by now. Please advise.

Thanks,
Zach

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Thursday, February 08, 2018 10:18 AM
To: Ken Merrill
Cc: Zach Welcker
Subject: RE: Kalispel Class I Designation

Hi Ken,

I'm concerned and somewhat surprised as well but for a different reason. Your request doesn't go to EPA headquarters because Region 10 has been delegated authority to approve these. Region 10 is the only Region that has such a delegation (because of the FARR) and the HQ Tribal folks should know that. We've followed the procedures in that delegation and our new Regional Administrator met with the new Assistant Administrator for Air (Bill Wehrum) last week to fulfill our obligation to consult with the AA.

The Federal Register proposing approval is ready to go and we're working on getting a space in Newport for our public hearing. At this time, we're just waiting for the green light from Bill Wehrum to move forward with the proposal.

I will touch base with the HQ tribal folks to make sure they understand where we are in the process. I wonder who the "EPA representative" was.

Dave

David C. Bray
Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Thursday, February 08, 2018 9:53 AM
To: Bray, Dave <Bray.Dave@epa.gov>
Cc: Zach Welcker <ZWelcker@kalispeltribe.com>
Subject: Kalispel Class I Designation

Hi David,
According to Kevin Greenleaf at the Kootenai Tribe, during an NTAA Listening Session for EPA TAC's and Headquarters Indian Coordinators an EPA representative told the group that they have not had the formal request from the Tribe to R-10 sent to them yet.

I was somewhat concerned but not surprised when I heard that, and I was wondering if there any problems with the progress toward our redesignation approval.
Thanks --Ken

Kenneth R. Merrill
Manager - Water Resources ProgramH
Kalispel Tribe Natural Resources
PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
Ex. 6 (cell)

To: Ken Merrill[kmerrill@kalispeltribe.com]
Cc: Mckelvey, Laura[Mckelvey.Laura@epa.gov]; Khatibi, Mehrdad[khatibi.mehrdad@epa.gov]; Christopher J Lee[Christopher.Lee@nau.edu]; natalene.cummings@fcpotawatomi-nsn.gov[natalene.cummings@fcpotawatomi-nsn.gov]
From: Bray, Dave
Sent: Wed 3/8/2017 8:15:12 PM
Subject: RE: Kalispel Class 1 Redesignation Public Notice

Hi Ken,

Thanks for letting us know.

And as always, feel free to contact me if any questions arise as you move through the procedural steps of the reclassification process.

Dave

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Wednesday, March 08, 2017 12:06 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Cc: Mckelvey, Laura <Mckelvey.Laura@epa.gov>; Khatibi, Mehrdad <khatibi.mehrdad@epa.gov>; Christopher J Lee <Christopher.Lee@nau.edu>; natalene.cummings@fcpotawatomi-nsn.gov
Subject: Kalispel Class 1 Redesignation Public Notice

Now out of the bag. Thanks for the training and guidance. --Ken

Kenneth R. Merrill
Manager - Water Resources Program
Kalispel Tribe Natural Resources
PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
Ex. 6 cell)

To: Ken Merrill[kmerrill@kalispeltribe.com]
From: Bray, Dave
Sent: Tue 2/21/2017 6:03:55 AM
Subject: RE: Latest news on the smelter

Hi Ken,

Yes, Tuesday at 10 works for me and Jay.

I'm actually available pretty much all day, including the time you'll be here in town so we can meet for as long as we need to.

We can also discuss the Ponderay permit for a few minutes as well.

When you arrive, go through our security check in there on the first floor and they'll call me to come down and pick you up.

See you tomorrow.

Dave

David C. Bray
Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Monday, February 20, 2017 7:39 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: FW: Latest news on the smelter

Hi David,
I bought nonrefundable flights for Tuesday betting you would be able to fit me in. I plan on leaving early in the morning and being in Seattle from 9-3. I'm hoping you can fit me in somewhere tomorrow - for lunch if nothing else. Thanks --Ken

Ken Merrill
Kalispel Natural Resources
509-447-7276

-----Original Message-----
From: Ken Merrill [kmerrill@kalispeltribe.com]
Received: Monday, 20 Feb 2017, 10:30AM
To: Bray.Dave@epa.gov [Bray.Dave@epa.gov]
Subject: RE: Latest news on the smelter

Hi David,
I will be in town Tuesday from 9 til 3 so there is some flexibility for setting up a meeting time.
Thanks --Ken

Ken Merrill
Kalispel Natural Resources
509-447-7276

-----Original Message-----
From: Bray, Dave [Bray.Dave@epa.gov]
Received: Friday, 17 Feb 2017, 6:43PM
To: Ken Merrill [kmerrill@kalispeltribe.com]
CC: callie@ridolfi.com [callie@ridolfi.com]
Subject: RE: Latest news on the smelter

Hi Ken,

Monday is a holiday for us but I'll check email so we can set something up ASAP.

Have a great weekend.

Dave

David C. Bray
Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Friday, February 17, 2017 6:39 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Cc: callie@ridolfi.com
Subject: RE: Latest news on the smelter

Hi David- We will figure something out and would like to do it as a soon as possible. --Ken

Ken Merrill
Kalispel Natural Resources
509-447-7276

-----Original Message-----
From: Bray, Dave [Bray.Dave@epa.gov]
Received: Friday, 17 Feb 2017, 6:32PM
To: Ken Merrill [kmerrill@kalispeltribe.com]
Subject: RE: Latest news on the smelter

Hi Ken,

We've completed our review and have a few things we'd like to provide feedback on.

Would it be possible for Ridolfi to come to our office and hook you up by phone? That way we could convey our thoughts verbally and Ridolfi could capture them for your consideration.

We could do it as early as next Tuesday.

Let me know what you think.

Dave

David C. Bray
Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Monday, February 13, 2017 1:17 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: RE: Latest news on the smelter

As of now we are proceeding. --Ken

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 (cell)

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Monday, February 13, 2017 12:47 PM
To: Ken Merrill
Subject: RE: Latest news on the smelter

Thanks Ken.

Will this have any impact on the Tribe's current thinking regarding PSD reclassification?

It doesn't look like a done deal right now so I would assume that the Usk location could still be under consideration by the company.

Dave

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Friday, February 10, 2017 4:13 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: Latest news on the smelter

http://chewelahindependent.com/hitest-looking-addy-plant/

Kenneth R. Merrill
Manager - Water Resources Program
Kalispel Tribe Natural Resources
PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
Ex. 6 (cell)

To: Ken Merrill[kmerrill@knrd.org]
From: Bray, Dave
Sent: Wed 10/5/2016 9:12:22 PM
Subject: RE: Preliminary screening model for air impacts from Smelter near Kalispel Reservation

OK.

Let me know how the FOIA process goes and I'll see what Bryan can do (he can be very persuasive).

Dave

From: Ken Merrill [mailto:kmerrill@knrd.org]
Sent: Wednesday, October 05, 2016 2:06 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: RE: Preliminary screening model for air impacts from Smelter near Kalispel Reservation

That's funny because there were some lawsuits filed over the permitting process by other industries. I asked MS DEQ for some public documents, and they are making fill out a FOIA. Hopefully, Bryan has better luck. --Ken

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 cell)

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Wednesday, October 05, 2016 1:55 PM
To: Ken Merrill
Subject: RE: Preliminary screening model for air impacts from Smelter near Kalispel Reservation

Thanks Ken.

