P4 Production, LLC

Soda Springs Plant
1853 Highway 34
P.O. Box 816
Soda Springs, Idaho 83276-0816
Phone: (208) 547-4300
Fax: (208) 547-3312

RECEIVED
APR 05 2016
DEPARTMENT OF ENVIRONMENTAL QUALITY
STATE A Q PROGRAM

March 31, 2016

Air Quality Program Office – Application Processing
Idaho Department of Environmental Quality
1410 N. Hilton
Boise, ID 83706

Subject: South Rasmussen Mine (Permit to Construct P-2011.0015) Modification Application and Air Quality Modeling Report

To Whom it May Concern:

P4 Production, LLC (P4) is hereby submitting the enclosed permit to construct modification application and air quality modeling report for the South Rasmussen Mine (SRM). The proposed changes associated with this modification include the installation of two new diesel generators, removal of one generator and relocation of one currently permitted diesel generator. The complete application and modeling report are provided as an enclosure to this letter.

In addition, a paid receipt for the $1,000 Application Fee is provided.

P4 appreciates your review of this application. Should you have any questions or require additional information, please feel free to contact Molly Prickett at (208) 547-1395.

Sincerely,

Roger W. Gibson
V.P. Operations
P4 Production, LLC

Enclosure: South Rasmussen Mine Permit to Construct Application and Air Quality Modeling Report

cc: Sabrina Pryor, Air Sciences Inc.

Enclosure 1: Receipt for PTC Application Fee

Receipt

Print this page or check your email for a receipt.

Payment Complete

Idaho.gov State of ID will appear on your statement for this transaction. Thank you for your business.

Order Number:	PP3ID3729136SID17069760-3729136
Order Date:	Tue Mar 29 15:20:52 MDT 2016
Payment Method:	MasterCard xxxxxxxxxxxx6071
Cost:	$1,030.00

Order

Item/Service	Qty	Price	Total
PTC Application Fee	1	$1,000.00	$1,000.00
		Subtotal	$1,000.00
		Sales Tax	$0.00
		Shipping	$0.00
		Purchased through Idaho.gov Price	$1,030.00

Contact information

Bill To: Molly Prickett
Monsanto Company
1853 Hwy 34
Soda Springs, ID 83276

Phone: (208) 360-3454

Email: molly.prickett@monsanto.com

Billing questions

Contact Idaho.gov by phone 208-332-0102 or toll-free at 1-877-443-3468.

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Enclosure 2:
South Rasmussen Mine Permit to Construct Application and Air Quality Modeling Report

AIR SCIENCES INC.

DENVER • PORTLAND • LOS ANGELES

South Rasmussen Mine Permit to Construct Application

PREPARED FOR:
P4 PRODUCTION, LLC

PROJECT NO. 303-3
MARCH 2016

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Appendix B – Air Quality Modeling Report: South Rasmussen Mine in Soda Springs, Idaho

EXECUTIVE SUMMARY

This Permit to Construct (PTC) application is being submitted to modify the State of Idaho Air Quality PTC Number P-2011.0015. The Idaho Department of Environmental Quality (IDEQ) issued this permit to the P4 Production, LLC (P4) South Rasmussen Mine (SRM) on April 6, 2011. The PTC issued to the SRM is for the Horseshoe Generator Project (the "Horseshoe Project"). The Horseshoe Project currently comprises four generators at the SRM, located approximately 18 miles northeast of Soda Springs, in Caribou County, Idaho. The generators power the Horseshoe Overburden Pile (HSOP) pumping system.

At this time, P4 would like to make the following modifications:

- Relocate the existing Haul Road Pond generator to a new location called Smith Pond and update the generator's maximum capacity from 115 kilowatts (kW) to 147 kW.
- Change all references of Horseshoe Pond to Horseshoe Dump.
- Update the existing Primary and Backup Horseshoe Dump generators' maximum capacities from 185 kW to 235 kW.
- Install a new Cummins 234-kW generator at the Horseshoe Dump.
- Remove an existing Horseshoe Pond generator, noted in the permit as a Godwin—Kubota 35-kW generator.
- Install a new Cummins 234-kW generator at the existing Haul Road Pond location, larger in size than the existing Haul Road Pond generator being moved to Smith Pond, currently noted in the permit as a John Deere 115-kW generator.

This application is submitted in accordance with Idaho Administrative Procedure Act Part 58 – Department of Environmental Quality, Title 01, Chapter 01 (IDAPA 58.01.01), Section 200, which defines PTC application requirements. The Horseshoe Project will comply with all applicable air quality rules, regulations, and permit requirements. This application to IDEQ demonstrates that the requested permit modifications will ensure P4's compliance with applicable Idaho and federal air quality regulations.

1.0 PERMIT TO CONSTRUCT APPLICATION

The following sections provide the information required by IDAPA 58.01.01.202, Application Procedures.

1.1 Process Description

While in operation, the SRM provided phosphate ore for further refining into elemental phosphorus. During mining, activities included topsoil and rock stockpiling, crushing, screening, hauling, drilling and blasting, loading and dumping, and other miscellaneous activities; however, in 2013, mining operations ended. Reclamation has continued onsite since mine closure and is expected to continue until at least 2022. The SRM is currently permitted to operate four diesel generators at the Horseshoe Project. The generators power the HSOP pumping system. No immediate changes to the pumping activities are expected.

A scaled plot plan of the SRM Horseshoe Project can be found in Appendix A.

1.2 Equipment List

The generators currently permitted at the SRM can be found in Table 1.

Table 1. Currently Permitted Generators

Model ID	Generator	Manufacturer	Model Number	Permit Rating
GEN1	Haul Road Pond Generator	Godwin-John Deere	6068HF285	115 kW (180 hp Prime)
GEN2	Primary Horseshoe Pond Generator	Godwin-John Deere	6068HF485	185 kW (315 hp Prime)
GEN3	Backup Horseshoe Pond Generator	Godwin-John Deere	6068HF485	185 kW (315 hp Prime)
GEN4	Horseshoe Pond Generator	Godwin-Kubota	V3600TE3BG	35 kW (53 hp Prime)

At this time, P4 would like to install two new generators, remove a generator, relocate a generator, and update the rating of three generators at the SRM. A summary of the proposed changes to each generator is presented in Table 2. Model IDs are included to distinguish each generator.

Table 2. Proposed Actions to Generators

Model ID	Generator	Proposed Action	Proposed Name
GEN1	Current Haul Road Pond Generator	Relocate to Smith Pond and update the rating	Smith Pond Generator
GEN2	Current Primary Horseshoe Pond Generator	Update the rating; will be replaced with New Generator (GEN6) at end of life	Primary Horseshoe Dump Generator
GEN3	Current Backup Horseshoe Pond Generator	Update the rating	Backup Horseshoe Dump Generator
GEN4	Current Horseshoe Pond Generator	Remove	-
GEN5	New Haul Road Pond Generator	New Generator	Haul Road Pond Generator
GEN6	New Alternate Horseshoe Dump Generator	New Generator	Alternate Horseshoe Dump Generator

The proposed generators to be permitted at the SRM with the manufacturer, model number, and rating are listed in Table 3. The manufacturer specification sheets for each generator can be found as supporting documentation to the emission inventory in Appendix A.

Table 3. Proposed Generators

Model ID	Generator	Manufacturer	Model Number	Rating
GEN5	Haul Road Pond Generator	Cummins Inc.	C150D2RE	234 kW (314 hp Standby)
GEN2	Primary Horseshoe Dump Generator	John Deere	6068HF485	235 kW (315 hp Standby)
GEN6	Alternate Horseshoe Dump Generator	Cummins Inc.	C200D2RE	234 kW (314 hp Standby)
GEN3	Backup Horseshoe Dump Generator	John Deere	6068HF485	235 kW (315 hp Standby)
GEN1	Smith Pond Generator	John Deere	6068HF285	147 kW (197 hp Standby)

1.2.1 Haul Road Pond Generator

A John Deere 6068HF285 generator is currently permitted at the Haul Road Pond and was relocated approximately 1,470 feet southwest to the Smith Pond on September 29, 2015. A new Cummins Inc. QSB7-G9 model C150D2RE Tier 4 diesel generator, rated at 314 hp at full standby, will be installed at the Haul Road Pond. P4 would like to install this generator as soon as possible for use during the 2016 runoff season.

1.2.2 Horseshoe Dump Generators

Two John Deere 6068HF485 generators are currently permitted at the Horseshoe Dump as the primary and backup generators. Since the primary generator is nearing the end of life, it will be replaced by a new Cummins Inc. QSB7-G9 model C200D2RE Tier 4 diesel generator, rated at 314 hp at full standby. P4 would like to install this new Alternate Horseshoe Dump generator as soon as possible for use during the 2016 runoff season.

The existing primary and backup generators will remain at the Horseshoe Dump. However, P4 would like to update the permit to reflect the manufacturer specification sheet rating of 235 kW (315 hp Standby) for these two generators.

Finally, the currently permitted Kubota V3600TE3BG generator rated at 35 kW has been removed from the facility and can be removed from the permit.

1.2.3 Smith Pond Generator

The John Deere 6068HF285 generator currently permitted at the Haul Road Pond was relocated to the Smith Pond on September 29, 2015. P4 would like to update the permit to reflect the manufacturer specification sheet rating of 147 kW (197 hp Standby) and the new location.

1.3 Potential to Emit

Using the maximum capacity of each new stationary source generator, SRM's potential emissions include carbon monoxide (CO), nitrogen oxides (NO_X), particulate matter (PM) (including PM less than 2.5 and 10 microns in aerometric diameter [$PM_{2.5}$ and PM_{10}, respectively]), sulfur dioxide (SO_2), volatile organic compounds (VOC), lead (Pb), and greenhouse gases (GHG) (including carbon dioxide [CO_2], nitrous oxide [N_2O], and methane [CH_4]). A detailed emission inventory can be found in Appendix A. Table 4 lists the post-project Potential to Emit (PTE) for New Source Review (NSR) regulated pollutants.

Table 4. Post-Project Potential to Emit for NSR Regulated Pollutants

Emissions Unit	CO tons/yr	NO_X tons/yr	PM/ PM_{10}/ $PM_{2.5}$ tons/yr	SO_2 tons/yr	VOC tons/yr	Pb tons/yr	GHG tons/yr
Haul Road Pond Generator	7.91	0.91	4.55E-2	1.49E-2	0.42	2.79E-4	1,575.15
Primary Horseshoe Dump Generator	7.94	9.07	0.45	1.49E-2	2.95	2.80E-4	1,580.16
Alternate Horseshoe Dump Generator	7.91	0.91	4.55E-2	1.49E-2	0.42	2.79E-4	1,575.15
Backup Horseshoe Dump Generator	7.94	9.07	0.45	1.49E-2	2.95	2.80E-4	1,580.16
Horseshoe Pond Generator (to be removed)	-	-	-	-	-	-	-
Smith Pond Generator	4.96	5.67	0.28	9.32E-3	1.84	1.75E-4	988.23
Total	36.67	25.64	1.28	6.89E-2	8.59	1.29E-3	7,298.84

Emissions from the new Haul Road Pond generator and the Alternate Horseshoe Dump generator have been estimated using the manufacturer exhaust emission data (specification sheets can be found in Appendix A, as supporting documentation). Emissions from the existing primary and backup Horseshoe Dump generators and the Smith Pond generator have been estimated using 40 CFR §89.112 emission standards for non-road engines, appropriate to the generator's rated power and tier rating.

All generators will utilize Ultra-Low Sulfur Diesel (ULSD); therefore, SO_2 emissions have been estimated assuming 15 parts per million (ppm) sulfur content.

Lead emission factors for diesel-fired internal combustion engines were not provided by the manufacturer, nor are they provided in EPA's AP-42 Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources. Therefore, EPA's Locating and Estimating Air Emissions from Sources of Lead and Lead Compounds report was used.[1] Section 5.2.2 of this report provides an emission factor of 2.9E-5 lb/MMBtu for distillate oil-fired gas turbines. This emission factor should be representative of any distillate-fired combustion device.

GHG emission factors for various types of fuel are provided in 40 CFR Part 98, Subpart C, Table C-1 and Table C-2. The CO_2, CH_4 and N_2O emission factors for distillate fuel oil No. 2 from Tables C-1 and C-2 were used to estimate emissions. These emission factors, along with the global warming potentials from 40 CFR Part 98, Table A-1, listed in Table 5 below, are used to determine the CO_2 equivalent (CO_2e) emissions, also referred to as GHG emissions. Equation 1 below shows the CO_2e emission factor used for all diesel combustion sources.

Table 5. Table A-1 to Subpart A of 40 CFR Part 98—GHG Global Warming Potentials

Chemical Formula	Global Warming Potential (100 yr)
CO_2	1
CH_4	25
N_2O	298

$$CO_2e = 1 \times 73.96\frac{kg}{MMBtu} + 25 \times 3.0E-3\frac{kg}{MMBtu} + 298 \times 6.0E-4\frac{kg}{MMBtu} = 74.21\frac{kg}{MMBtu} \quad (1)$$

[1] US Environmental Protection Agency. EPA-454/R-98-006, Locating and Estimating Air Emissions from Sources of Lead and Lead Compounds, Section 5.2.2. May 1998.

1.4 Air Quality Modeling Report

A modeling protocol was submitted to IDEQ on February 3, 2016. IDEQ approved this protocol on March 11, 2016. In accordance with the "State of Idaho Guideline for Performing Air Quality Impact Analyses," Air Sciences has prepared an air quality analysis report, showing the project's compliance with the applicable ambient standards. The "Air Quality Modeling Report: South Rasmussen Mine in Soda Springs, Idaho" can be found in Appendix B of this application.

1.5 Regulatory Analysis

1.5.1 NSPS, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

The New Source Performance Standards (NSPS), Subpart IIII – Standards of Performance for Stationary Compression Ignition (CI) Internal Combustion Engines (ICE), 40 CFR §60.4200, is applicable to the SRM. All five generators will be stationary CI ICE. The stationary CI ICE are subject to §60.4200(a)(4) as they commenced construction after July 11, 2005. The three existing engines were installed after December 31, 2008, and therefore meet the 2007 engine standards per §60.4208(a). The two new engines will be installed after December 31, 2012, and will therefore meet the 2011 engine standards per §60.4208(e). All five generators are therefore subject to the compliance requirements of this subpart. The complete Regulatory Analysis, as required by the IDEQ, can be found in Appendix A, along with IDEQ Form FRA (Federal Requirements Applicability).

1.5.2 Subpart ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines

The National Emissions Standards for Hazardous Air Pollutants (NESHAP), 40 CFR 63, Subpart ZZZZ, applies to all stationary reciprocating internal combustion engines (RICE) operated at an area source of HAP emissions. For new (constructed after June 12, 2006, per §63.6590(a)(2)(iii)) stationary RICE operated at an area source of HAP emissions, the compliance requirements of 40 CFR 63, Subpart ZZZZ, are met by complying with the requirements of 40 CFR 60, Subpart IIII.

All stationary RICE located at the SRM will be classified as new sources per this subpart and therefore will be subject to the compliance requirements of 40 CFR 60, Subpart IIII.

1.5.3 Prevention of Significant Deterioration

The SRM does not have facility-wide emissions of any criteria pollutant that exceed 250 tons per year, nor is it a major stationary source as defined in 40 CFR 52.21(b)(1)(i). Therefore, in accordance with 40 CFR 52.21(a)(2), PSD requirements are not applicable to the SRM.

1.5.4 Operating Permit Applicability

The proposed modifications do not require SRM to obtain a Tier I operating permit because it is not a Major Facility as defined at IDAPA 58.01.01.008.10, nor is it a Tier I Source as defined at IDAPA 58.01.01.006.122. In addition, the proposed facility is not required to obtain a Tier II operating permit pursuant to IDAPA 58.01.01.401.02.

1.6 Certification of Permit to Construct Application

Pursuant to IDAPA 58.01.01.123, all documents submitted to the Department including, but not limited to, application forms for permits to construct, and supporting information, shall contain a certification by a responsible official. This application certification can be found in Appendix A, Form GI, and it states that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

Appendix A – IDEQ Permit to Construct Application Forms

Form CSPTC – Cover Sheet

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Cover Sheet for Air Permit Application – Permit to Construct **Form CSPTC**

Please see instructions on page 2 before filling out the form.

COMPANY NAME, FACILITY NAME, AND FACILITY ID NUMBER

1. Company Name	P4 Production, L.L.C.		
2. Facility Name	South Rasmussen Mine	3. Facility ID No.	029-00038
4. Brief Project Description - One sentence or less	Install two new 314 hp generators, remove the 53 hp generator, and relocate existing 180 hp generator.		

PERMIT APPLICATION TYPE

5. ☐ New Source ☒ New Source at Existing Facility ☐ PTC for a Tier I Source Processed Pursuant to IDAPA 58.01.01.209.05.c
☐ Unpermitted Existing Source ☐ Facility Emissions Cap ☒ Modify Existing Source: Permit No.: P-2011.0015 Date Issued: 04/06/2011
☐ Required by Enforcement Action: Case No.:____

6. ☒ Minor PTC ☐ Major PTC

FORMS INCLUDED

Included	N/A	Forms		DEQ Verify
☒	☐	Form CSPTC – Cover Sheet		☐
☒	☐	Form GI – Facility Information		☐
☐	☒	Form EU0 – Emissions Units General		☐
☒	☐	Form EU1– Industrial Engine Information	Please specify number of EU1s attached: 5	☐
☐	☒	Form EU2– Nonmetallic Mineral Processing Plants	Please specify number of EU2s attached: ____	☐
☐	☒	Form EU3– Spray Paint Booth Information	Please specify number of EU3s attached: ____	☐
☐	☒	Form EU4– Cooling Tower Information	Please specify number of EU3s attached: ____	☐
☐	☒	Form EU5 – Boiler Information	Please specify number of EU4s attached: ____	☐
☐	☒	Form CBP– Concrete Batch Plant	Please specify number of CBPs attached: ____	☐
☐	☒	Form HMAP – Hot Mix Asphalt Plant	Please specify number of HMAPs attached: ____	☐
☐	☒	PERF – Portable Equipment Relocation Form		☐
☐	☒	Form AO – Afterburner/Oxidizer		☐
☐	☒	Form CA – Carbon Adsorber		☐
☐	☒	Form CYS – Cyclone Separator		☐
☐	☒	Form ESP – Electrostatic Precipitator		☐
☐	☒	Form BCE– Baghouses Control Equipment		☐
☐	☒	Form SCE– Scrubbers Control Equipment		☐
☐	☒	Form VSCE – Venturi Scrubber Control Equipment		☐
☐	☒	Form CAM – Compliance Assurance Monitoring		☐
☒	☐	Forms EI-– Emissions Inventory		☐
☒	☐	PP – Plot Plan		☐
☒	☐	Forms MI1 – MI4 – Modeling	(Excel workbook, all 4 worksheets)	☐
☒	☐	Form FRA – Federal Regulation Applicability		☐

Form GI – Facility Information

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline: 1-877-5PERMIT

General Information **Form GI**
Revision 7
6/29/12

Please see instructions on back page before filling out the form. All information is required. If information is missing, the application will not be processed.

Identification

1. Facility name: South Rasmussen Mine

2. Existing facility identification number: 029-00038

☐ **Check if new facility (not yet operating)**

3. Brief project description: Install two new 314 hp generators, remove 53 hp generator, relocate existing 180 hp generator.

Facility Information

4. Primary facility permitting contact name: Molly R. Prickett
Contact type: Facility permitting contact
Telephone number: 208-547-1395
E-mail: molly.prickett@monsanto.com

5. Alternate facility permitting contact name: Chris R. Leatherman
Alternate contact type: Facility permitting contact
Telephone number: 208-547-1435
E-mail: chris.r.leatherman@monsanto.com

6. Mailing address where permit will be sent (street/city/county/state/zip code): 1853 Hwy. 34, Soda Springs, Idaho, 83276

7. Physical address of permitted facility (if different than mailing address) (street/ city/county/state/zip code): 18 miles Northeast of Soda Springs, Caribou County

8. Is the equipment portable? ☐ **Yes*** ☒ **No** ***If yes, complete and attach PERF; see instructions.**

9. NAICS codes: Primary NAICS: 212392
Secondary NAICS:

10. Brief business description and principal product produced: Mining phosphate ore

11. Identify any adjacent or contiguous facility this company owns and/or operates: None

12. Specify type of application ☒ **Permit to construct (PTC); application fee of $1,000 required. See instructions.**

☐ **Tier I permit** ☐ **Tier II permit** ☐ **Tier II/Permit to construct**

For Tier I permitted facilities only: If you are applying for a PTC then you must also specify how the PTC will be incorporated into the Tier I permit.

☐ **Co-process Tier I modification and PTC** ☐ **Incorporate PTC at the time of Tier I renewal** ☐ **Administratively amend the Tier I permit to incorporate the PTC upon applicant's request (IDAPA 58.01.01.209.05.a, b, or c)**

Certification

In accordance with IDAPA 58.01.01.123 (Rules for the Control of Air Pollution in Idaho), I certify based on information and belief formed after reasonable inquiry, the statements and information in the document(s) are true, accurate, and complete.

13. Responsible official's name: Roger W. Gibson
Official's title: Plant Manager; V.P. Operations
Official's address: 1853 Hwy. 34, Soda Springs, Idaho, 83276
Telephone number: 208-547-1201
E-mail: roger.w.gibson@monsanto.com
Official's signature: Roy Gibson
Date: 3/31/16

☒ **14. Check here to indicate that you want to review the draft permit before final issuance.**

Form EU1 – Industrial Engine Information (5 forms)

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Units Industrial IC Engine Information - **Form EU1**
Revision 9
10/23/13

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name	2. Facility Name:
P4 Production, L.L.C.	South Rasmussen Mine

3. Brief Project Description:	Install two new 314 hp generators, remove the 53 hp generator, and relocate the existing 180 hp generator. This form is for the new Haul Road Pond Generator (GEN5).

IC ENGINE DESCRIPTION AND SPECIFICATIONS

4. Type of unit:
- ☒ New unit ☐ Unpermitted existing unit ☐ Modification to an existing permitted unit? Permit number: _____
- ☒ Full-time operation (non-emergency standby use)?
- ☐ Emergency standby use only (operation limited to 100 hrs/yr for maintenance and testing and emergency use only)?
- ☐ Emergency fire pump use only?
- ☐ Stationary test cell/stand operation only (as defined in NSPS Subpart ZZZZ)?
- ☐ National security operation only (as defined in NSPS Subpart ZZZZ)?
- ☐ Institutional emergency standby IC engine (as defined in NSPS Subpart ZZZZ)?

IC ENGINE SPECIFICATIONS

Questions 5 through 15 apply to **all IC engines**.

5. IC Engine Manufacturer: Cummins Inc. 6. Model: QSB7-G9/C150D2RE 7. Date manufactured: TBD 8. Model year: 2016
9. Date of installation (if an existing IC engine): _____ 10. IC Engine cylinder displacement: 6.7 liters per cylinder
11. Maximum rated horsepower (per the data plate/manufacturer specifications): 314 bhp
12. EPA Certification: Tier certification number T4 or ☐ None/not tier certified
13. Ignition type: ☐ Spark ☒ Compression
14. Fuel combusted in the IC engine? ☒ Distillate fuel oil ☐ Natural gas/LNG ☐ LPG/propane
    If distillate fuel oil (#1, #2, or a mixture) is used, what is the maximum sulfur content? ☒ 15 ppm (0.0015% by weight) ☐ 500 ppm (0.05% by weight)
15. IC engine exhaust stack parameters: Diameter 4 inches Height 8 feet Temperature 836 ºF Flow rate 1,162 acfm

IC ENGINE EMISSIONS PARAMETERS

Questions 16 through 27 apply to **full-time** non-Tier certified IC engines or Tier certified IC engines manufactured prior to July 11, 2005. If you are proposing a Tier certified IC engine manufactured on and after July 11, 2005 or an emergency standby IC engine do not answer questions 17 through 27.

16. Testing schedule (for emergency standby IC engines only): _____ hrs/day _____ hrs/mon _____ hrs/qtr _____ hrs/yr
17. Maximum daily operation: _____ hrs/day 18. Maximum annual operation: _____ hrs/yr **Note:** These operational limits will be placed in the permit.
19. Will CO emissions be limited to a specific ppmvd (i.e. 49 or 23 ppmvd)? ☐ Yes ☐ No 20. What will the CO emissions limit be? _____ ppmvd
21. Will CO emissions be reduced by 70% or more? ☐ Yes ☐ No
22. Will a CEMS (Continuous Emissions Monitoring System) be used to measure pollutants in the IC engine exhaust stream? ☐ Yes ☐ No
23. Will a CPMS (Continuous Parameters Monitoring System) be used to measure parameters of the IC engine exhaust stream? ☐ Yes ☐ No
24. Will the IC engine be equipped with an oxidation catalyst? ☐ Yes ☐ No
25. If applicable, will the oxidation catalyst be equipped with a temperature measurement system to ensure it is operating properly? ☐ Yes ☐ No
26. Will the IC engine be equipped with a diesel particulate filter? ☐ Yes ☐ No
27. If applicable, will the diesel particulate filter be equipped with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached? ☐ Yes ☐ No

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Units Industrial IC Engine Information - **Form EU1**
Revision 9
10/23/13

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name	2. Facility Name:
P4 Production, L.L.C.	South Rasmussen Mine

3. Brief Project Description:	Install two new 314 hp generators, remove the 53 hp generator, and relocate the existing 180 hp generator. This form is for the existing Primary Horseshoe Dump Generator (GEN2).

IC ENGINE DESCRIPTION AND SPECIFICATIONS

4. Type of unit:
- ☐ New unit ☐ Unpermitted existing unit ☒ Modification to an existing permitted unit? Permit number: P-2011.0015
- ☒ Full-time operation (non-emergency standby use)?
- ☐ Emergency standby use only (operation limited to 100 hrs/yr for maintenance and testing and emergency use only)?
- ☐ Emergency fire pump use only?
- ☐ Stationary test cell/stand operation only (as defined in NSPS Subpart ZZZZ)?
- ☐ National security operation only (as defined in NSPS Subpart ZZZZ)?
- ☐ Institutional emergency standby IC engine (as defined in NSPS Subpart ZZZZ)?

IC ENGINE SPECIFICATIONS

Questions 5 through 15 apply to **all IC engines**.

5. IC Engine Manufacturer: John Deere 6. Model: 6068HF485 7. Date manufactured: June-2010 8. Model year: 2010
9. Date of installation (if an existing IC engine): April-2011 10. IC Engine cylinder displacement: 6.8 liters per cylinder
11. Maximum rated horsepower (per the data plate/manufacturer specifications): 315 bhp
12. EPA Certification: Tier certification number Tier 3 or ☐ None/not tier certified
13. Ignition type: ☐ Spark ☒ Compression
14. Fuel combusted in the IC engine? ☒ Distillate fuel oil ☐ Natural gas/LNG ☐ LPG/propane
    If distillate fuel oil (#1, #2, or a mixture) is used, what is the maximum sulfur content? ☒ 15 ppm (0.0015% by weight) ☐ 500 ppm (0.05% by weight)
15. IC engine exhaust stack parameters: Diameter 6 inches Height 5.67 feet Temperature 905 ºF Flow rate 1,514 acfm

IC ENGINE EMISSIONS PARAMETERS

Questions 16 through 27 apply to **full-time** non-Tier certified IC engines or Tier certified IC engines manufactured prior to July 11, 2005. If you are proposing a Tier certified IC engine manufactured on and after July 11, 2005 or an emergency standby IC engine do not answer questions 17 through 27.

16. Testing schedule (for emergency standby IC engines only): _____ hrs/day _____ hrs/mon _____ hrs/qtr _____ hrs/yr
17. Maximum daily operation: _____ hrs/day 18. Maximum annual operation: _____ hrs/yr **Note:** These operational limits will be placed in the permit.
19. Will CO emissions be limited to a specific ppmvd (i.e. 49 or 23 ppmvd)? ☐ Yes ☐ No 20. What will the CO emissions limit be? _____ ppmvd
21. Will CO emissions be reduced by 70% or more? ☐ Yes ☐ No
22. Will a CEMS (Continuous Emissions Monitoring System) be used to measure pollutants in the IC engine exhaust stream? ☐ Yes ☐ No
23. Will a CPMS (Continuous Parameters Monitoring System) be used to measure parameters of the IC engine exhaust stream? ☐ Yes ☐ No
24. Will the IC engine be equipped with an oxidation catalyst? ☐ Yes ☐ No
25. If applicable, will the oxidation catalyst be equipped with a temperature measurement system to ensure it is operating properly? ☐ Yes ☐ No
26. Will the IC engine be equipped with a diesel particulate filter? ☐ Yes ☐ No
27. If applicable, will the diesel particulate filter be equipped with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached? ☐ Yes ☐ No

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Units Industrial IC Engine Information - **Form EU1**
Revision 9
10/23/13

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name	2. Facility Name:
P4 Production, L.L.C.	South Rasmussen Mine

3. Brief Project Description:	Install two new 314 hp generators, remove the 53 hp generator, and relocate the existing 180 hp generator. This form is for the new Alternate Horseshoe Dump Generator (GEN6).

IC ENGINE DESCRIPTION AND SPECIFICATIONS

4. Type of unit:
- ☒ New unit ☐ Unpermitted existing unit ☐ Modification to an existing permitted unit? Permit number: _____
- ☒ Full-time operation (non-emergency standby use)?
- ☐ Emergency standby use only (operation limited to 100 hrs/yr for maintenance and testing and emergency use only)?
- ☐ Emergency fire pump use only?
- ☐ Stationary test cell/stand operation only (as defined in NSPS Subpart ZZZZ)?
- ☐ National security operation only (as defined in NSPS Subpart ZZZZ)?
- ☐ Institutional emergency standby IC engine (as defined in NSPS Subpart ZZZZ)?

IC ENGINE SPECIFICATIONS

Questions 5 through 15 apply to **all IC engines**.

5. IC Engine Manufacturer: Cummins Inc. 6. Model: QSB7-G9/C200D2RE 7. Date manufactured: TBD 8. Model year: 2016
9. Date of installation (if an existing IC engine): _____ 10. IC Engine cylinder displacement: 6.7 liters per cylinder
11. Maximum rated horsepower (per the data plate/manufacturer specifications): 314 bhp
12. EPA Certification: Tier certification number T4 or ☐ None/not tier certified
13. Ignition type: ☐ Spark ☒ Compression
14. Fuel combusted in the IC engine? ☒ Distillate fuel oil ☐ Natural gas/LNG ☐ LPG/propane
    If distillate fuel oil (#1, #2, or a mixture) is used, what is the maximum sulfur content? ☒ 15 ppm (0.0015% by weight) ☐ 500 ppm (0.05% by weight)
15. IC engine exhaust stack parameters: Diameter 4 inches Height 8 feet Temperature 836 ºF Flow rate 1,162 acfm

IC ENGINE EMISSIONS PARAMETERS

Questions 16 through 27 apply to **full-time** non-Tier certified IC engines or Tier certified IC engines manufactured prior to July 11, 2005. If you are proposing a Tier certified IC engine manufactured on and after July 11, 2005 or an emergency standby IC engine do not answer questions 17 through 27.

16. Testing schedule (for emergency standby IC engines only): _____ hrs/day _____ hrs/mon _____ hrs/qtr _____ hrs/yr
17. Maximum daily operation: _____ hrs/day 18. Maximum annual operation: _____ hrs/yr **Note:** These operational limits will be placed in the permit.
19. Will CO emissions be limited to a specific ppmvd (i.e. 49 or 23 ppmvd)? ☐ Yes ☐ No 20. What will the CO emissions limit be? _____ ppmvd
21. Will CO emissions be reduced by 70% or more? ☐ Yes ☐ No
22. Will a CEMS (Continuous Emissions Monitoring System) be used to measure pollutants in the IC engine exhaust stream? ☐ Yes ☐ No
23. Will a CPMS (Continuous Parameters Monitoring System) be used to measure parameters of the IC engine exhaust stream? ☐ Yes ☐ No
24. Will the IC engine be equipped with an oxidation catalyst? ☐ Yes ☐ No
25. If applicable, will the oxidation catalyst be equipped with a temperature measurement system to ensure it is operating properly? ☐ Yes ☐ No
26. Will the IC engine be equipped with a diesel particulate filter? ☐ Yes ☐ No
27. If applicable, will the diesel particulate filter be equipped with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached? ☐ Yes ☐ No

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Emissions Units Industrial IC Engine Information - **Form EU1**
Revision 9
10/23/13

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name	2. Facility Name:
P4 Production, L.L.C.	South Rasmussen Mine

3. Brief Project Description:	Install two new 314 hp generators, remove the 53 hp generator, and relocate the existing 180 hp generator. This form is for the existing Backup Horseshoe Dump Generator (GEN3).

IC ENGINE DESCRIPTION AND SPECIFICATIONS

4. Type of unit:
- ☐ New unit ☐ Unpermitted existing unit ☒ Modification to an existing permitted unit? Permit number: P-2011.0015
- ☒ Full-time operation (non-emergency standby use)?
- ☐ Emergency standby use only (operation limited to 100 hrs/yr for maintenance and testing and emergency use only)?
- ☐ Emergency fire pump use only?
- ☐ Stationary test cell/stand operation only (as defined in NSPS Subpart ZZZZ)?
- ☐ National security operation only (as defined in NSPS Subpart ZZZZ)?
- ☐ Institutional emergency standby IC engine (as defined in NSPS Subpart ZZZZ)?

IC ENGINE SPECIFICATIONS

Questions 5 through 15 apply to **all IC engines**.

5. IC Engine Manufacturer: John Deere 6. Model: 6068HF485 7. Date manufactured: June-2010 8. Model year: 2010
9. Date of installation (if an existing IC engine): April-2011 10. IC Engine cylinder displacement: 6.8 liters per cylinder
11. Maximum rated horsepower (per the data plate/manufacturer specifications): 315 bhp
12. EPA Certification: Tier certification number Tier 3 or ☐ None/not tier certified
13. Ignition type: ☐ Spark ☒ Compression
14. Fuel combusted in the IC engine? ☒ Distillate fuel oil ☐ Natural gas/LNG ☐ LPG/propane
    If distillate fuel oil (#1, #2, or a mixture) is used, what is the maximum sulfur content? ☒ 15 ppm (0.0015% by weight) ☐ 500 ppm (0.05% by weight)
15. IC engine exhaust stack parameters: Diameter 6 inches Height 5.67 feet Temperature 905 ºF Flow rate 1,514 acfm

IC ENGINE EMISSIONS PARAMETERS

Questions 16 through 27 apply to **full-time** non-Tier certified IC engines or Tier certified IC engines manufactured prior to July 11, 2005. If you are proposing a Tier certified IC engine manufactured on and after July 11, 2005 or an emergency standby IC engine do not answer questions 17 through 27.

16. Testing schedule (for emergency standby IC engines only): _____ hrs/day _____ hrs/mon _____ hrs/qtr _____ hrs/yr
17. Maximum daily operation: _____ hrs/day 18. Maximum annual operation: _____ hrs/yr **Note:** These operational limits will be placed in the permit.
19. Will CO emissions be limited to a specific ppmvd (i.e. 49 or 23 ppmvd)? ☐ Yes ☐ No 20. What will the CO emissions limit be? _____ ppmvd
21. Will CO emissions be reduced by 70% or more? ☐ Yes ☐ No
22. Will a CEMS (Continuous Emissions Monitoring System) be used to measure pollutants in the IC engine exhaust stream? ☐ Yes ☐ No
23. Will a CPMS (Continuous Parameters Monitoring System) be used to measure parameters of the IC engine exhaust stream? ☐ Yes ☐ No
24. Will the IC engine be equipped with an oxidation catalyst? ☐ Yes ☐ No
25. If applicable, will the oxidation catalyst be equipped with a temperature measurement system to ensure it is operating properly? ☐ Yes ☐ No
26. Will the IC engine be equipped with a diesel particulate filter? ☐ Yes ☐ No
27. If applicable, will the diesel particulate filter be equipped with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached? ☐ Yes ☐ No

DEQ AIR QUALITY PROGRAM
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Emissions Units Industrial IC Engine Information - **Form EU1**
Revision 9
10/23/13

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name	2. Facility Name:
P4 Production, L.L.C.	South Rasmussen Mine

3. Brief Project Description:	Install two new 314 hp generators, remove the 53 hp generator, and relocate the existing 180 hp generator. This form is for the existing Haul Road Pond Generator being relocated to the Smith Pond (GEN1).