I noticed that the MS application is incomplete – it's missing the modeling analyses and it doesn't include any of the modeling results tables in the application itself.

I'll see if Bryan can track those down for us and I'll have him forward them to you if he can find them.

Dave

David C. Bray
Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Ken Merrill [mailto:kmerrill@knrd.org]
Sent: Tuesday, October 04, 2016 4:17 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: RE: Preliminary screening model for air impacts from Smelter near Kalispel Reservation

Hi Dave,
Yes for sure more info is needed. Here are some documents on the Mississippi Silicon plant which Bryan Holtrop of your staff found earlier and a draft impact statement for a new facility in Iceland. I will send you the Spokane Tribe's Class 1

Airshed Redesignation submittal document with the next email for your records.
Thanks --Ken

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 (cell)

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Thursday, September 29, 2016 2:23 PM
To: Ken Merrill; Wilson, Wenona
Subject: RE: Preliminary screening model for air impacts from Smelter near Kalispel Reservation

Thanks Ken.

Interesting stuff.

If we do end up doing some screening modeling, our modeler will need to get some more detailed information from the company (or Ecology if they've got something from the company yet).

Look forward to talking more soon.

Dave

David C. Bray
Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Ken Merrill [mailto:kmerrill@knrd.org]
Sent: Wednesday, September 28, 2016 2:44 PM
To: Wilson, Wenona <Wilson.Wenona@epa.gov>
Cc: Bray, Dave <Bray.Dave@epa.gov>
Subject: RE: Preliminary screening model for air impacts from Smelter near Kalispel Reservation

FYI- Attached is some info on the smelter project sent to us by the project proponent. PM numbers are omitted for some reason --Ken

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 (cell)

From: Ken Merrill
Sent: Tuesday, September 27, 2016 4:46 PM

To: Wilson, Wenona
Cc: 'Bray, Dave'; Zach Welcker; Deane Osterman
Subject: Preliminary screening model for air impacts from Smelter near Kalispel Reservation

Hi Wenona,

Thank you for your time today, and as we discussed, the Tribe needs to understand how the proposed smelter might impact the home of the Kalispel people and understand how a redesignation of the Tribes airshed to Class 1 might affect the PSD permitting outcome and the Tribe's air quality. If there were a way that EPA could help to do some screening modeling, we think it would help the Kalispel develop the capacity to best protect our right to clean air on the reservation.

Thanks for the consideration --Ken

Kenneth R. Merrill
Manager - Water Resources Program
Kalispel Tribe Natural Resources
PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
(Ex. 6 (cell)

To: Ken Merrill[kmerrill@kalispeltribe.com]
Cc: callie@ridolfi.com[callie@ridolfi.com]
From: Bray, Dave
Sent: Sat 2/18/2017 2:43:36 AM
Subject: RE: Latest news on the smelter

Hi Ken,

Monday is a holiday for us but I'll check email so we can set something up ASAP.

Have a great weekend.

Dave

David C. Bray
Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Friday, February 17, 2017 6:39 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Cc: callie@ridolfi.com
Subject: RE: Latest news on the smelter

Hi David- We will figure something out and would like to do it as a soon as possible. --Ken

Ken Merrill
Kalispel Natural Resources
509-447-7276

-----Original Message-----
From: Bray, Dave [Bray.Dave@epa.gov]
Received: Friday, 17 Feb 2017, 6:32PM
To: Ken Merrill [kmerrill@kalispeltribe.com]
Subject: RE: Latest news on the smelter

Hi Ken,

We've completed our review and have a few things we'd like to provide feedback on.

Would it be possible for Ridolfi to come to our office and hook you up by phone? That way we could convey our thoughts verbally and Ridolfi could capture them for your consideration.

We could do it as early as next Tuesday.

Let me know what you think.

Dave

David C. Bray
Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Monday, February 13, 2017 1:17 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: RE: Latest news on the smelter

As of now we are proceeding. --Ken

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 (cell)

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Monday, February 13, 2017 12:47 PM
To: Ken Merrill
Subject: RE: Latest news on the smelter

Thanks Ken.

Will this have any impact on the Tribe's current thinking regarding PSD reclassification?

It doesn't look like a done deal right now so I would assume that the Usk location could still be under consideration by the company.

Dave

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Friday, February 10, 2017 4:13 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: Latest news on the smelter

http://chewelahindependent.com/hitest-looking-addy-plant/

Kenneth R. Merrill
Manager - Water Resources Program
Kalispel Tribe Natural Resources
PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
Ex. 6 (cell)

To: Ken Merrill[kmerrill@kalispeltribe.com]
From: Bray, Dave
Sent: Sat 2/18/2017 2:32:02 AM
Subject: RE: Latest news on the smelter

Hi Ken,

We've completed our review and have a few things we'd like to provide feedback on.

Would it be possible for Ridolfi to come to our office and hook you up by phone? That way we could convey our thoughts verbally and Ridolfi could capture them for your consideration.

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Thanks Ken.

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Dave

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Sent: Friday, February 10, 2017 4:13 PM

To: Bray, Dave <Bray.Dave@epa.gov>
Subject: Latest news on the smelter

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PO Box 39, Usk, WA, 99180
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Ex. 6 (cell)

To: Ken Merrill[kmerrill@kalispeltribe.com]
Cc: Zokan, Jim[Zokan.Jim@epa.gov]; Deane Osterman[dosterman@kalispeltribe.com]; Zach Welcker[ZWelcker@kalispeltribe.com]; callie@ridolfi.com[callie@ridolfi.com]
From: Bray, Dave
Sent: Fri 12/9/2016 7:57:54 PM
Subject: RE: Kalispel-EPA Airshed meeting

Thanks Ken,

Here's our standard message to folks coming into our office for meetings:

LOGISTICS

Please provide the information requested below to David Bray (bray.dave@epa.gov), 206-553-4253, by COB Tuesday, December 13th.

- For Security, please provide the names of those attending from your Agency. Check-in is on the first floor behind guards' desk. Sign-in for guest pass. Someone from EPA will escort guests to the conference room.

What this doesn't say is that the building's first floor entrance is on the corner of University Street and 6th Avenue.

Dave

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Friday, December 09, 2016 8:47 AM
To: Bray, Dave <Bray.Dave@epa.gov>
Cc: Zokan, Jim <Zokan.Jim@epa.gov>; Deane Osterman <dosterman@kalispeltribe.com>; Zach Welcker <ZWelcker@kalispeltribe.com>; callie@ridolfi.com
Subject: RE: Kalispel-EPA Airshed meeting

Hi Dave,
Here is a draft agenda. See you on the 15th. --Ken

10:30 - Introductions
10:40 - Discussion of airshed redesignation approval process at Region 10
11:00 - Description of proposed approach for technical report with discussion

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 (cell)
Kalispel natural resources

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Thursday, December 08, 2016 5:13 PM
To: Ken Merrill
Cc: Zokan, Jim
Subject: RE: Kalispel-EPA Airshed meeting

Hi Ken,

Thanks for the update.

I'll send you the information on how to go through our security (I'll be giving them your names so the security folks will be expecting you).

This is your meeting so if you can provide an agenda (draft is OK) so that I can let folks know what will be discussed that would be greatly appreciated. Also if you have anything specific that you'd like us to be ready to discuss just let me know.