IC ENGINE DESCRIPTION AND SPECIFICATIONS

4. Type of unit:
- ☐ New unit ☐ Unpermitted existing unit ☒ Modification to an existing permitted unit? Permit number: P-2011.0015
- ☒ Full-time operation (non-emergency standby use)?
- ☐ Emergency standby use only (operation limited to 100 hrs/yr for maintenance and testing and emergency use only)?
- ☐ Emergency fire pump use only?
- ☐ Stationary test cell/stand operation only (as defined in NSPS Subpart ZZZZ)?
- ☐ National security operation only (as defined in NSPS Subpart ZZZZ)?
- ☐ Institutional emergency standby IC engine (as defined in NSPS Subpart ZZZZ)?

IC ENGINE SPECIFICATIONS

Questions 5 through 15 apply to **all IC engines**.

5. IC Engine Manufacturer: John Deere 6. Model: 6068HF285 7. Date manufactured: Sept-2010 8. Model year: 2010
9. Date of installation (if an existing IC engine): April-2011 10. IC Engine cylinder displacement: 6.8 liters per cylinder
11. Maximum rated horsepower (per the data plate/manufacturer specifications): 197 bhp
12. EPA Certification: Tier certification number Tier 3 or ☐ None/not tier certified
13. Ignition type: ☐ Spark ☒ Compression
14. Fuel combusted in the IC engine? ☒ Distillate fuel oil ☐ Natural gas/LNG ☐ LPG/propane
    If distillate fuel oil (#1, #2, or a mixture) is used, what is the maximum sulfur content? ☒ 15 ppm (0.0015% by weight) ☐ 500 ppm (0.05% by weight)
15. IC engine exhaust stack parameters: Diameter 6 inches Height 5.67 feet Temperature 982 ºF Flow rate 985 acfm

IC ENGINE EMISSIONS PARAMETERS

Questions 16 through 27 apply to **full-time** non-Tier certified IC engines or Tier certified IC engines manufactured prior to July 11, 2005. If you are proposing a Tier certified IC engine manufactured on and after July 11, 2005 or an emergency standby IC engine do not answer questions 17 through 27.

16. Testing schedule (for emergency standby IC engines only): _____ hrs/day _____ hrs/mon _____ hrs/qtr _____ hrs/yr
17. Maximum daily operation: _____ hrs/day 18. Maximum annual operation: _____ hrs/yr **Note:** These operational limits will be placed in the permit.
19. Will CO emissions be limited to a specific ppmvd (i.e. 49 or 23 ppmvd)? ☐ Yes ☐ No 20. What will the CO emissions limit be? _____ ppmvd
21. Will CO emissions be reduced by 70% or more? ☐ Yes ☐ No
22. Will a CEMS (Continuous Emissions Monitoring System) be used to measure pollutants in the IC engine exhaust stream? ☐ Yes ☐ No
23. Will a CPMS (Continuous Parameters Monitoring System) be used to measure parameters of the IC engine exhaust stream? ☐ Yes ☐ No
24. Will the IC engine be equipped with an oxidation catalyst? ☐ Yes ☐ No
25. If applicable, will the oxidation catalyst be equipped with a temperature measurement system to ensure it is operating properly? ☐ Yes ☐ No
26. Will the IC engine be equipped with a diesel particulate filter? ☐ Yes ☐ No
27. If applicable, will the diesel particulate filter be equipped with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached? ☐ Yes ☐ No

Forms EI – Emissions Inventory

NSR Pollutant PTE Summaries

Table 1: PRE-PROJECT POTENTIAL TO EMIT FOR NSR REGULATED POLLUTANTS[a]

Emissions Unit	CO	NO_X	$PM/PM_{10}/PM_{2.5}$	SO_2	VOC	Pb[b]	GHG[b]
	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
Point Sources							
Haul Road Pond Generator	6.43	5.21	0.38	1.16	0.32	--	--
Primary Horseshoe Pond Generator	7.91	9.13	0.46	0.51	0.56	--	--
Backup Horseshoe Pond Generator	7.91	9.13	0.46	0.51	0.56	--	--
Horseshoe Pond Generator	2.10	2.87	0.11	0.34	0.14	--	--
Smith Pond Generator	--	--	--	--	--	--	--
Totals	**24.35**	**26.33**	**1.41**	**2.51**	**1.58**	--	--

[a] For permitted emissions units provide the PTE under the existing permit conditions, for unpermitted emissions units provide the PTE based on the operational design capacity of the sources that are part of the project.
[b] Lead (Pb) and Greenhouse Gas (GHG) emissions were not calculated in the 2011 Statement of Basis, therefore not provided here.

Table 2: POST PROJECT POTENTIAL TO EMIT FOR NSR REGULATED POLLUTANTS[a]

Descrip COLT NOXLT PM10LT SO2LT VOCLT PbLT CO2eLT

Emissions Unit	CO	NO_X	$PM/PM_{10}/PM_{2.5}$	SO_2	VOC	Pb	GHG
	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
Point Sources							
Haul Road Pond Generator	7.91	0.91	4.55E-2	1.49E-2	0.42	2.79E-4	1,575.15
Primary Horseshoe Dump Generator	7.94	9.07	0.45	1.49E-2	2.95	2.80E-4	1,580.16
Alternate Horseshoe Dump Generator	7.91	0.91	4.55E-2	1.49E-2	0.42	2.79E-4	1,575.15
Backup Horseshoe Dump Generator	7.94	9.07	0.45	1.49E-2	2.95	2.80E-4	1,580.16
Horseshoe Pond Generator	--	--	--	--	--	--	--
Smith Pond Generator	4.96	5.67	0.28	9.32E-3	1.84	1.75E-4	988.23
Totals	**36.67**	**25.64**	**1.28**	**6.89E-2**	**8.59**	**1.29E-3**	**7,298.84**

[a] Provide the requested permitted emission rates as the PTE.

Table 3: CHANGES IN POTENTIAL TO EMIT FOR NSR REGULATED POLLUTANTS

Emissions Unit	CO	NO_X	$PM/PM_{10}/PM_{2.5}$	SO_2	VOC	Pb	GHG
	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
Point Sources							
Haul Road Pond Generator	1.48	-4.30	-0.34	-1.14	0.11	--	--
Primary Horseshoe Dump Generator	0.03	-0.05	0.00	-0.49	2.39	--	--
Alternate Horseshoe Dump Generator	7.91	0.91	0.05	0.01	0.42	--	--
Backup Horseshoe Dump Generator	0.03	-0.05	-2.61E-3	-0.49	2.39	--	--
Horseshoe Pond Generator	-2.10	-2.87	-0.11	-0.34	-0.14	--	--
Smith Pond Generator	4.96	5.67	0.28	0.01	1.84	--	--
Totals	**12.32**	**-0.69**	**-0.13**	**-2.44**	**7.01**	--	--

Table 4: Emission Increase/Actual Emissions/Proposed Emissions/Existing Allowable Emissions

Emissions Unit	Stack or Emissions Point ID	PM_{10}	$PM_{2.5}$		SO_2		NO_X		CO		Lead	
		lb/hr 24-hr Avg.	lb/hr 24-hr Avg.	lb/hr Annual Avg.	lb/hr Max.	lb/hr 3-hr Avg.	lb/hr Max.	lb/hr Annual Avg.	lb/hr Max.	lb/hr 8-hr Avg.	lb/hr monthly Avg.	lb/hr 1/4ly Avg.
Point Sources												
Haul Road Pond Generator	GEN5	N/A	1.04E-2	1.04E-2	N/A	N/A	0.21	0.21	N/A	N/A	N/A	N/A
Primary Horseshoe Dump Generator	GEN2	N/A	0.10	0.10	N/A	N/A	2.07	2.07	N/A	N/A	N/A	N/A
Alternate Horseshoe Dump Generator	GEN6	N/A	1.04E-2	1.04E-2	N/A	N/A	0.21	0.21	N/A	N/A	N/A	N/A
Backup Horseshoe Dump Generator	GEN3	N/A	0.10	0.10	N/A	N/A	2.07	2.07	N/A	N/A	N/A	N/A
Smith Pond Generator	GEN1	N/A	6.48E-2	6.48E-2	N/A	N/A	1.30	1.30	N/A	N/A	N/A	N/A

2,000 lb/ton
8,760 hr/yr

Toxic Air Pollutant Emissions Inventory

Table 5: PRE- AND POST PROJECT NON-CARCINOGENIC TAP EMISSIONS SUMMARY POTENTIAL TO EMIT

Non-Carcinogenic Toxic Air Pollutants (sum of all emissions)	Pre-Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Post Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Change in 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Non-Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Acrolein	1.96E-4	9.42E-4	7.46E-4	0.017	NO
Naphthalene	1.80E-4	8.64E-4	6.84E-4	3.33	NO
Toluene	8.66E-4	4.17E-3	3.30E-3	25	NO
Xylenes	6.04E-4	2.90E-3	2.30E-3	29	NO

Table 6: PRE- AND POST PROJECT CARCINOGENIC TAP EMISSIONS SUMMARY POTENTIAL TO EMIT

Carcinogenic Toxic Air Pollutants (sum of all emissions)	Pre-Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Post Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Change in Annual Average Emissions Rates for Units at the Facility (lb/hr)	Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
1,3-Butadiene	8.28E-5	3.98E-4	3.15E-4	2.40E-5	YES
Acetaldehyde	1.62E-3	7.81E-3	6.19E-3	3.00E-3	YES
Benzene	1.98E-3	9.50E-3	7.53E-3	8.00E-4	YES
Formaldehyde	2.50E-3	1.20E-2	9.52E-3	5.10E-4	YES
Total 7-PAH Group [a]	7.27E-6	3.50E-5	2.77E-5	2.00E-6	YES

[a] Polycyclic Organic Matter (POM) is considered as one TAP comprised of: benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)pyrene. The total is compared to benzo(a)pyrene.

Facility Wide Hazardous Air Pollutant Potential to Emit

Table 7: HAP POTENTIAL TO EMIT EMISSIONS SUMMARY

HAP Pollutants	PTE (ton/yr)
1,3-Butadiene	1.74E-3
Acetaldehyde	3.42E-2
Acrolein	4.13E-3
Benzene	4.16E-2
Formaldehyde	5.26E-2 [a]
Naphthalene	3.78E-3
Toluene	1.82E-2
Xylenes	1.27E-2
Total	1.69E-1

[a] Maximum Individual HAP

Air Sciences Inc.	PROJECT TITLE: South Rasmussen Mine	BY: S. Pryor		
	PROJECT NO: 303-3-1	PAGE: 1	OF: 6	SHEET: Criteria
AIR EMISSION CALCULATIONS	SUBJECT: South Rasmussen Mine	DATE: March 24, 2016		

EMISSIONS SUMMARY

Permitted		Haul Road Pond Generator	Primary Horseshoe Pond Generator	Backup Horseshoe Pond Generator	Horseshoe Pond Generator	Total
Total Output	*hp*	180	315	315	53	**-**
CO	*lb/hr*	1.47	1.81	1.81	0.48	**5.56**
	ton/yr	6.43	7.91	7.91	2.10	**24.35**
NO_X	*lb/hr*	1.19	2.08	2.08	0.65	**6.01**
	ton/yr	5.21	9.13	9.13	2.87	**26.33**
$PM/PM_{10}/PM_{2.5}$	*lb/hr*	0.09	0.10	0.10	0.03	**0.32**
	ton/yr	0.38	0.46	0.46	0.11	**1.41**
SO_2	*lb/hr*	0.26	0.12	0.12	0.08	**0.57**
	ton/yr	1.16	0.51	0.51	0.34	**2.51**
VOC	*lb/hr*	0.07	0.13	0.13	0.03	**0.36**
	ton/yr	0.32	0.56	0.56	0.14	**1.58**

Modification		Haul Road Pond Generator[a] GEN5	Primary Horseshoe GEN2	Alternate Dump Gens[a, b] GEN6	Backup GEN3	Horseshoe Pond Generator GEN4	Smith Pond Generator[c] GEN1	Total
Total Output	*hp*	314	315	314	315	REMOVED	197	**-**
CO	*lb/hr*	1.81	1.81	1.81	1.81	-	1.13	**8.37**
	ton/yr	7.91	7.94	7.91	7.94	-	4.96	**36.67**
NO_X	*lb/hr*	0.21	2.07	0.21	2.07	-	1.30	**5.85**
	ton/yr	0.91	9.07	0.91	9.07	-	5.67	**25.64**
$PM/PM_{10}/PM_{2.5}$	*lb/hr*	1.04E-2	0.10	1.04E-2	0.10	-	6.48E-2	**0.29**
	ton/yr	4.55E-2	0.45	4.55E-2	0.45	-	0.28	**1.28**
SO_2	*lb/hr*	3.39E-3	3.40E-3	3.39E-3	3.40E-3	-	2.13E-3	**1.57E-2**
	ton/yr	1.49E-2	1.49E-2	1.49E-2	1.49E-2	-	9.32E-3	**6.89E-2**
VOC	*lb/hr*	9.69E-2	0.67	9.69E-2	0.67	-	0.42	**1.96**
	ton/yr	0.42	2.95	0.42	2.95	-	1.84	**8.59**
Pb	*lb/hr*	6.37E-5	6.39E-5	6.37E-5	6.39E-5	-	4.00E-5	**2.95E-4**
	ton/yr	2.79E-4	2.80E-4	2.79E-4	2.80E-4	-	1.75E-4	**1.29E-3**

[a] *GEN5 and GEN6 are new engines*

[b] *GEN2 and GEN3 are existing engines*

[c] *GEN1 is an existing engine, moved to new location*

Modeling Applicability	CO	NO_X		PM_{10}	$PM_{2.5}$		SO_2		Pb
	lb/hr	*lb/hr*	*ton/yr*	*lb/hr*	*lb/hr*	*ton/yr*	*lb/hr*	*ton/yr*	*lb/month*
Haul Road Pond Generator - NEW ENGINE	1.81	0.21	0.91	1.04E-2	1.04E-2	4.55E-2	3.39E-3	1.49E-2	4.65E-2
Alternate Horseshoe Dump Gen - NEW ENGINE	1.81	0.21	0.91	1.04E-2	1.04E-2	4.55E-2	3.39E-3	1.49E-2	4.65E-2
Smith Pond Generator - NEW LOCATION	1.13	1.30	5.67	6.48E-2	6.48E-2	0.28	2.13E-3	9.32E-3	2.92E-2
Total Emissions for Modeling Applicability [a]	4.75	1.71	7.49	8.55E-2	8.55E-2	0.37	8.92E-3	3.90E-2	0.12
Level I Thresholds [b]	15	0.20	1.20	0.22	0.054	0.35	0.21	1.2	14
Modeling Triggered?	No	**Yes**	**Yes**	No	**Yes**	**Yes**	No	No	No

[a] *The Primary and Backup Horseshoe Dump Generators are not included because they are existing sources.*

[b] *IDEQ, Guideline for Performing Air Quality Impact Analyses Table 2, September-2013*

Conversions	
453.592	*g/lb*
2,000	*lb/ton*
1.34	*hp/kW*
3.281	*ft/m*
1,000,000	*Btu/MMBtu*

Assumptions			Reference
Ultra Low Sulfur Diesel (ULSD)	15	*ppm*	*Sulfur Content*
Distillate Oil Density	7.05	*lb/gal*	*AP-42, Appendix A*
Brake Specific Fuel Consumption	7,000	*Btu/hp-hr*	*AP-42, Table 3.3-1, Footnote a*
Diesel Fuel Heat Rate	137,000	*Btu/gal*	*AP-42, Appendix A*

SO_2 Emission Factor Calculation

SO_2 0.0049 *g/hp-hr* 0.0066 *g/kW-hr*

$$0.00490\ g/hp\text{-}hr = \frac{15\ \cancel{part\ S}}{1.00E+06\ \cancel{parts}} \cdot \frac{7.05\ \cancel{lb\ Fuel}}{\cancel{gal\ Fuel}} \cdot \frac{7{,}000\ \cancel{Btu}}{hp\text{-}hr} \cdot \frac{\cancel{gal\ Fuel}}{137{,}000\ \cancel{Btu}} \cdot \frac{2\ \cancel{lb}\text{-}SO_2}{\cancel{lb\ S}} \cdot \frac{453.6\ g}{\cancel{lb}}$$

Numbers in blue are direct entries.

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HAUL ROAD POND GENERATOR

CURRENT ENGINE **MOVED TO THE SMITH POND SEE PAGE 6**

Make/Model		John Deere/6068HF285		
Output (gross)	*Prime*	180	*hp*	*PTC No. P-2011.0015*
Model ID		GEN1		

NEW ENGINE

Make/Model		Cummins Inc. QSB7-G9, C150D2RE		
Output (gross)	*Standby*	314	*hp*	*Man. Spec. Sheet: Cummins Power Generation, Exhaust Emission Data Sheet, C150D2RE*
		234	*kW*	
EPA Tier Rating		4		
Heat Input Rate		2.2	*MMBtu/hr*	
Fuel Type		Ultra Low Sulfur Diesel (ULSD)		
Fuel Consumption	*Standby*	11	*gal/hr*	*Man. Spec. Sheet*
		96,360	*gal/yr*	
Operation		24	*hr/day*	
		8,760	*hr/yr*	
Control		None		
Model Year:		2016		

Emission Factors			Reference
CO	2.61	*g/hp-hr*	*Man. Spec. Sheet*
NO_X	0.30	*g/hp-hr*	*Man. Spec. Sheet*
$PM_{2.5}/PM_{10}/PM$	0.015	*g/hp-hr*	*Man. Spec. Sheet*
VOC	0.14	*g/hp-hr*	*Man. Spec. Sheet*
SO_2	0.00490	*g/hp-hr*	*SO_2 Emission Factor Calculation*
Pb	2.90E-5	*lb/MMBtu*	*EPA, L & E for Lead* [a]

[a] *EPA 454/R-98-006, Locating and Estimating Air Emissions from Sources of Lead and Lead Compounds, Section 5.2.2, May 1998*

Modification Emissions	*lb/hr*	*lb/day*	*ton/yr*
CO	1.81	43.36	7.91
NO_X	0.21	4.98	0.91
$PM_{2.5}/PM_{10}/PM$	1.04E-2	0.25	4.55E-2
VOC	9.69E-2	2.33	0.42
SO_2	3.39E-3	8.14E-2	1.49E-2
Pb	6.37E-5	1.53E-3	2.79E-4

Modeling Parameters					Reference
Model ID	GEN5				
Discharge Height	8	*ft*	2.44	*m*	*Austin Hildebrandt email 3/1/2016*
Exhaust Gas Temp	836	*F*	719.8	*K*	*Man. Spec. Sheet*
Exhaust Gas Flow	1,162	*CFM*	33	*ACMM*	*Man. Spec. Sheet*
Exhaust Velocity	221.9	*ft/s*	67.64	*m/s*	
Stack Direction	Vertical				
Stack Shape	Circular				
Stack Diameter	0.33	*ft*	0.10	*m*	*Austin Hildebrandt email 3/1/2016*

Sample Calculations

NO_X Emissions

$$0.21\ lb/hr = \frac{0.30\ g}{hp\ hr} \cdot \frac{314\ hp\ hr}{hr} \cdot \frac{lb}{453.6\ g}$$

Numbers in blue are direct entries.

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PRIMARY HORSESHOE DUMP GENERATOR

CURRENT ENGINE		**HIGHLIGHTED ITEMS ARE BEING UPDATED**		
Make/Model		John Deere/6068HF485		
Output (gross)	*Standby*	315 *hp*	*Man. Spec. Sheet: John Deere, 6068HF485, Nov-2007*	
	Standby	235 *kW*		As Information Only:
EPA Tier Rating		3		*From Permit PTC No. P-2011.0015*
Heat Input Rate		2.2 *MMBtu/hr*		*Prime* 315 *hp*
Fuel Type		Ultra Low Sulfur Diesel (ULSD)		*Max Capacity* 185 *kW*
Fuel Consumption	*Standby*	110 *lb/hr*	*Man. Spec. Sheet*	
		16 *gal/hr*	*Using density of 7.05 lb/gal*	*From John Deere, 6068HF485, Nov-2007*
		136,681 *gal/yr*		*Prime* 286 *hp*
Operation		24 *hr/day*		*Prime* 213 *kW*
		8,760 *hr/yr*		
Control		None		
Date Manufactured:		June-2010		
Model Year:		2010		
Installation Date:		April-2011		

Emission Factors			**Reference**
CO	3.5	*g/kW-hr*	*40 CFR 89.112, Table 1*
NO_X	4.0	*g/kW-hr*	*40 CFR 89.112, Table 1*
$PM_{2.5}/PM_{10}/PM$	0.20	*g/kW-hr*	*40 CFR 89.112, Table 1*
VOC	1.3	*g/kW-hr*	*40 CFR 89.112, Table 1*
SO_2	0.0066	*g/kW-hr*	*SO_2 Emission Factor Calculation*
Pb	2.90E-5	*lb/MMBtu*	*EPA, L & E for Lead*[a]

[a] *EPA 454/R-98-006, Locating and Estimating Air Emissions from Sources of Lead and Lead Compounds, Section 5.2.2, May 1998*

Current EF, From SOB, 4/5/2011				
CO	2.6	*g/hp-hr*	3.49	*g/kW-hr*
NO_X	3.0	*g/hp-hr*	4.02	*g/kW-hr*
PM_{10}	0.150	*g/hp-hr*	0.20	*g/kW-hr*
VOC	0.1836	*g/hp-hr*	0.25	*g/kW-hr*
SO_X	0.166	*g/hp-hr*	0.22	*g/kW-hr*
$PM_{2.5}$	0.1455	*g/hp-hr*	0.20	*g/kW-hr*
SO_X EF Calculated				
SO_X	0.6651	*g/hp-hr*	0.89	*g/kW-hr*
Sulfur	2,000	ppm		

$PM_{2.5}$ emissions were assumed to be 97% of PM_{10}

Modification Emissions	*lb/hr*	*lb/day*	*ton/yr*
CO	1.81	43.50	7.94
NO_X	2.07	49.71	9.07
$PM_{2.5}/PM_{10}/PM$	0.10	2.49	0.45
VOC	0.67	16.16	2.95
SO_2	3.40E-3	8.17E-2	1.49E-2
Pb	6.39E-5	1.53E-3	2.80E-4

Modeling Parameters					**Reference**
Model ID	GEN2				
Discharge Height	5.67	*ft*	1.73	*m*	*Shaun Smith confirmed on 3/2/2016*
Exhaust Gas Temp	905	*F*	758.2	*K*	*Man. Spec. Sheet*
Exhaust Gas Flow	1,514	*CFM*	43	*ACMM*	*Man. Spec. Sheet*
Exhaust Velocity	128.5	*ft/s*	39.17	*m/s*	
Stack Direction	Vertical				*Shaun Smith confirmed on 3/2/2016*
Stack Shape	Circular				*Shaun Smith confirmed on 3/2/2016*
Stack Diameter	0.50	*ft*	0.15	*m*	*Shaun Smith confirmed on 3/2/2016*

Sample Calculations

NO_X Emissions

$$2.1\ lb/hr = \frac{4.00\ g}{\cancel{kW\text{-}hr}} \cdot \frac{235\ \cancel{kW\text{-}hr}}{hr} \cdot \frac{lb}{453.6\ g}$$

Numbers in blue are direct entries.

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ALTERNATE HORSESHOE DUMP GENERATOR

THIS ENGINE WILL BE AN ALTERNATE TO THE PRIMARY AND THEN BECOME THE MAIN PRIMARY AFTER THE END OF THE LIFE OF THE EXISTING JOHN DEERE PRIMARY HORSESHOE DUMP GENERATOR

NEW ENGINE

Make/Model		Cummins Inc. QSB7-G9, C200D2RE		
Output (gross)	*Standby*	314	*hp*	*Man. Spec. Sheet: Cummins Power Generation, Exhaust Emission Data Sheet, C200D2RE*
		234	*kW*	
EPA Tier Rating		4		
Heat Input Rate		2.2	*MMBtu/hr*	
Fuel Type		Ultra Low Sulfur Diesel (ULSD)		
Fuel Consumption	*Standby*	11	*gal/hr*	*Man. Spec. Sheet*
		96,360	*gal/yr*	
Operation		24	*hr/day*	
		8,760	*hr/yr*	
Control		None		
Model Year:		2016		

Emission Factors			Reference
CO	2.61	*g/hp-hr*	*Man. Spec. Sheet*
NO_X	0.30	*g/hp-hr*	*Man. Spec. Sheet*
$PM_{2.5}/PM_{10}/PM$	0.015	*g/hp-hr*	*Man. Spec. Sheet*
VOC	0.14	*g/hp-hr*	*Man. Spec. Sheet*
SO_2	0.00490	*g/hp-hr*	*SO_2 Emission Factor Calculation*
Pb	2.90E-5	*lb/MMBtu*	*EPA, L & E for Lead* [a]

[a] *EPA 454/R-98-006, Locating and Estimating Air Emissions from Sources of Lead and Lead Compounds, Section 5.2.2, May 1998*

Modification Emissions	*lb/hr*	*lb/day*	*ton/yr*
CO	1.81	43.36	7.91
NO_X	0.21	4.98	0.91
$PM_{2.5}/PM_{10}/PM$	1.04E-2	0.25	4.55E-2
VOC	9.69E-2	2.33	0.42
SO_2	3.39E-3	8.14E-2	1.49E-2
Pb	6.37E-5	1.53E-3	2.79E-4

Maximum Emissions (Horseshoe Dump Generator)

	lb/hr	*ton/yr*
CO	1.81	7.94
NO_X	2.07	9.07
$PM_{2.5}/PM_{10}/PM$	0.10	0.45
VOC	0.67	2.95
SO_2	3.40E-3	1.49E-2
Pb	6.39E-5	2.80E-4

Modeling Parameters					Reference
Model ID	GEN6				
Discharge Height	8	*ft*	2.44	*m*	*Austin Hildebrandt email 3/1/2016*
Exhaust Gas Temp	836	*F*	719.8	*K*	*Man. Spec. Sheet*
Exhaust Gas Flow	1,162	*CFM*	33	*ACMM*	*Man. Spec. Sheet*
Exhaust Velocity	221.9	*ft/s*	67.64	*m/s*	
Stack Direction	Vertical				
Stack Shape	Circular				
Stack Diameter	0.33	*ft*	0.10	*m*	*Austin Hildebrandt email 3/1/2016*

Sample Calculations

NO_X Emissions

$$0.21\ lb/hr = \frac{0.30\ g}{hp\ hr} \cdot \frac{314\ hp\ hr}{hr} \cdot \frac{lb}{453.6\ g}$$

Numbers in blue are direct entries.

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BACKUP HORSESHOE DUMP GENERATOR

CURRENT ENGINE		**HIGHLIGHTED ITEMS ARE BEING UPDATED**		
Make/Model		John Deere/6068HF485		
Output (gross)	*Standby*	315 *hp*	*Man. Spec. Sheet: John Deere, 6068HF485, Nov-2007*	
	Standby	235 *kW*		As Information Only:
EPA Tier Rating		3		*From Permit PTC No. P-2011.0015*
Heat Input Rate		2.2 *MMBtu/hr*		*Prime* 315 *hp*
Fuel Type		Ultra Low Sulfur Diesel (ULSD)		*Max Capacity* 185 *kW*
Fuel Consumption	*Standby*	110 *lb/hr*	*Man. Spec. Sheet*	
		16 *gal/hr*	*Using density of 7.05 lb/gal*	*From John Deere, 6068HF485, Nov-2007*
		136,681 *gal/yr*		*Prime* 286 *hp*
Operation		24 *hr/day*		*Prime* 213 *kW*
		8,760 *hr/yr*		
Control		None		
Date Manufactured:		June-2010		
Model Year:		2010		
Installation Date:		April-2011		

Emission Factors			**Reference**
CO	3.5	*g/kW-hr*	*40 CFR 89.112, Table 1*
NO_X	4.0	*g/kW-hr*	*40 CFR 89.112, Table 1*
$PM_{2.5}/PM_{10}/PM$	0.20	*g/kW-hr*	*40 CFR 89.112, Table 1*
VOC	1.3	*g/kW-hr*	*40 CFR 89.112, Table 1*
SO_2	0.0066	*g/kW-hr*	*SO_2 Emission Factor Calculation*
Pb	2.90E-5	*lb/MMBtu*	*EPA, L & E for Lead*[a]

[a] *EPA 454/R-98-006, Locating and Estimating Air Emissions from Sources of Lead and Lead Compounds, Section 5.2.2, May 1998*

Current EF, From SOB, 4/5/2011				
CO	2.6	*g/hp-hr*	3.49	*g/kW-hr*
NO_X	3.0	*g/hp-hr*	4.02	*g/kW-hr*
PM_{10}	0.150	*g/hp-hr*	0.20	*g/kW-hr*
VOC	0.1836	*g/hp-hr*	0.25	*g/kW-hr*
SO_X	0.166	*g/hp-hr*	0.22	*g/kW-hr*
$PM_{2.5}$	0.1455	*g/hp-hr*	0.20	*g/kW-hr*
SO_X EF Calculated				
SO_X	0.6651	*g/hp-hr*	0.89	*g/kW-hr*
Sulfur	2,000	ppm		

$PM_{2.5}$ emissions were assumed to be 97% of PM_{10}

Modification Emissions	*lb/hr*	*lb/day*	*ton/yr*
CO	1.81	43.50	7.94
NO_X	2.07	49.71	9.07
$PM_{2.5}/PM_{10}/PM$	0.10	2.49	0.45
VOC	0.67	16.16	2.95
SO_2	3.40E-3	8.17E-2	1.49E-2
Pb	6.39E-5	1.53E-3	2.80E-4

Modeling Parameters				**Reference**
Model ID	GEN3			
Discharge Height	5.67 *ft*	1.73	*m*	*Shaun Smith confirmed on 3/2/2016*
Exhaust Gas Temp	905 *F*	758.2	*K*	*Man. Spec. Sheet*
Exhaust Gas Flow	1,514 *CFM*	43	*ACMM*	*Man. Spec. Sheet*
Exhaust Velocity	128.5 *ft/s*	39.17	*m/s*	
Stack Direction	Vertical			*Shaun Smith confirmed on 3/2/2016*
Stack Shape	Circular			*Shaun Smith confirmed on 3/2/2016*
Stack Diameter	0.50 *ft*	0.15	*m*	*Shaun Smith confirmed on 3/2/2016*

Sample Calculations

NO_X Emissions

$$2.1\ lb/hr = \frac{4.00\ g}{kW\text{-}hr} \cdot \frac{235\ kW\text{-}hr}{hr} \cdot \frac{lb}{453.6\ g}$$

Numbers in blue are direct entries.

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SMITH POND GENERATOR

CURRENT ENGINE		**NEW AT THIS LOCATION, CURRENTLY PERMITTED AT HAUL ROAD POND**		As Information Only:	
Make/Model		John Deere/6068HF285			
Output (gross)	*Prime*	180 *hp*	*PTC No. P-2011.0015*	*From Permit PTC No. P-2011.0015*	
	Prime	134 *kW*		*Prime*	180 *hp*
EPA Tier Rating		3		*Prime*	134 *kW*
				Max Capacity	115 *kW*

REVISED ENGINE		**HIGHLIGHTED ITEMS ARE BEING MODIFIED**			
Make/Model		John Deere/6068HF285			
Output (gross)	*Standby*	197 *hp*	*Man. Spec. Sheet: John Deere, 6068HF285, March-2008*		
	Standby	147 *kW*		*From John Deere, 6068HF285, March-2008*	
EPA Tier Rating		3		*Standby*	197 *hp*
Heat Input Rate		1.4 *MMBtu/hr*		*Standby*	147 *kW*
Fuel Type		Ultra Low Sulfur Diesel (ULSD)		*Standby*	70 *lb/hr*
Fuel Consumption	*Standby*	70 *lb/hr*	*Man. Spec. Sheet*	*Prime*	180 *hp*
		10 *gal/hr*	*Using density of 7.05 lb/gal*	*Prime*	134 *kW*
		86,979 *gal/yr*		*Prime*	66 *lb/hr*
Operation		24 *hr/day*			
		8,760 *hr/yr*			
Control		None			
Date Manufactured:		Sep-2010			
Model Year:		2010			
Installation Date:		April-2011			

Emission Factors			**Reference**
CO	3.5	*g/kW-hr*	*40 CFR 89.112, Table 1*
NO_X	4.0	*g/kW-hr*	*40 CFR 89.112, Table 1*
$PM_{2.5}/PM_{10}/PM$	0.20	*g/kW-hr*	*40 CFR 89.112, Table 1*
VOC	1.3	*g/kW-hr*	*40 CFR 89.112, Table 1*
SO_2	0.00657	*g/kW-hr*	*SO_2 Emission Factor Calculation*
Pb	2.90E-5	*lb/MMBtu*	*EPA, L & E for Lead*[a]

[a] *EPA 454/R-98-006, Locating and Estimating Air Emissions from Sources of Lead and Lead Compounds, Section 5.2.2, May 1998*

Current EF, From SOB, 4/5/2011				
CO	3.7	*g/hp-hr*	4.96	*g/kW-hr*
NO_X	3.0	*g/hp-hr*	4.02	*g/kW-hr*
PM_{10}	0.220	*g/hp-hr*	0.30	*g/kW-hr*
VOC	0.1836	*g/hp-hr*	0.25	*g/kW-hr*
SO_X	0.6651	*g/hp-hr*	0.89	*g/kW-hr*
$PM_{2.5}$	0.2134	*g/hp-hr*	0.29	*g/kW-hr*
Sulfur	2,000	ppm		

$PM_{2.5}$ emissions were assumed to be 97% of PM_{10}

Modification Emissions	*lb/hr*	*lb/day*	*ton/yr*
CO	1.13	27.20	4.96
NO_X	1.30	31.09	5.67
$PM_{2.5}/PM_{10}/PM$	6.48E-2	1.55	0.28
VOC	0.42	10.10	1.84
SO_2	2.13E-3	5.11E-2	9.32E-3
Pb	4.00E-5	9.60E-4	1.75E-4

Modeling Parameters				**Reference**
Model ID	GEN1			
Discharge Height	5.67 *ft*	1.73	*m*	*Shaun Smith confirmed on 3/2/2016*
Exhaust Gas Temp	982 *F*	800.9	*K*	*Man. Spec. Sheet*
Exhaust Gas Flow	985 *CFM*	28	*ACMM*	*Man. Spec. Sheet*
Exhaust Velocity	83.6 *ft/s*	25.48	*m/s*	
Stack Direction	Vertical			*Shaun Smith confirmed on 3/2/2016*
Stack Shape	Circular			*Shaun Smith confirmed on 3/2/2016*
Stack Diameter	0.50 *ft*	0.15	*m*	*Shaun Smith confirmed on 3/2/2016*

Sample Calculations

NO_X Emissions

$$1.30\ lb/hr = \frac{4.00\ g}{kW\text{-}hr} \cdot \frac{147\ kW\text{-}hr}{hr} \cdot \frac{lb}{453.6\ g}$$

Numbers in blue are direct entries.