Dave

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- Presentation – We will bring a laptop with projector to facilitate discussion.
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- Conf line – Jim said he could arrange for a conference call line so Zach and Deane can call in for the first part of the meeting.

Thanks --Ken

Kenneth R. Merrill
Manager - Water Resources Program
Kalispel Tribe Natural Resources
PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
Ex. 6 (cell)

To: Ken Merrill[kmerrill@kalispeltribe.com]
From: Bray, Dave
Sent: Fri 12/9/2016 7:49:24 PM
Subject: RE: Kalispel-EPA Airshed meeting

And I should have also said that, based on our current understanding of the proposed silicon smelter emissions, a complete PSD application would set the minor source baseline dates for PM2.5 and NO2.

Dave

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Friday, December 09, 2016 11:42 AM
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: RE: Kalispel-EPA Airshed meeting

Thank you

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 (cell)

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Friday, December 09, 2016 11:36 AM
To: Ken Merrill
Subject: RE: Kalispel-EPA Airshed meeting

Hi Ken,

PSD baseline dates are established pollutant=by-pollutant for each pollutant that has increments. The baseline dates have been established for some pollutants in the Kalispel airshed but not for all.

The Department of Ecology has a webpage that shows all of the baseline dates for the Air Quality Control Regions in Washington. Here's the link to that webpage:

http://www.ecy.wa.gov/programs/air/psd/psd_dates.htm

Let me know if you have any questions.

Dave

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Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Friday, December 09, 2016 11:30 AM
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: RE: Kalispel-EPA Airshed meeting

Dave- There is some uncertainty about whether there have been any increments already used by a PSD affecting the Kalispel airshed. We are assuming that the baseline has not been established yet. Is there a possibility of your technical staff confirming that before our meeting?
Thanks --Ken

Ken Merrill
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To: Ken Merrill[kmerrill@kalispeltribe.com]
From: Bray, Dave
Sent: Fri 12/9/2016 7:35:40 PM
Subject: RE: Kalispel-EPA Airshed meeting

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PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
Ex. 6 (cell)

To: Ken Merrill[kmerrill@kalispeltribe.com]
From: Bray, Dave
Sent: Mon 2/13/2017 9:19:31 PM
Subject: RE: Latest news on the smelter

Thanks.

Looking forward to seeing the draft.

Dave

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Monday, February 13, 2017 1:17 PM
To: Bray, Dave <Bray.Dave@epa.gov>
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Subject: Latest news on the smelter

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Kalispel Tribe Natural Resources
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(509) 447-7276 (office)
Ex. 6 (cell)

Kalispel
natural resources

To: Ken Merrill[kmerrill@kalispeltribe.com]
From: Bray, Dave
Sent: Mon 2/13/2017 8:47:06 PM
Subject: RE: Latest news on the smelter

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To: Bray, Dave <Bray.Dave@epa.gov>
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Kenneth R. Merrill
Manager - Water Resources Program
Kalispel Tribe Natural Resources
PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
Ex. 6 (cell)

To: Zokan, Jim[Zokan.Jim@epa.gov]; Ken Merrill[kmerrill@kalispeltribe.com]
From: Bray, Dave
Sent: Fri 12/9/2016 4:00:27 PM
Subject: RE: Kalispel-EPA Airshed meeting

10:30 to noon Seattle time.

Dave

David C. Bray
Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Zokan, Jim
Sent: Friday, December 09, 2016 7:45 AM
To: Bray, Dave <Bray.Dave@epa.gov>; Ken Merrill <kmerrill@kalispeltribe.com>
Subject: RE: Kalispel-EPA Airshed meeting

What time is the meeting?

James F. Zokan
Environmental Specialist
US Environmental Protection Agency
950 W. Bannock St.
Suite 900
Boise, ID 83702
208-378-5691 Phone
208-378-5744 Fax
zokan.jim@epa.gov

From: Bray, Dave
Sent: Thursday, December 08, 2016 6:13 PM
To: Ken Merrill <kmerrill@kalispeltribe.com>
Cc: Zokan, Jim <Zokan.Jim@epa.gov>
Subject: RE: Kalispel-EPA Airshed meeting

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Ex. 6 cell)

To: Ken Merrill[kmerrill@kalispeltribe.com]
Cc: Zokan, Jim[Zokan.Jim@epa.gov]
From: Bray, Dave
Sent: Fri 12/9/2016 1:13:19 AM
Subject: RE: Kalispel-EPA Airshed meeting

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PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
Ex. 6 (cell)

To: Ken Merrill[kmerrill@kalispeltribe.com]
From: Bray, Dave
Sent: Tue 11/22/2016 5:38:37 PM
Subject: RE: Kalispel meeting on December 15

Even if you send it that morning before you leave, I can make sure it is ready to show when you get here.

Dave

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Tuesday, November 22, 2016 8:11 AM
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: RE: Kalispel meeting on December 15

OK. I will send you the presentation when it's ready, but it will be within days of our meeting date.
Thanks --Ken

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 (cell)

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Monday, November 21, 2016 4:45 PM
To: Ken Merrill
Subject: RE: Kalispel meeting on December 15

Thanks Ken.

The room I've reserved will be able to display the presentation. But you won't be able to connect your computer to our network so email me the presentation the day before and I'll make sure that it is loaded onto an EPA computer and is ready to show.

Looking forward to our continued discussion.

Dave

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Monday, November 21, 2016 4:02 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: RE: Kalispel meeting on December 15

Hi Dave,
It will be me, Zach – our senior policy advisor, Deane – Executive Director of Natural Resources, and Callie Ridolfi (consultant). Callie will give a brief power point presentation of the report content. If possible, a room with the capability to show the presentation would be good.
Thanks again --Ken

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Water Resources Program
(509) 447-7276 (office)
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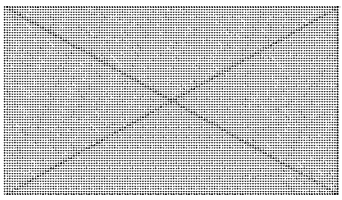

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Monday, November 21, 2016 1:46 PM
To: Ken Merrill
Subject: RE: Kalispel meeting on December 15

No problem.

Who all will be coming from the Tribe?

Just trying to figure out who all from EPA I want to invite. For example, if your attorney is coming, I would want to invite the Region 10 attorney who would end up working on any PSD reclassification.

Dave

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
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To: Bray, Dave <Bray.Dave@epa.gov>
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Thanks Dave

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Water Resources Program
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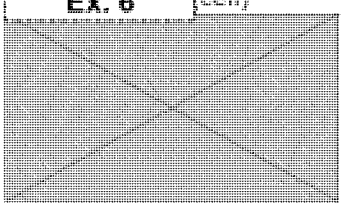

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Monday, November 21, 2016 12:17 PM
To: Ken Merrill
Cc: Wilson, Wenona; Zach Welcker; Dossett, Donald; McAlpine, Jay
Subject: RE: Kalispel meeting on December 15

Hi Ken,

I've confirmed that folks will be available at 10:30 on December 15 to meet. I'll get back to you with more details on where we'll be meeting and procedures for getting through our security as the date gets closer.

Dave

David C. Bray
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From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]

Sent: Friday, November 18, 2016 9:49 AM
To: Bray, Dave <Bray.Dave@epa.gov>
Cc: Wilson, Wenona <Wilson.Wenona@epa.gov>; Zach Welcker <ZWelcker@kalispeltribe.com>
Subject: Kalispel meeting on December 15

Hi Dave,
I was checking to see if the proposed December 15th meeting date will still work. I can't remember the exact time we talked about, but around 10:30 would be best for us with the long commute. Please let me know if we can harden up the calendar and schedule it with our consultant.
Thanks --Ken

Kenneth R. Merrill
Manager - Water Resources Program
Kalispel Tribe Natural Resources
PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
Ex. 6 (cell)

To: Ken Merrill[kmerrill@kalispeltribe.com]
From: Bray, Dave
Sent: Tue 11/22/2016 12:44:46 AM
Subject: RE: Kalispel meeting on December 15

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Sent: Friday, November 18, 2016 9:49 AM
To: Bray, Dave <Bray.Dave@epa.gov>
Cc: Wilson, Wenona <Wilson.Wenona@epa.gov>; Zach Welcker <ZWelcker@kalispeltribe.com>
Subject: Kalispel meeting on December 15

Hi Dave,
I was checking to see if the proposed December 15th meeting date will still work. I can't remember the exact time we talked about, but around 10:30 would be best for us with the long commute. Please let me know if we can harden up the calendar and schedule it with our consultant.
Thanks --Ken

Kenneth R. Merrill
Manager - Water Resources Program
Kalispel Tribe Natural Resources
PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
Ex. 6 (cell)

To: Ken Merrill[kmerrill@kalispeltribe.com]
From: Bray, Dave
Sent: Mon 11/21/2016 9:45:53 PM
Subject: RE: Kalispel meeting on December 15

No problem.

Who all will be coming from the Tribe?

Just trying to figure out who all from EPA I want to invite. For example, if your attorney is coming, I would want to invite the Region 10 attorney who would end up working on any PSD reclassification.

Dave

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Monday, November 21, 2016 1:37 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: RE: Kalispel meeting on December 15

Thanks Dave

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 (cell)

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Monday, November 21, 2016 12:17 PM
To: Ken Merrill
Cc: Wilson, Wenona; Zach Welcker; Dossett, Donald; McAlpine, Jay
Subject: RE: Kalispel meeting on December 15

Hi Ken,

I've confirmed that folks will be available at 10:30 on December 15 to meet. I'll get back to you with more details on where we'll be meeting and procedures for getting through our security as the date gets closer.

Dave

David C. Bray
Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Friday, November 18, 2016 9:49 AM
To: Bray, Dave <Bray.Dave@epa.gov>
Cc: Wilson, Wenona <Wilson.Wenona@epa.gov>; Zach Welcker <ZWelcker@kalispeltribe.com>
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PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
Ex. 6 (cell)

To: Ken Merrill[kmerrill@knrd.org]
From: Bray, Dave
Sent: Wed 10/5/2016 8:55:30 PM
Subject: RE: Preliminary screening model for air impacts from Smelter near Kalispel Reservation

Thanks Ken.

I noticed that the MS application is incomplete – it's missing the modeling analyses and it doesn't include any of the modeling results tables in the application itself.

I'll see if Bryan can track those down for us and I'll have him forward them to you if he can find them.

Dave

David C. Bray
Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Ken Merrill [mailto:kmerrill@knrd.org]
Sent: Tuesday, October 04, 2016 4:17 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: RE: Preliminary screening model for air impacts from Smelter near Kalispel Reservation

Hi Dave,
Yes for sure more info is needed. Here are some documents on the Mississippi Silicon plant which Bryan Holtrop of your staff found earlier and a draft impact statement for a new facility in Iceland. I will send you the Spokane Tribe's Class 1 Airshed Redesignation submittal document with the next email for your records.
Thanks --Ken

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 (cell)
Kalispel natural resources

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Thursday, September 29, 2016 2:23 PM
To: Ken Merrill; Wilson, Wenona
Subject: RE: Preliminary screening model for air impacts from Smelter near Kalispel Reservation

Thanks Ken.

Interesting stuff.

If we do end up doing some screening modeling, our modeler will need to get some more detailed information from the company (or Ecology if they've got something from the company yet).

Look forward to talking more soon.

Dave

David C. Bray
Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Ken Merrill [mailto:kmerrill@knrd.org]
Sent: Wednesday, September 28, 2016 2:44 PM
To: Wilson, Wenona <Wilson.Wenona@epa.gov>
Cc: Bray, Dave <Bray.Dave@epa.gov>
Subject: RE: Preliminary screening model for air impacts from Smelter near Kalispel Reservation

FYI- Attached is some info on the smelter project sent to us by the project proponent. PM numbers are omitted for some reason --Ken

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 (cell)

From: Ken Merrill
Sent: Tuesday, September 27, 2016 4:46 PM
To: Wilson, Wenona
Cc: 'Bray, Dave'; Zach Welcker; Deane Osterman
Subject: Preliminary screening model for air impacts from Smelter near Kalispel Reservation

Hi Wenona,

Thank you for your time today, and as we discussed, the Tribe needs to understand how the proposed smelter might impact the home of the Kalispel people and understand how a redesignation of the Tribes airshed to Class 1 might affect the PSD permitting outcome and the Tribe's air quality. If there were a way that EPA could help to do some screening modeling, we think it would help the Kalispel develop the capacity to best protect our right to clean air on the reservation.

Thanks for the consideration --Ken

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PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
Ex. 6 (cell)

To: Ken Merrill[kmerrill@knrd.org]; Wilson, Wenona[Wilson.Wenona@epa.gov]
From: Bray, Dave
Sent: Tue 10/4/2016 11:31:19 PM
Subject: RE: Spokane Class 1 airshed redesignation submission document - Preliminary screening model for air impacts from Smelter near Kalispel Reservation

Thanks Ken.

And pass our thanks onto the Spokanes the next time that you talk with them. It will be great to have a copy of this back in our records.

Dave

David C. Bray
Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Ken Merrill [mailto:kmerrill@knrd.org]
Sent: Tuesday, October 04, 2016 4:22 PM
To: Bray, Dave <Bray.Dave@epa.gov>; Wilson, Wenona <Wilson.Wenona@epa.gov>
Subject: RE: Spokane Class 1 airshed redesignation submission document - Preliminary screening model for air impacts from Smelter near Kalispel Reservation

Dave and Wenona,
Here is the Spokane's Class 1 redesignation submission documents they so kindly sent us. I told them I would forward it on to you with their permission. --Ken

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 (cell)

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Thursday, September 29, 2016 2:23 PM
To: Ken Merrill; Wilson, Wenona
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Thanks Ken.

Interesting stuff.

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Look forward to talking more soon.

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Thanks for the consideration --Ken

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(509) 447-7276 (office)
Ex. 6 (cell)

To: Ken Merrill[kmerrill@knrd.org]; Wilson, Wenona[Wilson.Wenona@epa.gov]
From: Bray, Dave
Sent: Thur 9/29/2016 9:22:51 PM
Subject: RE: Preliminary screening model for air impacts from Smelter near Kalispel Reservation

Thanks Ken.

Interesting stuff.

If we do end up doing some screening modeling, our modeler will need to get some more detailed information from the company (or Ecology if they've got something from the company yet).

Look forward to talking more soon.