Model ID	Description	Heat Input (MMBtu/hr)	Heat Input (MMBtu/yr)
GEN5	Haul Road Pond Generator	2.2	19,254
GEN2	Primary Horseshoe Dump Generator	2.2	19,316
GEN6	Alternate Horseshoe Dump Generator	2.2	19,254
GEN3	Backup Horseshoe Dump Generator	2.2	19,316
GEN1	Smith Pond Generator	1.4	12,080
Total		**10.2**	**89,221**

TOXIC AIR POLLUTANT (TAP) AND HAZARDOUS AIR POLLUTANT (HAP) EMISSIONS

TAP/HAP Emission Factors

CAS. No.	Pollutant [a]	Emission Factor [b] (lb/MMBtu)	PAH	HAP	TAP	Non-Carcinogenic EL[c] (lb/hr)	Carcinogenic EL[c] (lb/hr)
106990	1,3-Butadiene	3.91E-5		HAP	TAP		2.4E-05
75070	Acetaldehyde	7.67E-4		HAP	TAP		3.0E-03
107028	Acrolein	9.25E-5		HAP	TAP	0.017	
71432	Benzene	9.33E-4		HAP	TAP		8.0E-04
56553 [d]	Benzo(a)anthracene	1.68E-6	PAH		TAP		
50328 [d]	Benzo(a)pyrene	1.88E-7	PAH		TAP		2.0E-06
205992 [d]	Benzo(b)fluoranthene	9.91E-8	PAH		TAP		
207089 [d]	Benzo(k)fluoranthene	1.55E-7	PAH		TAP		
218019 [d]	Chrysene	3.53E-7	PAH		TAP		
53703 [d]	Dibenz(a,h)anthracene	5.83E-7	PAH		TAP		
50000	Formaldehyde	1.18E-3		HAP	TAP		5.1E-04
193395 [d]	Indeno(1,2,3-cd)pyrene	3.75E-7	PAH		TAP		
91203	Naphthalene	8.48E-5		HAP	TAP	3.33	
115071	Propylene	2.58E-3					
108883	Toluene	4.09E-4		HAP	TAP	25	
1330207	Xylenes	2.85E-4		HAP	TAP	29	

[a] *Only pollutants with IDEQ Screening emission levels (EL) and the 7-PAH pollutants are listed in this table*

[b] *AP-42, Tab. 3.3-2 (10/96), diesel engines (≤ 600 hp)*

[c] *Screening Emission Levels listed in IDAPA 58.01.01.585 and 586*

[d] *These PAHs are considered together as one TAP, equivalent in potency to benzo(a)pyrene*

Conversions

2,000	*lb/ton*
907.185	*kg/ton*

Numbers in blue are direct entries.

TAP/HAP Emissions

	PAH	HAP	TAP	Total Emissions (lb/hr)	Total Emissions (ton/yr)
1,3-Butadiene		HAP	TAP	3.98E-4	1.74E-3
Acetaldehyde		HAP	TAP	7.81E-3	3.42E-2
Acrolein		HAP	TAP	9.42E-4	4.13E-3
Benzene		HAP	TAP	9.50E-3	4.16E-2
Benzo(a)anthracene	PAH		TAP	1.71E-5	7.49E-5
Benzo(a)pyrene	PAH		TAP	1.91E-6	8.39E-6
Benzo(b)fluoranthene	PAH		TAP	1.01E-6	4.42E-6
Benzo(k)fluoranthene	PAH		TAP	1.58E-6	6.91E-6
Chrysene	PAH		TAP	3.60E-6	1.57E-5
Dibenz(a,h)anthracene	PAH		TAP	5.94E-6	2.60E-5
Formaldehyde		HAP	TAP	1.20E-2	5.26E-2
Indeno(1,2,3-cd)pyrene	PAH		TAP	3.82E-6	1.67E-5
Naphthalene		HAP	TAP	8.64E-4	3.78E-3
Propylene				2.63E-2	1.15E-1
Toluene		HAP	TAP	4.17E-3	1.82E-2
Xylenes		HAP	TAP	2.90E-3	1.27E-2
PAH Subtotal		-	-	*3.50E-5*	*1.53E-4*
HAP Subtotal		-	-	*3.86E-2*	*1.69E-1*
TAP Total		**-**	**-**	**3.86E-2**	**1.69E-1**

GREENHOUSE GAS (GHG) EMISSIONS

Diesel CO_{2e} Emission Factors	73.96	*kg CO_2/MMBtu*	*40 CFR Part 98, Table C-1 to Subpart C (11/13) Distillate Fuel Oil #2*
	3.00E-03	*kg CH_4/MMBtu*	*40 CFR Part 98, Table C-2 to Subpart C (11/13) Petroleum*
	6.00E-04	*kg N_2O/MMBtu*	*40 CFR Part 98, Table C-2 to Subpart C (11/13) Petroleum*
Total Diesel Heat Input	89,221	*MMBtu/yr*	

Diesel CO_{2e} Emissions:

Greenhouse Gas	Global Warming Potential[a]	GEN5 CO_{2e} (ton/yr)	GEN2 CO_{2e} (ton/yr)	GEN6 CO_{2e} (ton/yr)	GEN3 CO_{2e} (ton/yr)	GEN1 CO_{2e} (ton/yr)	Total CO_{2e} (ton/yr)
CO_2	1	1,570	1,575	1,570	1,575	984.8	7,274
CH_4	25	1.6	1.6	1.6	1.6	1.0	7
N_2O	298	3.8	3.8	3.8	3.8	2.4	18
Total	-	1,575	1,580	1,575	1,580	988.2	7,299

[a] *40 CFR 98, Table A-1 (12/14)*

Numbers in blue are direct entries.

Supporting Documentation

Exhaust Emission Data Sheet
C150D2RE
60 and 50 Hz Diesel Generator Set
T4(f)/EU Stage IIIA

Engine Information:

Model:	Cummins Inc. QSB7-G9	Bore:	4.21 in. (107 mm)
Type:	4 Cycle, In-line, 6 Cylinder Diesel	Stroke:	4.88 in. (124 mm)
Aspiration:	Turbocharged and CAC	Displacement:	409 cu. In .(6.7 liters)
Compression Ratio:	17.3:1		
Emission Control Device:	Turbocharged with CAC and T4F Aftertreatment system		

	60 Hz	50 Hz
PERFORMANCE DATA	**Full Standby**	**Full Standby**
BHP @ 1800 RPM (60 Hz)	314	274
Fuel Consumption (gal/Hr)	11	10
Exhaust Gas Flow (CFM)	1162	951
Exhaust Gas Temperature (°F)	836	855
EXHAUST EMISSION DATA		
HC (Total Unburned Hydrocarbons)	0.14	0.14
NOx (Oxides of Nitrogen as NO2)	0.3	0.3
CO (carbon Monoxide)	2.61	2.61
PM (Particular Matter)	0.015	0.015
SO2 (g/Hp-hr)	NA	NA
Smoke (Bosch)	NA	NA
		All values are Grams per HP-Hour

TEST CONDITIONS

Data is representative of steady-state engine speed (± 25 RPM) at designated genset loads. Pressures, temperatures, and emission rates were stabilized.

Fuel Specification:	ASTM D975 No. 2-D diesel fuel with 0.03-0.05% sulfur content (by weight), and 40-48 cetane number.
Fuel Temperature:	99 ± 9 °F (at fuel pump inlet)
Intake Air Temperature:	77 ± 9 °F
Barometric Pressure:	29.6 ± 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H2O/lb dry air
Reference Standard:	ISO 8178

The NOx, HC, CO and PM emission data tabulated here are representative of test data taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits or with improper maintenance, may results in elevated emission levels.

GEN2 - Primary Horseshoe Dump Generator and
GEN3 - Backup Horseshoe Dump Generator

JOHN DEERE

ENGINE PERFORMANCE CURVE

Rating: Gross Power
Application: Generator (60 Hz)
Target: 200 kWe Standby Market

PowerTech Plus™ 6.8L Engine
Model: **6068HF485**

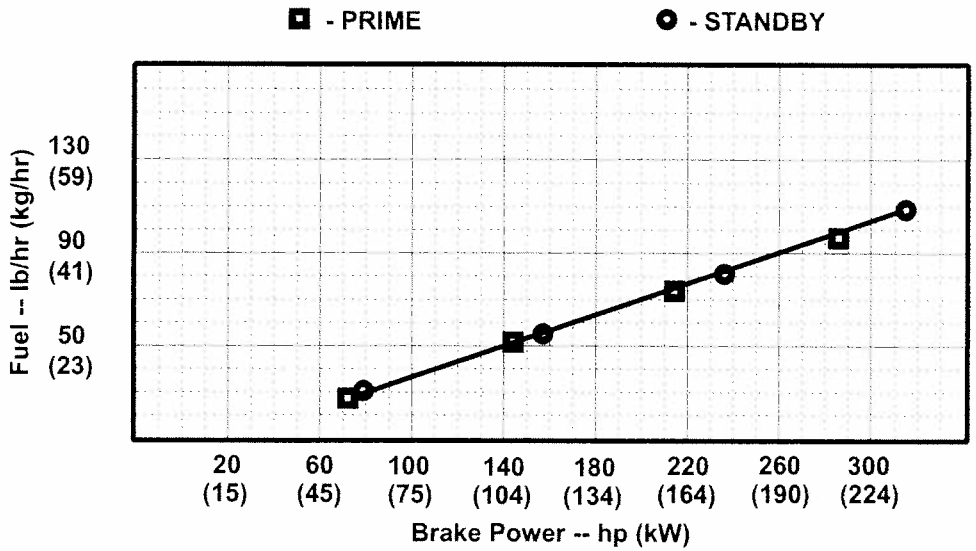
286 hp (214 kW) Prime
315 hp (235 kW) Standby

[See Option Code Tables]

Nominal Engine Power @ 1800 RPM			
Prime		Standby	
HP	kW	HP	kW
286	214	315	235

Generator Efficiency %	Fan Power (6% of Standby)		Power Factor	Prime Rating [2]		Standby Rating [1,2]		4 sec Standby Block Load Capability
	hp	kW		kWe	kVA	kWe	kVA	
88-92	18.9	14.1	0.8	176-184	220-230	194-203	243-254	80%

Note 1: Based on nominal engine power. Derate 20% for 100% block load capability.
Note 2: kWe / kVA rating assumes 90% efficiency. "Generator Efficiency %" will vary.



STANDARD CONDITIONS

Air Intake Restriction ..... 12 in.H_2O (3 kPa)
Exhaust Back Pressure ..... 30 in.H_2O (7.5 kPa)

Gross power guaranteed within + or - 5% at SAE J1995 and ISO 3046 conditions:
- 77 °F (25 °C) air inlet temperature
- 29.31 in.Hg (99 kPa) barometer
- 104 °F (40 °C) fuel inlet temperature
- 0.853 fuel specific gravity @ 60 °F (15.5 °C)

Conversion factors:
- Power: kW = hp x 0.746
- Fuel: 1 gal = 7.1 lb, 1 L = 0.85 kg
- Torque: N•m = lb-ft x 1.356

All values are from currently available data and are subject to change without notice.

Notes:
All OEM Gen Set Engine Applications must be pre-screened for torsional vibration compatibility with the respective alternator end hardware.

OEM Engine Application Engineering will perform this computer-based analysis work upon request.

Tier-3 Emission Certifications:	Certified by:
CARB; EPA Ref: Engine Emission Label	22 June '07

* Revised Data
Curve 6068HF4851800315 ..... Sheet 1 of 2
June 2007

Engine Installation Criteria

General Data

Model	6068HF485
Number of Cylinders	6
Bore and Stroke--in. (mm)	4.19 x 5.00 (106 x 127)
Displacement--in.^{3} (L)	415 (6.8)
Compression Ratio	17.0:1
Valves per Cylinder--Intake/Exhaust	2 / 2
Firing Order	1-5-3-6-2-4
Combustion System	Unit Injection
Engine Type	In-line, 4-Cycle
Aspiration	Turbocharged
Charge Air Cooling System	Air-to-Air
Engine Crankcase Vent System	Open

Physical Data

Length--in. (mm)	45.7* (1161*)
Width--in. (mm)	24.3* (616*)
Height--in. (mm)	44.4* (1128*)
Weight, with oil--lb (kg)	1495 (678)
(Includes flywheel hsg., flywheel & electrics)	
Center of Gravity Location	
From Rear Face of Block (X-axis)--in. (mm)	15.5 (394)
Right of Crankshaft (Y-axis)--in. (mm)	-0.1 (-2.24)
Above Crankshaft (Z-axis)--in. (mm)	7.4 (189)
Max. Allow. Static Bending Moment at Rear Face of Flywhl Hsg w/ 5-G Load--lb-ft (N•m)	600 (814)

Thrust Bearing Load Limit --lb (N)	Forward	Rearward
Intermittent	899 (4000)	450 (2000)
Continuous	495 (2200)	225 (1000)

Max. Front of Crank. Torsional Vibration--DDA	0.25
Max. Continuous Damper Temp--°F (°C)	180 (82)

Electrical System	12 Volt	24 Volt
Min. Battery Capacity (CCA)--amp	800	570
Max. Allow. Start. Circ't Resist.--Ohm	0.0012	0.002
Starter Rolling Current:		
At 32 °F (0 °C)--amp	920	600
At -22 °F (-30 °C)--amp	1300	700
Min. Volts at ECU while Cranking--volts	6	10
Max. ECU Temperature--°F (°C)	221 (105)	
Max. VTG Actuator Surface Temp.--°F (°C)	356 (180)	
Max. Harness Temperature--°F (°C)	248 (120)	
Maximum Voltage From Engine Crankshaft/ Generator Shaft to Ground--VAC	0.15	0.15

Air System	Prime	Standby
Max. Allowable Temp Rise--Ambient Air to Engine Inlet--°F (°C)	15 (8)	15 (8)
Maximum Air Intake Restriction		
Dirty Air Cleaner--in.H_2O (kPa)	25 (6.25)	25 (6.25)
Clean Air Cleaner--in.H_2O (kPa)	15 (3.75)	15 (3.75)
Engine Air Flow--ft^3/min (m^3/min)	520 (14.7)	619 (17.5)
Air Cleaner Efficiency--%	99.9	

Charge Air Cooling System	Prime	Standby
Air/Air Exchanger Heat Rejection--BTU/min (kW)	2298(40.37)	3264(57.34)
Compress. Dischrg. Temp.(Rated) @ 77 °F (25°C) Amb. Air--°F (°C)	365(185)	441(227)
Compress. Dischrg. Temp.(Max.) @ 47°C amb. and 80 kPa bar.--°F (°C)	000(000)	000(000)
Press. Drop, thru CAC--in.H_2O (kPa)		
Max.	64 (16)	64 (16)
Min.	32 (8)	32 (8)
Intake Manifold Pressure--psi (kPa)	27 (188)	37 (252)
CAC Out Temp @ 77°F (25°C) Amb.--°F (°C)		
Max.	126 (52)	126 (52)
Min.	109 (43)	109 (43)
CAC Out Temp @ any Ambient--°F (°C)		
Max.	190 (88)	190 (88)

Cooling System	Prime	Standby
Engine Heat Reject.--BTU/min (kW)	4766(83.7)	5404(94.9)
Coolant Flow--gal/min (L/min)	70 (265)	70 (265)
Thermostat Start to Open--°F (°C)	180 (82)	180 (82)
Thermostat Fully Open--°F (°C)	203 (95)	203 (95)
Engine Coolant Capacity--qt (L)	13 (11.9)	13 (11.9)
Min. Pressure Cap--psi (kPa)	14.5 (100)	14.5 (100)
Max. Top Tank Temp--°F (°C)	230 (110)	230 (110)
Min. Coolant Fill Rate--gal/min (L/min)	3 (11)	3 (11)
Min. Air-to-Boil Temperature--°F (°C)	117 (47)	117 (47)
Min. Pump Inlet Pressure--psi (kPa)	4.4 (30)	4.4 (30)

Exhaust System	Prime	Standby
Exhaust Flow--ft^3/min (m^3/min)	1371 (38.8)	1514 (42.9)
Exhaust Temperature--°F (°C)	982 (528)	905 (485)
Max. Exhaust Restriction----in. H_2O (kPa)	40 (10)	
Min. Exhaust Restriction----in. H_2O (kPa)	16 (4)	
Max. Bend. Moment, Turbo Out.--lb-ft (N•m)	5.2 (7.0)	
Max. Shear on Turbo Outlet--lb (kg)	24 (11)	

Fuel System	Prime	Standby
ECU Description	L14 Controller	
Fuel System Description	HPCR	
Fuel Injection Pump	Denso HP3	
Governor Type	Electronic	
Total Fuel Flow--lb/hr (kg/hr)	161 (73.1)	174 (78.7)
Fuel Consumption--lb/hr (kg/hr)	97 (44)	110 (50)
Max. Fuel Inlet Temp.--°F (°C)	176 (80)	
Fuel Temp. Rise, Inlt to Retrn--°F (°C)	97.2(54)	100.8(56)
Max. Fuel Inlet Restriction--in. H_2O (kPa)	80 (20)	
Max. Fuel Inlet Pressure--in. H_2O (kPa)	NA (NA)	
Max. Fuel Return Pressure--in. H_2O (kPa)	80 (20)	

Lubrication System	Prime	Standby
Oil Press. at Rated Speed--psi (kPa)	49 (339)	49 (339)
Oil Pressure at Low Idle--psi (kPa)	15 (105)	
Max. Oil Carryover in Blow-by--lb/hr (g/hr)	0.002 (1.0)	
Max. Airflow in Blow-by--gal/min (l/min)	34 (130)	
Max. Crankcase Pressure--in. H_2O (kPa)	2 (0.5)	

Performance Data	Prime	Standby
Rated Power--hp (kW)	286 (214)	315 (235)
Rated Speed--rpm	1800	1800
Low Idle Speed--rpm	1150	1150
Rated Torque--lb-ft (N•m)	1536 (1133)	1690 (1247)
BMEP--psi (kPa)	304 (2094)	334 (2304)
Friction Power @ Rated Speed--hp (kW)	25 (18.7)	25 (18.7)
Altitude Capability--ft (m)	10,000 (3000)	
Ratio--Air : Fuel	23.0 : 1	24.0 : 1
Smoke @ Rated Speed--Bosch No.	0.45	0.77
Noise--dB(A) @ 1 m	89.0*	89.0*

Fuel Consumption -- lb/hr (kg/h)	Prime	Standby
25 % Power	27.8 (12.6)	30.3 (13.7)
50 % Power	51.4 (23.3)	56.2 (25.5)
75 % Power	73.2 (33.2)	80.4 (36.5)
100 % Power	97.2 (44.1)	109.7 (49.8)

All values at rated speed and power with standard options unless otherwise noted.