Dave

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To: Ken Merrill[kmerrill@knrd.org]
Cc: Deane Osterman[dosterman@kalispeltribe.com]; Zach Welcker[ZWelcker@kalispeltribe.com]
From: Bray, Dave
Sent: Tue 9/27/2016 3:34:24 PM
Subject: RE: Kalispel questions on airshed redesignation

That works for me.

Talk soon.

Dave

David C. Bray
Associate Director for Air
Office of Air and Waste
EPA Region 10
Seattle, WA
(206) 553-4253

From: Ken Merrill [mailto:kmerrill@knrd.org]
Sent: Tuesday, September 27, 2016 8:02 AM
To: Bray, Dave <Bray.Dave@epa.gov>
Cc: Deane Osterman <dosterman@kalispeltribe.com>; Zach Welcker <ZWelcker@kalispeltribe.com>
Subject: RE: Kalispel questions on airshed redesignation

Hi Dave,
How about 9:30? We will call you at your office.
Thanks --Ken

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 (cell)

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Monday, September 26, 2016 3:33 PM
To: Ken Merrill
Subject: RE: Kalispel questions on airshed redesignation

Hi Ken,

Thursday this week looks pretty good right now. I'm available anytime except from 11:00 am to noon.

If that doesn't work, we can look to see what works for us next week.

Dave

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Thanks --Ken

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PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
Ex. 6 (cell)

To: Ken Merrill[kmerrill@knrd.org]
From: Bray, Dave
Sent: Mon 9/26/2016 11:36:06 PM
Subject: RE: Kalispel questions on airshed redesignation

Sounds good. Just let me know.

Probably best for you all to just call my number – (206) 553-4253.

Dave

From: Ken Merrill [mailto:kmerrill@knrd.org]
Sent: Monday, September 26, 2016 4:34 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: RE: Kalispel questions on airshed redesignation

OK. I'm trying to find out from my guys also. --Ken

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 (cell)

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Monday, September 26, 2016 4:32 PM
To: Ken Merrill
Subject: RE: Kalispel questions on airshed redesignation

I could do a call between 9 and noon tomorrow.

Dave

From: Ken Merrill [mailto:kmerrill@knrd.org]
Sent: Monday, September 26, 2016 4:30 PM
To: Bray, Dave <Bray.Dave@epa.gov>
Subject: RE: Kalispel questions on airshed redesignation

My bad. Let me get back to you, but sometime tomorrow would be best for us --Ken

Ken Merrill
Water Resources Program
(509) 447-7276 (office)
Ex. 6 (cell)

From: Bray, Dave [mailto:Bray.Dave@epa.gov]
Sent: Monday, September 26, 2016 4:25 PM
To: Ken Merrill
Subject: RE: Kalispel questions on airshed redesignation

Hi Ken,

Sorry for the confusion – 11 am is the one time that I'm NOT available on Thursday.

Does another time work for you all?

Dave

From: Ken Merrill [mailto:kmerrill@knrd.org]
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Sent: Mon 9/26/2016 11:32:23 PM
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Ex. 6 (cell)

To: Ken Merrill[kmerrill@knrd.org]
From: Bray, Dave
Sent: Mon 9/26/2016 11:25:20 PM
Subject: RE: Kalispel questions on airshed redesignation

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Ex. 6 (cell)

To: Ken Merrill[kmerrill@knrd.org]
From: Bray, Dave
Sent: Mon 9/26/2016 10:33:11 PM
Subject: RE: Kalispel questions on airshed redesignation

Hi Ken,

Thursday this week looks pretty good right now. I'm available anytime except from 11:00 am to noon.

If that doesn't work, we can look to see what works for us next week.

Dave

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Kenneth R. Merrill
Manager - Water Resources Program
Kalispel Tribe Natural Resources
PO Box 39, Usk, WA, 99180
(509) 447-7276 (office)
Ex. 6 (cell)

To: kmerrill@kalispeltribe.com[kmerrill@kalispeltribe.com]
Cc: Ex. 6
From: Bosneag, Andra
Sent: Mon 3/19/2018 3:14:19 PM
Subject: FW: Kalispel Tribal CAA Sec 103 funding proposal
Kalispel CAA Sec 103 FY19 Proposal Narrative w- detailed budget.pdf

Ken,

I was glad to see your email. I've received your CAA 103 funding proposal and will discuss it with the tribal air team. I will probably also call you with a few questions this week. Once we receive all the current program applications—due April 2nd—we will evaluate the budget and get in touch with you regarding the request.

Thanks,
Andra

Andra M. Boşneag
Environmental Protection Specialist
Office of Air and Waste
U.S. Environmental Protection Agency, Region 10
(206) 553-1226

From: Ken Merrill [mailto:kmerrill@kalispeltribe.com]
Sent: Friday, March 16, 2018 10:02 PM
To: Bosneag, Andra <bosneag.andra@epa.gov>
Cc: Ex. 6
Subject: Kalispel Tribal CAA Sec 103 funding proposal

Hi Andra,
Please accept the attached CAA 103 funding proposal and contact me if you have any questions or concerns.
Thanks --Ken

Clean Air Act Tribal Program §103 FY19 Proposal
Kalispel Indian Community of the Kalispel Reservation
Kalispel Natural Resources Department

Kalispel Tribe of Indians
1981 N. LeClerc Rd.
Cusick, WA 99119-9682

Contact Person:
Ken Merrill, Kalispel Natural Resources
(509) 447-7276
kmerrill@kalispeltribe.com

DUNS NUMBER: 071836951

I. INTRODUCTION

The Kalispel Tribe of Indians is federally recognized, and the Kalispel Indian Reservation was established by executive order in 1914 (Figure 1). The reservation occupies both sides of the Pend Oreille River in northeast Washington State. The Kalispel Tribe has occupied this region since time immemorial and has always heavily depended on the Pend Oreille River and its resources for food, transportation, commerce, and socializing. The original reservation is about 4,600 acres with an additional 2,200 acres of land held in trust being acquired over the last 15 years mostly as mitigation for natural resource impacts from hydropower projects.

The Kalispel Tribal Business Committee has directed the Kalispel Natural Resources Department (KNRD) to expand resource management and planning efforts across Kalispel aboriginal territory. The territory is those aboriginal lands adjudicated by the federal government to have been transferred from tribal to non-tribal ownership. Kalispel adjudicated lands are along the Clark Fork / Pend Oreille River extending from western Montana through northern Idaho and northeastern Washington to British Columbia (Figure 2). The KNRD is now actively involved in diversified natural resource management and planning processes throughout the region. Identification and development of administrative solutions for environmental risks over the Kalispel aboriginal lands require the ability to deal with watershed and environmental issues.

Environmental issues on and near the Kalispel Indian Reservation receive the highest priority, but environmental and human health risks throughout Kalispel adjudicated aboriginal lands are within the purview of the department especially those that may affect lasting change on tribal natural resources. The recent eminent threat presented by a large proposed silicon smelter adjacent and upwind of the reservation along with the recent severe problems from wildland fire smoke has made it evident that protecting air quality needs to have much higher priority for the Kalispel Tribe.

ED_002139_00010348-00001

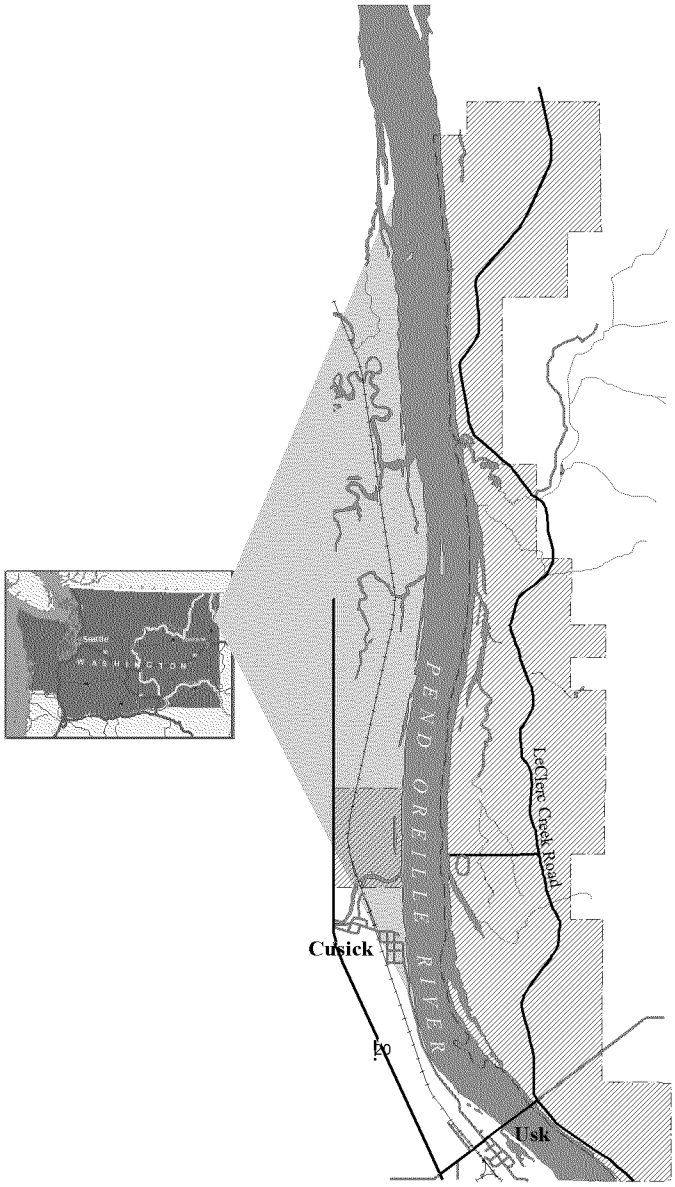

Figure 1. Kalispel Indian Reservation

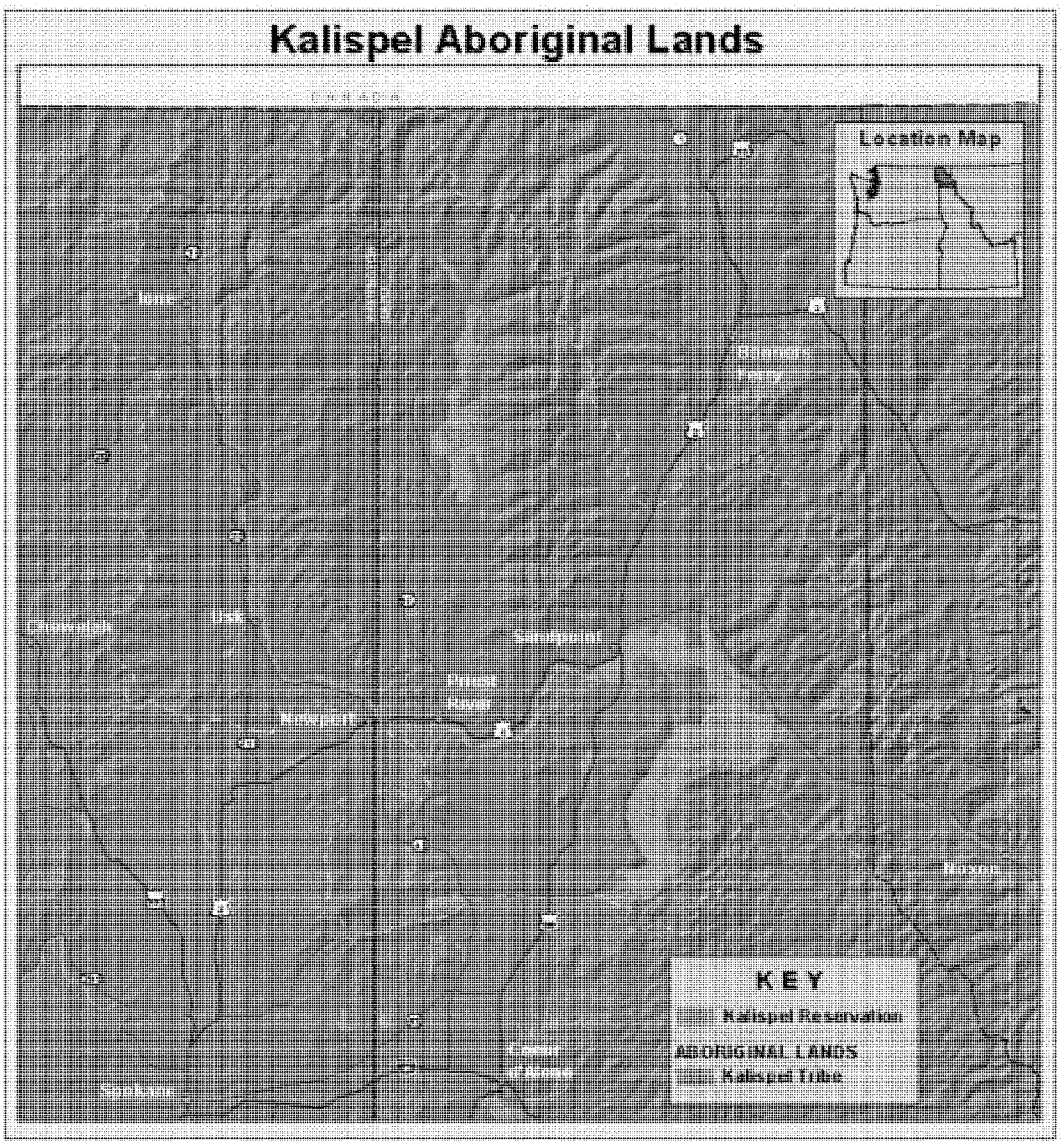

Figure 2. Kalispel Adjudicated Aboriginal Lands

II. ADMINISTRATIVE CAPACITY

The Kalispel Tribe has received funds from various EPA programs as a Performance Partnership Agree (PPG) for more than ten years including funds from GAP, 106, and 319 exceeding more than $4 million. Until recently, those funds primarily supported much of the Water Resources Program within KNRD.

The new threat to air quality from the proposed smelter required that existing GAP funds be reprogrammed away from water quality protection to find alternatives for protecting reservation air quality. The funds were used to quickly develop staff capacity in Clean Air Act (CAA) competency and completing the process of a formal submission to EPA for redesignating the Kalispel Reservation as Class I under the PSD Program of the Clean Air Act. The CAA process for Class 1 Redesignation required large amounts of staff resources which fell primarily on the shoulders of the existing Manager of the Water Resources Program and the Senior Policy Advisor of KNRD.