* Revised Data

Curve 6068HF4851800315 ..... Sheet 2 of 2

June 2007

Exhaust Emission Data Sheet
C200D2RE
60 and 50 Hz Diesel Generator Set
T4(f)/EU Stage IIIA

Engine Information:

Model:	Cummins Inc. QSB7-G9	Bore:	4.21 in. (107 mm)
Type:	4 Cycle, In-line, 6 Cylinder Diesel	Stroke:	4.88 in. (124 mm)
Aspiration:	Turbocharged and CAC	Displacement:	409 cu. In .(6.7 liters)
Compression Ratio:	17.3:1		
Emission Control Device:	Turbocharged with CAC and T4F Aftertreatment system		

	60 Hz	50 Hz
PERFORMANCE DATA	**Full Standby**	**Full Standby**
BHP @ 1800 RPM (60 Hz)	314	274
Fuel Consumption (gal/Hr)	11	10
Exhaust Gas Flow (CFM)	1162	951
Exhaust Gas Temperature (°F)	836	855
EXHAUST EMISSION DATA		
HC (Total Unburned Hydrocarbons)	0.14	0.14
NOx (Oxides of Nitrogen as NO2)	0.3	0.3
CO (carbon Monoxide)	2.61	2.61
PM (Particular Matter)	0.015	0.015
SO2 (g/Hp-hr)	NA	NA
Smoke (Bosch)	NA	NA
		All values are Grams per HP-Hour

TEST CONDITIONS

Data is representative of steady-state engine speed (± 25 RPM) at designated genset loads. Pressures, temperatures, and emission rates were stabilized.

Fuel Specification:	ASTM D975 No. 2-D diesel fuel with 0.03-0.05% sulfur content (by weight), and 40-48 cetane number.
Fuel Temperature:	99 ± 9 °F (at fuel pump inlet)
Intake Air Temperature:	77 ± 9 °F
Barometric Pressure:	29.6 ± 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H2O/lb dry air
Reference Standard:	ISO 8178

The NOx, HC, CO and PM emission data tabulated here are representative of test data taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits or with improper maintenance, may results in elevated emission levels.

From: PRICKETT, MOLLY [AG/1850]
To: Sabrina Pryor
Subject: FW: Monsanto Project #67307
Date: Thursday, March 03, 2016 3:15:15 PM

Sabrina,

Please see the information below on the generators, regarding stack sizing.

Thanks!

Molly R. Prickett
Environmental Engineer
Monsanto - Soda Springs, ID
Office: 208-547-1395
Cell: 208-360-3454

From: SMITH, SHAUN E [AG/1850]
Sent: Thursday, March 03, 2016 3:05 PM
To: PRICKETT, MOLLY [AG/1850]
Subject: Fwd: Monsanto Project #67307

Molly,

Please see the info below that was provided to me by Cummins.

Shaun

Sent from my iPhone

Begin forwarded message:

> **From:** Greg E Kittridge <greg.e.kittridge@cummins.com>
> **Date:** March 3, 2016 at 2:06:43 PM MST
> **To:** "SMITH, SHAUN E [AG/1850]" <shaun.e.smith@monsanto.com>
> **Subject: FW: Monsanto Project #67307**
>
> Hi Shaun,
>
> Here is the information on the exhaust system.
>
> Thanks,
> Greg Kittridge
> Power Gen Account Manager
> Greg.e.kittridge@cummins.com
> Office direct (208) 387-2866
> Cell (208) 941-3147

Fax (208) 338-5436

From: Austin Hildebrandt
Sent: Thursday, March 03, 2016 1:48 PM
To: Shannon L Kahler <shannon.l.kahler@cummins.com>
Cc: Christopher L Scott <christopher.l.scott@cummins.com>; Greg E Kittridge <greg.e.kittridge@cummins.com>; Robin Stevenson <robin.stevenson@cummins.com>; Jennifer L Bolson <jennifer.bolson@cummins.com>
Subject: RE: Monsanto Project #67307

Good Afternoon Shannon,

Please see below. The model year is 2016 and the engine manufacture date I will provide once the engine is installed on the line. Let me know if you need anything else! Thanks!

4 Inch Exhaust stack diameter on both Erie (C200D2RE & C150D2RE) and Huron (C275D2RE)

Erie (C200D2RE & C150D2RE): Total height with trailer 96 inches.(74 inches without trailer)

Austin Hildebrandt

Customer Account Manager
Cummins Power Generation
6499 University Avenue North East
Fridley, MN 55432
Office: 763-574-3761
Cell: 763-486-9836

From: Shannon L Kahler
Sent: Thursday, March 03, 2016 11:24 AM
To: Austin Hildebrandt <austin.hildebrandt@cummins.com>
Cc: Christopher L Scott <christopher.l.scott@cummins.com>; Greg E Kittridge <greg.e.kittridge@cummins.com>; Robin Stevenson <robin.stevenson@cummins.com>; Jennifer L Bolson <jennifer.bolson@cummins.com>
Subject: RE: Monsanto Project #67307

Good morning Austin, yes for both models.

Thank you,

Shannon Kahler – BE107

Cummins Rocky Mountain LLC
8211 East 96th Avenue
Henderson, Colorado 80640

303-927-2228 Office phone
303-931-5754 Cell phone
303-927-2089 Fax
www.rockymountain.cummins.com

shannon.l.kahler@cummins.com

From: Austin Hildebrandt
Sent: Tuesday, March 01, 2016 1:01 PM
To: Shannon L Kahler <shannon.l.kahler@cummins.com>
Cc: Christopher L Scott <christopher.l.scott@cummins.com>; Greg E Kittridge <greg.e.kittridge@cummins.com>; Robin Stevenson <robin.stevenson@cummins.com>; Jennifer L Bolson <jennifer.bolson@cummins.com>
Subject: RE: Monsanto Project #67307

Hey Shannon,

I will get a hold of the T4F team and get this information for you. I assume you want this for both models, let me know if that is not the case.

Thanks,

Austin Hildebrandt

Customer Account Manager
Cummins Power Generation
6499 University Avenue North East
Fridley, MN 55432
Office: 763-574-3761
Cell: 763-486-9836

From: Shannon L Kahler
Sent: Tuesday, March 01, 2016 1:59 PM
To: Austin Hildebrandt <austin.hildebrandt@cummins.com>
Cc: Christopher L Scott <christopher.l.scott@cummins.com>; Greg E Kittridge <greg.e.kittridge@cummins.com>; Robin Stevenson <robin.stevenson@cummins.com>; Jennifer L Bolson

<jennifer.bolson@cummins.com>
Subject: RE: Monsanto Project #67307

Austin, the customer is looking for the following on order 7325687. Can you help?
They would like:
Engine manufacture Date.
Exhaust Stack Diameter.
Exhaust Stack height.
Model year that I would assume would be 2016.

Thank you,

Shannon Kahler – BE107

Cummins Rocky Mountain LLC
8211 East 96th Avenue
Henderson, Colorado 80640

303-927-2228 Office phone
303-931-5754 Cell phone
303-927-2089 Fax
www.rockymountain.cummins.com

shannon.l.kahler@cummins.com

From: Greg E Kittridge
Sent: Tuesday, March 01, 2016 11:08 AM
To: Robin Stevenson <robin.stevenson@cummins.com>; Shannon L Kahler <shannon.l.kahler@cummins.com>; Jennifer L Bolson <jennifer.bolson@cummins.com>
Cc: Christopher L Scott <christopher.l.scott@cummins.com>
Subject: Monsanto Project #67307

Hi all,

I'm not sure who to go to! I have been contacted by the customer requesting information on the generator for EPA permitting.

They would like:
Engine manufacture Date.
Exhaust Stack Diameter.
Exhaust Stack height.
Model year that I would assume would be 2016.

THANKS,

Greg Kittridge
Power Gen Account Manager
Greg.e.kittridge@cummins.com
Office direct (208) 387-2866
Cell (208) 941-3147
Fax (208) 338-5436

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California Environmental Protection Agency AIR RESOURCES BOARD	JOHN DEERE POWER SYSTEMS	EXECUTIVE ORDER U-R-004-0386 New Off-Road Compression-Ignition Engines

Pursuant to the authority vested in the Air Resources Board by Sections 43013, 43018, 43101, 43102, 43104 and 43105 of the Health and Safety Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-02-003;

IT IS ORDERED AND RESOLVED: That the following compression-ignition engines and emission control systems produced by the manufacturer are certified as described below for use in off-road equipment. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	DISPLACEMENT (liters)	FUEL TYPE	USEFUL LIFE (hours)
2010	AJDXL06.8104	4.5, 6.8	Diesel	8000

SPECIAL FEATURES & EMISSION CONTROL SYSTEMS	TYPICAL EQUIPMENT APPLICATION
Electronic Control Module, Direct Diesel Injection, Turbo Charger, Charge Air Cooler, Smoke Puff Limiter	Loaders, Tractor, Pump, Compressor, Generator Set, Other Industrial Equipment

The engine models and codes are attached.

The following are the exhaust certification standards (STD), or family emission limit(s) (FEL) as applicable, and certification levels (CERT) for hydrocarbon (HC), oxides of nitrogen (NOx), or non-methane hydrocarbon plus oxides of nitrogen (NMHC+NOx), carbon monoxide (CO), and particulate matter (PM) in grams per kilowatt-hour (g/kw-hr), and the opacity-of-smoke certification standards and certification levels in percent (%) during acceleration (Accel), lugging (Lug), and the peak value from either mode (Peak) for this engine family (Title 13, California Code of Regulations, (13 CCR) Section 2423):

RATED POWER CLASS	EMISSION STANDARD CATEGORY		EXHAUST (g/kw-hr)					OPACITY (%)		
			HC	NOx	NMHC+NOx	CO	PM	ACCEL	LUG	PEAK
130 ≤ kW < 225	Tier 3	STD	N/A	N/A	4.0	3.5	0.20	20	15	50
		CERT	--	--	3.6	1.3	0.18	14	3	30

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the information and materials to demonstrate certification compliance with 13 CCR Section 2424 (emission control labels), and 13 CCR Sections 2425 and 2426 (emission control system warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

This Executive Order is only granted to the engine family and model-year listed above. Engines in this family that are produced for any other model-year are not covered by this Executive Order.

Executed at El Monte, California on this 29 day of December 2009.

Annette Hebert, Chief
Mobile Source Operations Division

JOHN DEERE

ENGINE PERFORMANCE CURVE

Rating: Gross Power
Application: Generator (60 Hz)
Target: 125 kWe Standby Market

PowerTech E™ 6.8L Engine
Model: **6068HF285**

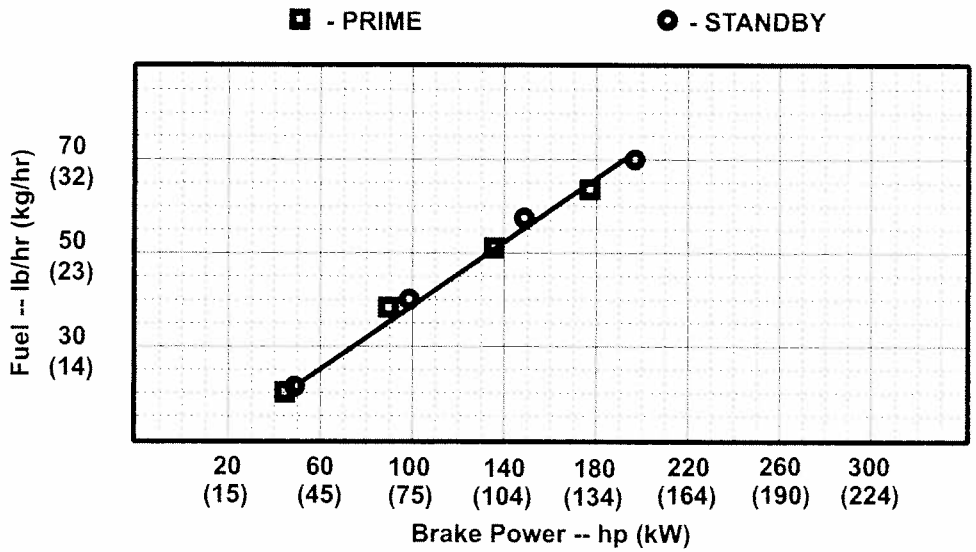
180 hp (134 kW) Prime
197 hp (147 kW) Standby

[See Option Code Tables]

Nominal Engine Power @ 1800 RPM			
Prime		Standby	
HP	kW	HP	kW
180	134	197	147

Generator Efficiency %	Fan Power (6% of Standby)		Power Factor	Prime Rating [2]		Standby Rating [1,2]		ISO 8528 G2 Block Load Capability
	hp	kW		kWe	kVA	kWe	kVA	
88-92	10.9	8.1	0.8	111-116	139-145	122-128	153-160	100%

Note 1: Based on nominal engine power.
Note 2: kWe / kVA rating assumes 90% efficiency. "Generator Efficiency %" will vary.



STANDARD CONDITIONS

Air Intake Restriction ..... 12 in.H_2O (3 kPa)
Exhaust Back Pressure ..... 30 in.H_2O (7.5 kPa)

Gross power guaranteed within + or - 5% at SAE J1995 and ISO 3046 conditions:
- 77 °F (25 °C) air inlet temperature
- 29.31 in.Hg (99 kPa) barometer
- 104 °F (40 °C) fuel inlet temperature
- 0.853 fuel specific gravity @ 60 °F (15.5 °C)

Conversion factors:
- Power: kW = hp x 0.746
- Fuel: 1 gal = 7.1 lb, 1 L = 0.85 kg
- Torque: N•m = lb-ft x 1.356

All values are from currently available data and are subject to change without notice.

Notes:
All OEM Gen Set Engine Applications must be pre-screened for torsional vibration compatibility with the respective alternator end hardware.

OEM Engine Application Engineering will perform this computer-based analysis work upon request.

Tier-3 Emission Certifications:	Certified by:
CARB; EPA Ref: Engine Emission Label	22 June '07

* Revised Data
Curve 6068HF2851800197 ..... Sheet 1 of 2
June 2007

Engine Installation Criteria

General Data

Model	6068HF285
Number of Cylinders	6
Bore and Stroke--in. (mm)	4.19 x 5.00 (106 x 127)
Displacement--in.^{3} (L)	415 (6.8)
Compression Ratio	19.0:1
Valves per Cylinder--Intake/Exhaust	1 / 1
Firing Order	1-5-3-6-2-4
Combustion System	Unit Injection
Engine Type	In-line, 4-Cycle
Aspiration	Turbocharged
Charge Air Cooling System	Air-to-Air
Engine Crankcase Vent System	Open

Physical Data

Length--in. (mm)	44.2 (1123)
Width--in. (mm)	25.9 (657)
Height--in. (mm)	40.8 (1036)
Weight, with oil--lb (kg)	1340 (608)
(Includes flywheel hsg., flywheel & electrics)	
Center of Gravity Location (Estimated based on Tier 2)	
From Rear Face of Block (X-axis)--in. (mm)	14.5 (369)
Right of Crankshaft (Y-axis)--in. (mm)	0.1 (3)
Above Crankshaft (Z-axis)--in. (mm)	6.1 (154)
Max. Allow. Static Bending Moment at Rear Face of Flywhl Hsg w/ 5-G Load--lb-ft (N•m)	600 (814)

Thrust Bearing Load Limit --lb (N)	Forward	Rearward
Intermittent	899 (4000)	450 (2000)
Continuous	495 (2200)	225 (1000)

Max. Front of Crank. Torsional Vibration--DDA	0.25
Max. Continuous Damper Temp--°F (°C)	180 (82)

Electrical System	12 Volt	24 Volt
Min. Battery Capacity (CCA)--amp	800	570
Max. Allow. Start. Circ't Resist.--Ohm	0.0012	0.002
Starter Rolling Current:		
At 32 °F (0 °C)--amp	920	600
At -22 °F (-30 °C)--amp	1300	700
Min. Volts at ECU while Cranking--volts	6	10
Max. ECU Temperature--°F (°C)	221 (105)	
Max. Harness Temperature--°F (°C)	248 (120)	
Maximum Voltage From Engine Crankshaft/ Generator Shaft to Ground--VAC	0.15	0.15

Air System	Prime	Standby
Max. Allowable Temp Rise--Ambient Air to Engine Inlet--°F (°C)	15 (8)	
Maximum Air Intake Restriction		
Dirty Air Cleaner--in.H_2O (kPa)	25 (6.25)	
Clean Air Cleaner--in.H_2O (kPa)	15 (3.75)	
Engine Air Flow--ft^3/min (m^3/min)	378 (10.7)	381 (10.8)*
Air Cleaner Efficiency--%	99.9	

Charge Air Cooling System	Prime	Standby
Air/Air Exchanger Heat Rejection--BTU/min (kW)	1081(19.0)	1138 (20.0)*
Compress. Dischrg. Temp.(Rated) @ 77 °F (25°C) Amb. Air--°F (°C)	313(156)	316(158)*
Compress. Dischrg. Temp.(Max.) @ 47°C amb. and 80 kPa bar.--°F (°C)	NA (NA)	NA (NA)
Press. Drop, thru CAC--in.H_2O (kPa)		
Max.	52 (13)	
Min.	None*	
Intake Manifold Pressure--psi (kPa)	19(129)	19 (132)*
CAC Out Temp @ 77°F (25°C) Amb.--°F (°C)		
Max.	140 (60)	
Min.	118 (48)	
CAC Out Temp @ any Ambient--°F (°C)		
Max.	190 (88)	

Cooling System	Prime	Standby
Engine Heat Reject.--BTU/min (kW)	4269(75.0)*	4758 (83.6)
Coolant Flow--gal/min (L/min)	48(180)	48(180)
Thermostat Start to Open--°F (°C)	180 (82)	
Thermostat Fully Open--°F (°C)	203 (95)	
Engine Coolant Capacity--qt (L)	13 (11.9)	
Min. Pressure Cap--psi (kPa)	14.5 (100)	
Max. Top Tank Temp--°F (°C)	230 (110)	
Min. Coolant Fill Rate--gal/min (L/min)	3 (11)	
Min. Air-to-Boil Temperature--°F (°C)	117 (47)	
Min. Pump Inlet Pressure--psi (kPa)	4.4 (30)	