The KNRD is familiar with the TAS process since it has already completed the TAS process for the Tribe under the Clean Water Act. The Water Resources Manager has become familiar with the CAA by completed two different week-long courses including; *"Clean Air Act & Permitting"* and *"Reviewing New Source Review (NSR) and Title V Permits"* provided by the Institute for Tribal Environmental Professional (ITEP) and by completing the process for Class I Redesignation of the Kalispel Reservation under the Prevention of Significant Deterioration (PSD) Program of the CAA.

The KNRD has also submitted a small GAP work plan component for continuing to increase tribal capacity for CAA requirements for obtaining EPA's TAS approval. All KNRD programs are well supported by the Kalispel Finance Department with an excellent proficiency for financial management of EPA grant funds as documented by annual audits with no corrective action required under EPA funding agreements.

III. ENVIRONMENTAL ISSUES

The Tribe has recently recognized the vulnerability of the reservation's air quality from emissions external to boundaries of the reservation by the large proposed silicon smelter just up-wind and nearly adjacent to the reservation boundaries. The proposed smelter would be one of WA's larger emitters of SO_2 , NO_x , and greenhouse gases. It became evident to the Tribal Council that there was a need for the Tribe to be able to influence decisions on air quality protection and initiated the PSD Class 1 redesignation technical study almost immediately.

WORK PLAN

The required CAA process for Class I redesignation was completed and submitted to EPA Region 10 on May 11, 2017, and approval of the Class I redesignation is currently pending at EPA. The Tribe wants to begin the process for obtaining TAS under the CAA to retain a larger role in the governance of the CAA on the reservation with the potential for other CAA program implementation in the future by completing;

1) The required public review process for obtaining CAA TAS and,
2) All documentation for the TAS application as required by EPA to approve CAA TAS for the Kalispel Tribe.

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IV. EPA ROLES AND RESPONSIBILITIES

If the assistance agreement is funded as a grant, the EPA will have no substantial involvement in the accomplishment of work plan commitments. EPA will monitor progress and provide technical assistance as needed to ensure project completion.

V. COMPONENTS

This proposal contains one primary work plan objective which is identified in the attached program plan.

VI. JOINT PERFORMANCE EVALUATION PROCESS

Within 30 days of the end of each semiannual period, Environmental Program staff will submit a performance report detailing the accomplishments toward the completion of work plan commitments, discussing the work performed for all work plan components, and identifying any existing problem areas that could affect or delay project completion. This evaluation process will help to ensure that the grant is being administered properly and that work conducted under the grant is in accordance with approved work plan.

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Table 1: CAA §103 Tribal Program

Standardized Work Plan Format

Tribe: Kalispel Tribe of Indians

Region: Region 10

Work Plan Period Begin: October 1, 2018 End: September 30, 2019

Work Plan Component _1_: Complete the public process and required EPA procedural requirements for approved to be treated in the same manner as states (TAS) under the CAA

Personnel: WATER RESOURCES PROGRAM MANAGER – 0.10 FTE

Long-Term Outcome (s) (Changes in the Environment, Public Health, Behavior or Knowledge):

- **Tribal governance of reservation air quality as provided under the CAA provisions for treatment same as States**

Intermediate Outcome (s) (this work plan period):

- **Well informed public on aspects of TAS approval under the CAA**
- **Submission of application to EPA for TAS under the CAA**

Estimated Cost: $10,667 **Estimated Work Years:** FY19

	COMMITMENTS	Estimated Task Cost (optional)	END DATE	OUTPUTS AND DELIVERABLES
1.1	Complete required public review process for proposed TAS under CAA		9-30-19	Responsiveness summary to public comments received
1.2	Complete required documentation and submit TAS application to EPA for approval under CAA		9-30-19	Approval of Kalispel TAS under the CAA

EPA Use Only

FY 2018-2022 EPA Strategic Plan

Goal 2 – Cooperative Federalism: Rebalance the power between Washington and the states to create tangible environmental results for the American people

Objective 2.1 - Enhance Shared Accountability: Improve environmental protection through shared governance and enhanced collaboration with state, tribal, local, and federal partners using the full range of compliance assurance tools.

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CAA Sec. 103 Detailed Budget FY19 - Kalispel Tribe of Indians

Category	Position/title	Hourly Rate	Annual Salary		% Time	Amount
PERSONNEL	Program Mgr		$70,335		10%	$7,034
						TOTAL PERS. $7,034
FRINGE	Fringe benefits consist of FICA, FUTA, Health/Disability/Life Ins., L&I, vacation					
	Prog Mgr	33.76%				$2,375
						TOTAL FRINGE $2,375
TRAVEL						TOTAL TRAVEL $0
SUPPLIES						TOTAL SUPPLIES $0
CONTRACT						TOTAL CONTRACT $0
OTHER						TOTAL OTHER $0
						TOTAL DIRECT COSTS $9,408
INDIRECT COSTS		Indirects are 13.38% of total direct costs				
	Indirect Rate	13.38%				TOTAL INDIRECT COSTS $1,259
						TOTAL BUDGET $10,667

Organizer: Khatibi, Mehrdad[khatibi.mehrdad@epa.gov]

From: Khatibi, Mehrdad

Location: Ex. 6 code: Ex. 6

Importance: Normal

Subject: Tribal - EPA Air Quality Call for March

Start Time: Mon 3/20/2017 4:00:00 PM

End Time: Mon 3/20/2017 5:30:00 PM

Required Attendees: 'acraig@ctclusi.org'; 'andreab@nezperce.org'; 'andrew.beers@burnspaiute-nsn.gov'; 'argeorge@cdatribe-nsn.gov'; 'bill.sullivan@puyalluptribe.com'; 'bjk@spokanetribe.com'; 'CalebMinthorn@ctuir.org'; 'ckelly@quinault.org'; 'cmay@suquamish.nsn.us'; 'dana.sarff@makah.com'; 'deepak.sehgal@ctwsbnr.org'; 'dfuller@pgst.nsn.us'; kris.ray@colvilletribes.com; 'doug.sternback@makah.com'; dwilliams@suquamish.nsn.us; 'eddy.chu@muckleshoot.nsn.us'; 'eliharris@ctuir.org'; esanchey@yakama.com; 'frank.geyer@quileutenation.org'; gburns@shoalwaterbay-nsn.gov; 'gconnelly@chehalistribe.org'; 'gmacwilliams@nooksack-nsn.gov'; 'gmittelstaedt@thhnw.org'; 'grant.timentwa@muckleshoot.nsn.us'; greenleaf@kootenai.org; 'greggd@lummi-nsn.gov'; Heather Bartlett; 'heather@snoqualmietribe.us'; 'hhals@jamestowntribe.org'; 'jason.fenton@burnspaiute-nsn.gov'; 'jasongobin@tulaliptribes-nsn.gov'; 'jdickison@squaxin.us'; 'jjoseph@sauk-suiattle.com'; 'jmaroney@knrd.org'; 'johnab@nezperce.org'; 'jpavel@skokomish.org'; julies@nezperce.org; 'jwolf@skokomish.org'; 'Kathy Moses'; kmerrill@knrd.org; laurenR@upperskagit.com; 'lhiggins@cdatribe-nsn.gov'; 'lhowell@shoshonebannocktribes.com'; likebe@swinomish.nsn.us; 'lucas.bair@spokanetribe.com'; 'Maria Roberts'; 'mary.basballe@puyalluptribe.com'; maryf@nezperce.org; 'matt.beirne@elwha.nsn.us'; mcorvi@ctclusi.org; 'meagan.flier@grandronde.org'; 'mel.moon@quileutenation.org'; mikek@ctsi.nsn.us; 'Mollie Cline'; 'Natalia Shaw'; 'noelle@yakama.com'; 'paulm@pgst.nsn.us'; 'pstevenson@stillaguamish.com'; 'pwakeland@coquilletribe.org'; 'rbarnes@skokomish.org'; 'rmoses@tulaliptribes-nsn.gov'; 'rodskeen@ctuir.org'; 'romac@pgst.nsn.us'; 'Sam Phillips'; 'sbaldwin@shoshonebannocktribes.com'; 'scossairt@kootenai.org'; 'ssteltzner@squaxin.us'; Ex. 6; stanley.curtis@nisqually-nsn.gov; 'taylor.a@cowlitz.org'; 'terryg@yakama.com'; 'thomasb@lummi-nsn.gov'; 'tim.outman@ctwsbnr.org'; 'tracyb@ctsi.nsn.us'; 'twoodard@samishtribe.nsn.us'; 'walter.george@nisqually-nsn.gov'; 'will.hatcher@klamathtribes.com'; 'jmainord@swinomish.nsn.us'; Valiere, Lucita; Todd, Bill; Hall, Chris; Meyer, Dan; Bray, Dave; Hardesty, Doug; Rose, Keith; Kline, Debbie; Lambert, Aaron; McGown, Michael; Elleman, Robert; Stewart, Gretchen; Vaupel, Claudia; Wilson, Wenona; Brozusky, Sandra; McTigue, Erin; Krauss, Kayla; Bosneag, Andra; Shayna McCrary-Martin

Optional Attendees: Jeff Dickison; Kelly, Carolyn; Grant Timentwa; Jacinda Mainord; Cherrie May; Gillian Mittelstaedt

DraftCourseListFY18.doc

Tribal – EPA Air Quality Call for March 2017

Call in number: Ex. 6
Access code: Ex. 6

1. Roll Call
2. FY17 State & Tribal Air Grants (STAG) funding update: Mehrdad
3. FARR and FARR Online Registration System (FORS) update: Andra and Bill
4. Kalispel Tribe Class I Redesignation: Mehrdad
5. Wood smoke activity book: Sandra
    a. https://www.epa.gov/burnwise/wood-smoke-activity-book
    b. Thanks to: Burn Wise Alaska, Alaska DEC, and Carolyn Kelly
6. Biannual Tribal Air meeting update: Mehrdad
    a. Planning members: Carolynn Kelly, Jacinda Maynard, Kathy Moses, Kevin Greenleaf, and Bill Todd)
    b. Monthly planning calls – first Wednesday of the month at 1:30 pm. Next call: Wednesday April 3rd at 1:30.
7. ITEP air quality trainings for FY18 announced. See attached.
    a. What other air quality training courses would you like to see ITEP offer?
8. Region 10 tribal air monitors
    a. Options for managing and maintaining
        i. EPA Region 10 Manchester Lab
        ii. EPA TAMS Center lab
        iii. Other options?
9. Tribal Updates
    a. National Tribal Air Association – Executive Committee (Kevin Greenleaf / Carolynn Kelly)

b. Tribal Air Monitoring Support Center – Steering Committee (Kris Ray)
c. Tribal Healthy Homes Network – Gillian Mittelstaedt
d. Other Tribal Updates

Thanks
Mehrdad

Mehrdad Khatibi
Tribal Air Team Lead
Tribal Programs, Diesel, and Indoor Air Unit
Office of Air and Waste
U.S. Environmental Protection Agency, Region 10

Ph: (206) 553-1603
Khatibi.Mehrdad@epa.gov

Possible ITEP Air Quality Courses for FY18

Level 1 Classroom
Air Quality Computations
Indoor Air Quality in Tribal Communities
Introduction to Tribal Air Quality *[can fill this course every 7-9 months]*

Level 2 Classroom
Air Pollution and Ecosystems *(including air/water interface)*
Air Pollution Technology
Fundamentals of Air Monitoring – *(include PM, O3, Met, Hg, Toxics)*
IAQ Diagnostic Tools *(for lower 48)*
Management of Tribal Air Programs and Grants
Basic NSR or CAA & Permitting *(OAQPS course)*
Tribal Participation in the SIP Process *(OAQPS course)*

Level 3 Classroom
Air Pollution Modeling
Gaseous Pollutant Monitoring *(emphasize Ozone formation, transport, theory of analyzer function, new Ozone NAAQS)*
GIS for Air Quality *(not offered in FY17)*
Reviewing NSR and Title V Permits *(sequel to Basic NSR) (OAQPS course)*

Alaska Classroom *(collaborate with Regional Health entities, ANTHC, ADEC, U-AK)*
Air Pollution and Ecosystems *(including air/water interface)*
Air Quality Project Planning, QAPPs, and Grants for Alaska
Air Quality and Indoor Air Quality in Alaska (Level 1)
IAQ Diagnostic Tools in Alaska (Level 2)

Notes for AIAQTP Courses
Budget for 10 classroom courses in lower 48
Budget for 2 classroom courses in Alaska and an air training at ATCEM in Anchorage
Budget for 3 mini-courses (smaller group, fewer instructors, topics vary, as need arises)
Take a course to the Midwest or Eastern U.S. in FY18

Notes for OAQPS Courses
Budget for 2 classroom courses in lower 48
Budget for 1 community training
Budget for training at a national meeting

Revised
3/7/17

Revised

3/7/17

Online Courses

Self-Paced Online Courses

AQS *(14 videos)*

Building Performance: Improving Energy Efficiency and IAQ in Cold Climates *(8 hours of online coursework; 3 modules)*

QA Fundamentals *(10 hours of online coursework; 3 modules)*

Radon Fundamentals (*7 hours of online coursework; 4 modules*)

–Radon – Presentations from NTF?

Introduction to Data Management (5 *hours of online coursework; 5 modules*)

–This is one of at least 6 online courses in a series that Melinda has planned.

Instructor-Led Online Courses

Emissions Inventory–Fundamentals *(1st in series) (50 hours of online coursework; 6 modules)*

Emissions Inventory–Advanced *(2nd in series) (120 hours of online coursework; 11 modules)*

–These are estimates of time for the EI courses

Tribal Data Toolbox *(Number of sessions?)* (upload summer 2017)

Possible Future Online Courses

Air Quality and Wildfire (NEW)

Building Performance: Improving Energy Efficiency and IAQ in Warm Climates

Climate Change on Tribal Lands (Level 1) *(format uncertain)*

Community Outreach (series of webinars?) (NEW)

Data Management additional courses

–Field data management, QA/QC, QAPPs, AQS using AQS Fast Track videos

Online prerequisite course for IAQ Diagnostic Tools 2018

Online prerequisite course for Management of Tribal Air Programs & Grants 2018?

Other Online Training Ideas

Asthma

Community Education – Mold/Mildew

Grant Management: writing, EPA forms, closeout

Meth

Smoke management/smoke forecasting

Tobacco Smoke

Wood Smoke

Alaska-specific courses

Revised

3/7/17