Exhaust System	Prime	Standby
Exhaust Flow--ft^3/min (m^3/min)	974(27.6)	985(27.9)*
Exhaust Temperature--°F (°C)	977(525)	982(528)*
Max. Exhaust Restriction----in. H_2O (kPa)	30 (7.5)	
Min. Exhaust Restriction----in. H_2O (kPa)	None	
Max. Bend. Moment, Turbo Out.--lb-ft (N•m)	5.2 (7.0)	
Max. Shear on Turbo Outlet--lb (kg)	24 (11)	

Fuel System	Prime	Standby
ECU Description	L16 Controller	
Fuel Injection Pump	Denso HP3	
Governor Type	Electronic	
Total Fuel Flow--lb/hr (kg/hr)	159(72.0)	169(76.6)*
Fuel Consumption--lb/hr (kg/hr)	66(30.0)	70 (31.9)*
Max. Fuel Inlet Temp.--°F (°C)	176 (80)	
Fuel Temp. Rise, Inlt to Retrn--°F (°C)	70.2(39)	69.8(38.8)*
Max. Fuel Inlet Restriction--in. H_2O (kPa)	80 (20)	
Max. Fuel Inlet Pressure--in. H_2O (kPa)	NA (NA)	
Max. Fuel Return Pressure--in. H_2O (kPa)	80 (20)	

Lubrication System	Prime	Standby
Oil Press. at Rated Speed--psi (kPa)	44 (300)	
Min. Oil Pressure--psi (kPa)	15 (105)	
Max. Oil Carryover in Blow-by--lb/hr (g/hr)	0.002 (1.0)	
Max. Airflow in Blow-by--gal/min (l/min)	34 (130)	
Max. Crankcase Pressure--in. H_2O (kPa)	2 (0.5)	

Performance Data	Prime	Standby
Rated Power--hp (kW)	180 (134)	197 (147)
Rated Speed--rpm	1800	1800
Low Idle Speed--rpm	1150	1150
Rated Torque--lb-ft (N•m)	1151 (849)	1266 (934)*
BMEP--psi (kPa)	228 (1569)	250 (1726)*
Friction Power @ Rated Speed--hp (kW)	23 (17)	23 (17)
Altitude Capability--ft (m)	10,000(3050)	10,000(3050)
Ratio--Air : Fuel	24* : 1	23* : 1
Smoke @ Rated Speed--Bosch No.	0.99*	0.99*
Noise--dB(A) @ 1 m	88.4*	88.8*

Fuel Consumption -- lb/hr (kg/h)	Prime	Standby
25 % Power	20.0 (9.1)	21.6 (9.8)
50 % Power	38.1 (17.3)	41.7 (18.9)*
75 % Power	51.0 (23.1)	57.8 (26.2)*
100 % Power	63.7 (28.9)	70.5 (32.0)

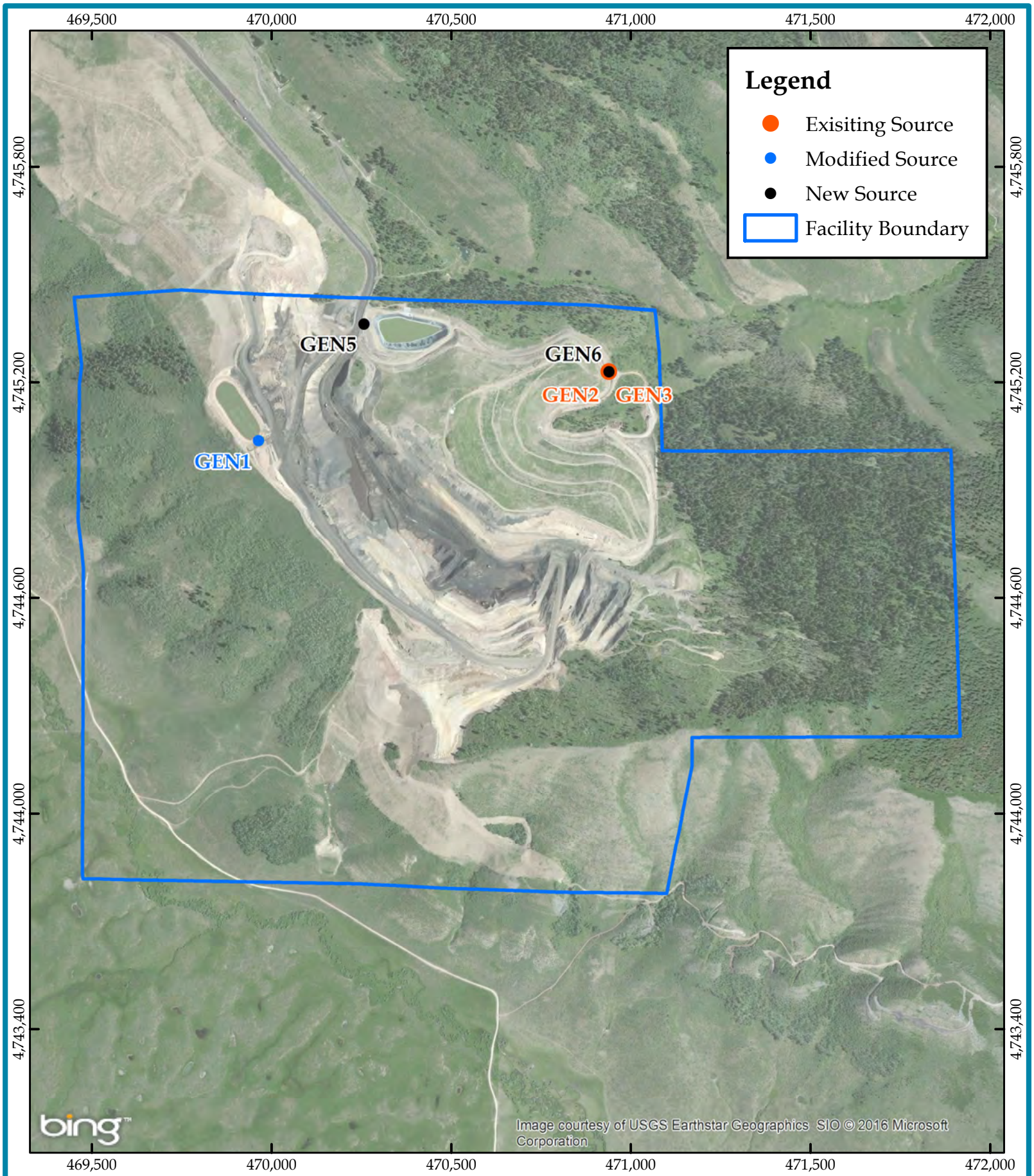
All values at rated speed and power with standard options unless otherwise noted.

* Revised Data

Curve 6068HF2851800197 ..... Sheet 2 of 2

June 2007

PP – Plot Plan



NAD 1983 UTM Zone 12N

0 0.25 0.5 1 km

N

Version: 03/2016

Project No. 303-3

PP-Plot Plan

South Rasmussen Mine

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Forms MI1-MI4 – Modeling

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
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PERMIT TO CONSTRUCT APPLICATION

Revision 3
4/5/2007

Please see instructions on page 2 before filling out the form.

Company Name:	P4 Production, L.L.C.
Facility Name:	South Rasmussen Mine
Facility ID No.:	029-00038
Brief Project Description:	Install two new 314 hp generators, remove the 53 hp generator, and relocate existing 180 hp generator.

SUMMARY OF AIR IMPACT ANALYSIS RESULTS - CRITERIA POLLUTANTS

		1.		2.	3.	4.		5.
Criteria Pollutants	**Averaging Period**	**Significant Impact Analysis Results (µg/m3)**	**Significant Contribution Level (µg/m3)**	**Full Impact Analysis Results (µg/m3)**	**Background Concentration (µg/m3)**	**Total Ambient Impact (µg/m3)**	**NAAQS (µg/m3)**	**Percent of NAAQS**
$PM_{2.5}$	24-hour	0.4	1.2	N/A	5.9	N/A	35.0	N/A
	Annual	0.1	0.3	N/A	1.8	N/A	12.0	N/A
PM_{10}	24-hour	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SO_2	1-hour	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3-hour	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	24-hour	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Annual	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NO_2	1-hour	22.2	7.5	85.3	20.7	106.0	188.0	56%
	Annual	1.3	1.0	4.5	1.9	6.4	100.0	6%
CO	1-hr	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	8-hr	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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Revision 3
3/27/2007

Please see instructions on page 2 before filling out the form.

Company Name:	P4 Production, L.L.C.
Facility Name:	South Rasmussen Mine
Facility ID No.:	029-00038
Brief Project Description:	Install two new 314 hp generators, remove the 53 hp generator, and relocate existing 180 hp generator.

POINT SOURCE STACK PARAMETERS

1.	2.	3a.	3b.	4.	5.	6.	7.	8.	9.	10.
Emissions units	**Stack ID**	**UTM Easting (m)**	**UTM Northing (m)**	**Base Elevation (m)**	**Stack Height (m)**	**Modeled Diameter (m)**	**Stack Exit Temperature (K)**	**Stack Exit Flowrate (acfm)**	**Stack Exit Velocity (m/s)**	**Stack orientation (e.g., horizontal, rain cap)**
Point Source(s)										
Haul Road Pond Generator	GEN5	470,257.45	4,745,362.95	2,107.66	2.44	0.10	719.82	1,162.00	67.64	Vertical
Primary Dump Generator	GEN2	470,938.78	4,745,230.14	2,084.28	1.73	0.15	758.15	1,514.00	39.17	Vertical
Alternate Dump Generator	GEN6	470,938.78	4,745,230.14	2,084.28	2.44	0.10	719.82	1,162.00	67.64	Vertical
Backup Dump Generator	GEN3	470,938.78	4,745,230.14	2,084.28	1.73	0.15	758.15	1,514.00	39.17	Vertical
Smith Pond Generator	GEN1	469,964.40	4,745,037.60	2,153.70	1.73	0.15	800.93	985.00	25.48	Vertical

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PERMIT TO CONSTRUCT APPLICATION
Revision 3
4/5/2007

Please see instructions on page 2 before filling out the form.

Company Name:	P4 Production, L.L.C.
Facility Name:	South Rasmussen Mine
Facility ID No.:	029-00038
Brief Project Description:	Install two new 314 hp generators, remove the 53 hp generator, and relocate existing 180 hp generator.

FUGITIVE SOURCE PARAMETERS

1.	2.	3a.	3b.	4.	5.	6.	7.	8.	9.	10.
Emissions units	**Stack ID**	**UTM Easting (m)**	**UTM Northing (m)**	**Base Elevation (m)**	**Release Height (m)**	**Easterly Length (m)**	**Northerly Length (m)**	**Angle from North (°)**	**Initial Vertical Dimension (m)**	**Initial Horizontal Dimension (m)**
Area Source(s)										
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Volume Source(s)										
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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Revision 3
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Please see instructions on page 2 before filling out the form.

Company Name:	P4 Production, L.L.C.
Facility Name:	South Rasmussen Mine
Facility ID No.:	029-00038
Brief Project Description:	Install two new 314 hp generators, remove the 53 hp generator, and relocate existing 180 hp generator.

BUILDING AND STRUCTURE INFORMATION

1.	2.	3.	4.	5.	6.	7.
Building ID Number	**Length (ft)**	**Width (ft)**	**Base Elevation (m)**	**Building Height (m)**	**Number of Tiers**	**Description/Comments**
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A

Form FRA – Federal Regulation Applicability

IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
1410 N. Hilton, Boise, ID 83706
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Preapplication Meeting Information Form FRA (Federal Requirements Applicability) - Regulatory Review

In each box in the table below, CTRL+click on the blue underlined text for instructions and information.

IDENTIFICATION	
1. Company Name:	2. Facility Name:
P4 Production, LLC	South Rasmussen Mine
3. Brief Project Description:	Install two new 314 hp generators, remove the 53 hp generator, and relocate existing 180 hp generator.

APPLICABILITY DETERMINATION	
4. List all applicable subparts of the New Source Performance Standards (NSPS) (40 CFR part 60). List all non-applicable subparts of the NSPS which may appear to apply to the facility but do not. Examples of NSPS-affected emissions units include internal combustion engines, boilers, turbines, etc. Applicant must thoroughly review the list of affected emissions units.	List of all applicable subpart(s): 40 CFR Part 60, Subpart A 40 CFR Part 60, Subpart IIII List of all non-applicable subpart(s) which may appear to apply but do not: ☐ Not Applicable
5. List applicable subpart(s) of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR part 61 and 40 CFR part 63). List all non-applicable subparts of the NESHAP which may appear to apply to the facility but do not. Examples of affected emission units include solvent cleaning operations, industrial cooling towers, paint stripping and miscellaneous surface coating. Reference EPA's webpage on NESHAPs for more information.	List of all applicable subpart(s): List of all non-applicable subpart(s) which may appear to apply but do not: 40 CFR Part 63, Subpart ZZZZ ☑ Not Applicable
6. For each subpart identified above, conduct a complete regulatory analysis using the instructions and referencing the example on the following pages. **Note** - Regulatory reviews must be submitted with sufficient detail so that DEQ can verify applicability and document in legal terms why the regulation does or does not apply. Regulatory reviews submitted with insufficient detail will be determined incomplete.	☐ A detailed regulatory review is provided (Follow instructions and example). ☐ DEQ has already been provided a detailed regulatory review. Give a reference to the document including the date. The detailed regulatory review will be provided at a later date.

Appendix B – Air Quality Modeling Report: South Rasmussen Mine in Soda Springs, Idaho

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Air Quality Modeling Report: South Rasmussen Mine in Soda Springs, Idaho

PREPARED FOR:
P4 PRODUCTION, LLC

PROJECT NO. 303-3
MARCH 2016

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1.0 Summary

The South Rasmussen Mine (SRM) is owned by P4 Production, LLC (P4) and was in production until 2013. Located approximately 20 miles northeast of Soda Springs, Idaho, currently only reclamation and remediation activities occur onsite. The center of the facility is located at 42° 51' 12.6" N and 111° 21' 38.9" W. More specific information regarding the facility location, including a map showing the location of the SRM facility and surrounding vicinity, is provided in Section 2.2.

Four stationary diesel-powered generators are currently used to power the Horseshoe Overburden Pile Pumping System. In general, the main proposed changes at the SRM facility will be to reconfigure the diesel generators as described in Table 1-1. No immediate changes to the pumping activities are expected.

The air quality analysis described in this modeling report for Idaho Department of Environmental Quality (DEQ) review demonstrates that emissions from the proposed project will not result in criteria pollutant impacts that exceed state or federal ambient air quality standards.

Table 1-1. Proposed Actions to Generators

Model ID	Generator	Proposed Action	Proposed Name
GEN1	Current Haul Road Pond Generator	Relocate to Smith Pond and update the rating	Smith Pond Generator
GEN2	Current Primary Horseshoe Pond Generator	Update the rating; will be replaced with New Generator (GEN6) at end of life	Primary Horseshoe Dump Generator
GEN3	Current Backup Horseshoe Pond Generator	Update the rating	Backup Horseshoe Dump Generator
GEN4	Current Horseshoe Pond Generator	Remove	-
GEN5	New Haul Road Pond Generator	New Generator	Haul Road Pond Generator
GEN6	New Alternate Horseshoe Dump Generator	New Generator	Alternate Horseshoe Dump Generator

2.0 Project Description and Background as it Relates to Modeling Analyses

The existing facility is a minor source of air pollution and currently operates under Permit to Construct Number P-2011.0015. The SRM facility is located in an attainment area for all criteria air pollutants, that is, existing air pollutant levels are less than the National Ambient Air Quality Standards (NAAQS). Emissions from the facility will remain less than 100 tons/year after the expansion, so it will remain a minor source and not subject to Prevention of Significant Deterioration (PSD) permitting. The proposed facility expansion will be a minor modification because the emissions associated with the modification will be less than significant emission rates (e.g., 15 tpy PM_{10}, 10 tpy $PM_{2.5}$, 100 tpy CO, 40 tpy SO_2, 40 tpy NO_X[1]), in accordance with the Idaho Air Rules (IDAPA 58.01.01) Section 006.108.

Based on SRM's review of emissions from new project sources (discussed in more detail in Section 3.2), SRM asserts that only $PM_{2.5}$ and NO_X need to be modeled. The PM_{10}, CO, and SO_2 emissions increases from the project do not exceed modeling thresholds and modeling is not required.

2.1 General Facility/Project Description

2.1.1 Existing Facility Process

While in operation, the South Rasmussen Mine provided phosphate ore for further refining into elemental phosphorous. During mining, activities included topsoil and rock stockpiling, crushing, screening, hauling, drilling and blasting, loading and dumping, wind erosion, and other miscellaneous activities; however, in 2013, mining operations ended. Reclamation has continued onsite since mine closure and is expected to continue until at least 2022. SRM is currently permitted to operate diesel generators at the facility.

2.1.2 New Facility Process

The generator replacement and modification project will add two new generators and will relocate one existing generator. No immediate changes to the pumping activities are expected.

2.2 Location of Project

__X__ A map showing the geographical location of the facility is provided in this section or a reference is provided to another location in the application where a map is provided.

Figure 2-1 shows the location of SRM facility and surrounding vicinity. The SRM facility is located in a rural area of the Caribou National Forest approximately 20 miles northeast of Soda Springs, Idaho. The center of the facility is located at 42° 51' 12.6" N and 111° 21' 38.9" W. The Universal Transverse Mercator (UTM) coordinate system projected in North American Datum of 1983 (NAD83), Zone 12, was used in the air quality modeling analysis to define all locations in the modeling domain (sources and receptors). Within the UTM NAD83 Zone 12 coordinate system, the SRM facility is located at 470,522 meters easting and 4,744,611 meters northing.

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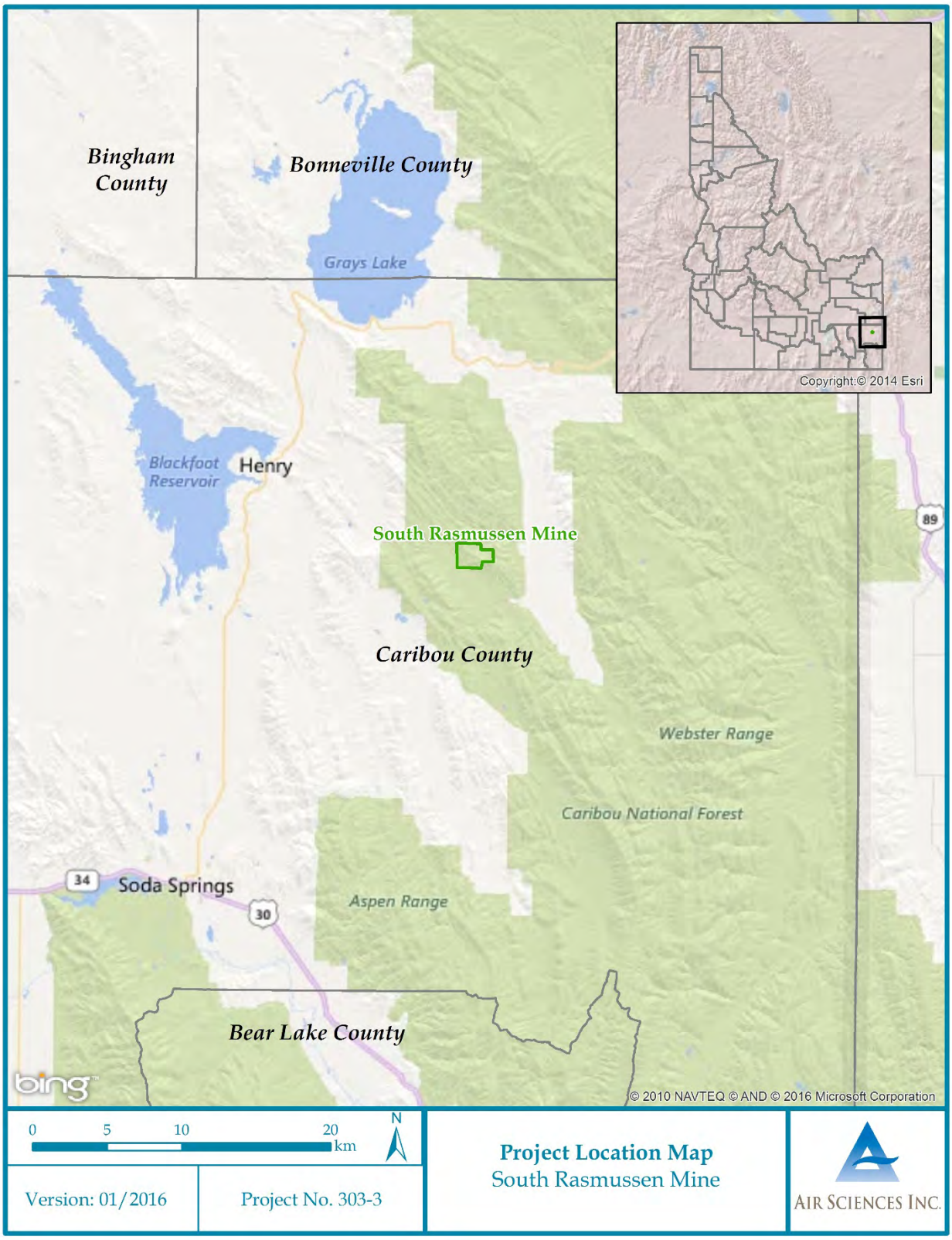
[1] PM_{10} and $PM_{2.5}$ = particulate matter less than 10 and 2.5 microns in aerometric diameter, respectively; CO = carbon monoxide; SO_2 = sulfur dioxide; NO_X = nitrogen oxides

Elevations within the facility's ambient air boundary range from approximately 6,500 feet above sea level to the southwest of the facility (shrubland) to approximately 7,200 feet to the eastern portion of the facility (forested). A forested ridge is located three kilometers to the southwest of SRM with elevations reaching approximately 7,700 feet. Areas north of SRM include forested terrain, including Rasmussen Ridge at approximately 7,800 feet and Henry Peak at approximately 8,300 feet in elevation. The town of Wayan, Idaho is located 9 miles to the north of the facility.

Consistent with a previous AERMOD (American Meteorological Society/ Environmental Protection Agency Regulatory Model) modeling analysis of the SRM facility in 2010 and based on a review of the current land use surrounding the SRM facility today, the land use in the vicinity of the facility is considered rural under the Auer land use scheme.

The SRM facility is located in an attainment area for all criteria air pollutants, that is, existing air pollutant levels are less than the NAAQS.

Figure 2-1. Project Location Map



2.3 Existing Permits and Modeling Analyses Performed

_X_ Any existing air quality permits are listed and described in this section, and any associated air quality modeling analyses have been described and referenced, and submitted if appropriate.

The SRM facility currently operates under Permit to Construct Number P-2011.0015. In 2011, P4 installed four generators to support reclamation and remediation activities. Due to the similarity between these projects, the previous air quality modeling analyses have not been included.

3.0 Modeling Analyses Applicability and Protocol

In this section, the estimated emissions and emissions changes from the SRM facility related to the proposed modifications are summarized and compared to their appropriate modeling trigger thresholds. In addition, discussion is provided regarding the applicable ambient air quality standards considered in the modeling analyses.

3.1 Applicable Standards

Ambient air quality standards are maximum concentrations of pollutants in ambient air that are considered protective of the public health. These standards are established by the Environmental Protection Agency (EPA) for air pollutants with known or anticipated human health effects. The estimated total ambient concentrations (modeled concentrations plus applicable background concentrations) from the modeling analysis are compared to the NAAQS for compliance demonstration.

Criteria pollutant NAAQS are listed along with significant impact levels (SILs) in Table 3-1. Note that Table 3-1 provided below is DEQ's full NAAQS table for all criteria pollutants. However, based on SRM's review of emissions from new/modified SRM project sources, only $PM_{2.5}$ and NO_2 (nitrogen dioxide) require explicit dispersion modeling for the proposed project. The SRM project emissions of PM_{10}, CO, SO_2, and Pb (lead) do not trigger modeling, and O_3 (ozone) is not typically modeled; therefore, these pollutants are not addressed further in this modeling analysis.

Table 3-1. Applicable Regulatory Limits

Pollutant	Averaging Period	Significant Impact Levels[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Design Value Used[d]
PM_{10}[e]	24-hour	5.0	150[f]	Maximum 6th highest[g]
$PM_{2.5}$[h]	24-hour	1.2	35[i]	Mean of maximum 8th highest[j]
	Annual	0.3	12[k]	Mean of maximum 1st highest[l]
Carbon monoxide (CO)	1-hour	2,000	40,000[m]	Maximum 2nd highest[n]
	8-hour	500	10,000[m]	Maximum 2nd highest[n]
Sulfur Dioxide (SO_2)	1-hour	3 ppb[o] (7.8 $\mu g/m^3$)	75 ppb[p] (196 $\mu g/m^3$)	Mean of maximum 4th highest[q]
	3-hour	25	1,300[m]	Maximum 2nd highest[n]
	24-hour	5	365[m]	Maximum 2nd highest[n]
	Annual	1.0	80[r]	Maximum 1st highest[n]
Nitrogen Dioxide (NO_2)	1-hour	4 ppb (7.5 $\mu g/m^3$)	100 ppb[s] (188 $\mu g/m^3$)	Mean of maximum 8th highest[t]
	Annual	1.0	100[r]	Maximum 1st highest[n]
Lead (Pb)	3-month[u]	NA	0.15[r]	Maximum 1st highest[n]
	Quarterly	NA	1.5[r]	Maximum 1st highest[n]
Ozone (O_3)	8-hour	40 TPY VOC[v]	75 ppb[w]	Not typically modeled

a. IDAPA Section 006 (definition for significant contribution) or as incorporated by reference per IDAPA Section 107.03.b.
b. Micrograms/cubic meter.
c. Incorporated into IDAPA by reference, per IDAPA Section 107.
d. The maximum 1st highest modeled value is always used for the significant impact analysis unless indicated otherwise. Modeled design values are calculated for each ambient air receptor.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
f. Not to be exceeded more than once per year on average over 3 years.
g. Concentration at any modeled receptor when using five years of meteorological data.
h. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
i. 3-year mean of the upper 98th percentile of the annual distribution of 24-hour concentrations.
j. 5-year mean of the 8th highest modeled 24-hour concentrations at the modeled receptor for each year of meteorological data modeled. For the SIL analysis, the 5-year mean of the 1st highest modeled 24-hour impacts at the modeled receptor for each year.
k. 3-year mean of annual concentration.
l. 5-year mean of annual averages at the modeled receptor.
m. Not to be exceeded more than once per year.
n. Concentration at any modeled receptor.
o. Interim SIL established by EPA policy memorandum.
p. 3-year mean of the upper 99th percentile of the annual distribution of maximum daily 1-hour concentrations.
q. 5-year mean of the 4th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of 1st highest modeled 1-hour impacts for each year is used.
r. Not to be exceeded in any calendar year.
s. 3-year mean of the upper 98th percentile of the annual distribution of maximum daily 1-hour concentrations.
t. 5-year mean of the 8th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of maximum modeled 1-hour impacts for each year is used.
u. 3-month rolling average.
v. An annual emissions rate of 40 ton/year of VOCs is considered significant for O_3.
w. Annual 4th highest daily maximum 8-hour concentration averaged over three years.

__N/A__ All TAPs [Toxic Air Pollutants] identified in the emissions inventory for the project are listed in the TAPs Emission Level (EL) and Acceptable Ambient Concentrations / Acceptable Ambient Concentrations for Carcinogens AAC/AACC Table in this section.

IDAPA 58.01.01 Section 161 states, "Any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation." DEQ may require toxics analyses on a case-by-case basis. However, per P4's discussion with DEQ and in accordance with IDAPA Section 210.20, all the sources associated with the SRM project's modifications are regulated by 40 CFR Part 60, Subpart IIII, and therefore are exempt from "further procedures for demonstrating preconstruction compliance" (IDAPA 58.01.01.210.20.b.) with toxic standards.

3.2 Criteria Pollutant Modeling Applicability

__X__ Explanations/documentation why modeling was or was not performed for each criteria pollutant are provided in this section.

__X__ Emissions calculations that clearly show how the modeling applicability determination was performed are provided in this section.

Following Idaho Department of Environmental Quality's modeling guidelines (IDEQ 2013), modeling needs to be conducted when the facility's or project's pollutant emissions exceed modeling thresholds. The facility criteria pollutant emission increases associated with the SRM proposed modification and associated modeling thresholds are shown in Table 3-2.

Table 3-2. SRM Criteria Pollutant Emissions and Modeling Thresholds

Pollutant	Type	New Project Sources	Units	Threshold[a]	Units	Required?
PM_{10}	Short-Term	0.09	*lb/hr*	0.22	*lb/hr*	No
$PM_{2.5}$	Short-Term	0.09	*lb/hr*	0.054	*lb/hr*	**Yes**
	Long-Term	0.37	*ton/yr*	0.35	*ton/yr*	**Yes**
CO	Short-Term	4.75	*lb/hr*	15	*lb/hr*	No
SO_2	Short-Term	0.01	*lb/hr*	0.21	*lb/hr*	No
	Long-Term	0.04	*ton/yr*	1.2	*ton/yr*	No
NO_X	Short-Term	1.71	*lb/hr*	0.2	*lb/hr*	**Yes**
	Long-Term	7.49	*ton/yr*	1.2	*ton/yr*	**Yes**

[a.] DEQ's Level 1 thresholds in Table 2 of the modeling guidelines (IDEQ 2013).

Table 3-3 lists criteria pollutants for which site-specific modeling analyses were performed to demonstrate compliance with NAAQS.

Table 3-3. Modeling Applicability

Criteria Pollutant	Modeled (yes/no)	Basis for Exclusion from Modeling
PM_{10} 24-hour	No	___ BRC Exempt[a]
		_X_ Emissions Below Level l Thresholds[b]
		___ Emissions Below Level II Thresholds[c]
$PM_{2.5}$ 24-hour	**Yes**	___ BRC Exempt
		___ Emissions Below Level l Thresholds
		___ Emissions Below Level II Thresholds
$PM_{2.5}$ annual	**Yes**	___ BRC Exempt
		___ Emissions Below Level l Thresholds
		___ Emissions Below Level II Thresholds
CO 1-hour, 8-hour	No	___ BRC Exempt
		_X_ Emissions Below Level l Thresholds
		___ Emissions Below Level II Thresholds
SO_2 1-hour, 3-hour	No	___ BRC Exempt
		_X_ Emissions Below Level l Thresholds
		___ Emissions Below Level II Thresholds
SO_2 annual	No	___ BRC Exempt
		_X_ Emissions Below Level l Thresholds
		___ Emissions Below Level II Thresholds
NO_2 1-hour	**Yes**	___ BRC Exempt
		___ Emissions Below Level l Thresholds
		___ Emissions Below Level II Thresholds
NO_2 annual	**Yes**	___ BRC Exempt
		___ Emissions Below Level l Thresholds
		___ Emissions Below Level II Thresholds

a. If the project would have qualified for a Category I BRC permitting exemption for the criteria pollutant in question, per IDAPA Section 221.01, except for the emissions quantities of another criteria pollutant, then a NAAQS compliance analysis is not required under Section 203.02 or 403.02 for that criteria pollutant.

b. Level I Modeling Thresholds from Table 2 in Section 3 of the DEQ Modeling Guideline. NAAQS compliance is assured through DEQ's non-site-specific modeling analyses.

c. Level II Modeling Thresholds from Table 2 in Section 3 of the DEQ Modeling Guideline. NAAQS compliance is assured through DEQ's non-site-specific modeling analyses. Level II Modeling Thresholds can only be used with prior DEQ approval.

3.3 TAP Modeling Applicability

__X__ Explanation/documentation on why modeling was or was not performed for emissions of each TAP identified in the emissions inventory of the application are provided in this section.

IDAPA 58.01.01 Section 161 states, "Any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation." DEQ may require toxics analyses on a case-by-case basis. However, per P4's discussion with DEQ and in accordance with IDAPA Section 210.20, all the sources associated with the SRM project's modifications are regulated by 40 CFR Part 60, Subpart IIII, and therefore are exempt from "further procedures for demonstrating preconstruction compliance" (IDAPA 58.01.01.210.20.b.) with toxic standards.

3.4 Modeling Protocol

__X__ If a protocol was submitted to DEQ prior to performing the modeling analyses, the protocol and DEQ's conditional protocol approval notice are included in Attachment A and Attachment B of this Modeling Report.

A modeling protocol was submitted to DEQ on February 3, 2016, and is included as Attachment A. The DEQ protocol approval letter dated and received on March 11, 2016, is included as Attachment B.

__X__ Concerns identified by DEQ in the protocol approval notice have been addressed in the analyses performed and in this Modeling Report.

4.0 Modeled Emissions Sources

__X__ The modeling emissions inventory and the emissions inventory presented in other parts of the permit application are consistent, and if they are not identical numbers, it is clearly shown, with calculations submitted, how the modeled value was derived from the value provided in the emissions inventory.

Table 4-1 shows the existing and proposed emission points and their modeling identifications used for the modeling analysis. Table 4-2 shows the emissions for each source. Table 4-3 shows a comparison of facility-wide PTE emissions pre- and post-project. The emission inventory is provided as an appendix to the associated PTC application.

Table 4-1. SRM Emission Sources and Modeling Identification

Model ID	Description	New, Existing, or Modified
GEN5	Haul Road Pond Generator	New
GEN2	Primary Horseshoe Dump Generator	Existing
GEN6	Alternate Horseshoe Dump Generator	New
GEN3	Backup Horseshoe Dump Generator	Existing
GEN1	Smith Pond Generator	Modified[a]

[a]Modified due to change of location.

Table 4-2. SRM Emission Rates for Existing and Proposed Sources

Model ID	NO_X *(lb/hr)*	NO_X *(lb/yr)*	$PM_{2.5}$ *(lb/day)*	$PM_{2.5}$ *(lb/yr)*	New, Existing, or Modified
GEN5	0.21	1,819	0.25	91	New
GEN2	2.07	18,146	2.49	907	Existing
GEN6	0.21	1,819	0.25	91	New
GEN3	2.07	18,146	2.49	907	Existing
GEN1	1.30	11,348	1.55	567	Modified[a]

[a]Modified due to change of location.

Table 4-3. SRM Emission Rates for Pre- and Post-Project

Annual Emissions	PM_{10} *(ton/yr)*	$PM_{2.5}$ *(ton/yr)*	CO *(ton/yr)*	SO_2 *(ton/yr)*	NO_X *(ton/yr)*
Pre-Project PTE Minus Fugitive Emissions	1.41	1.41	24.35	2.51	26.33
Post-Project PTE Minus Fugitive Emissions	1.28	1.28	36.67	0.07	25.64
Changes in PTE	-0.13	-0.13	12.32	-2.44	-0.69

4.1 Criteria Pollutants

AERMOD was run for the facility and the modeled impact added to the background concentration for comparison to the NAAQS.

For comparison to SILs, AERMOD was run for the expansion project sources (new and modified sources) for each pollutant and averaging time. If the maximum impact was less than the applicable SIL, then the analysis was assumed completed for that pollutant and averaging time. If the pollutant impact exceeded the SIL, a full impact analysis was conducted, which included impacts from both new and existing sources at the SRM facility. Emissions information related to the SIL and cumulative NAAQS analyses is provided below.

4.1.1 Modeled Emissions Rates for Significant Impact Level Analyses

__X__ Emissions rates in Table 4-4 are identical to those in the model input files for SIL analyses.

__X__ Calculations of modeled emissions are thoroughly documented in this section, and any unique handling of emissions in the model has been described.

The new and modified facility sources as listed above in Table 4-1 constitute the emission sources considered for the significant impact area (SIA) modeling analyses. These emissions are also provided in DEQ's requested format below. Table 4-4 lists criteria pollutant emissions rates used in the SIL analyses. The values in Table 4-4 are the representative pound-per-hour emission rates for each new source. The annual emission values, for example, were calculated by dividing the total pound-per-year emission rate by 8,760 hours. The daily emission rates were calculated by dividing the pound-per-day values by 24 hours. These pound-per-hour values for each averaging period were then converted to gram-per-second values for direct input for modeling.

Table 4-4. Modeled Emission Rates for SIL Analyses

Source ID	Source Description	Pollutant	Averaging Period	Emissions (lb/hr)[a]
GEN5	Haul Road Pond Generator	$PM_{2.5}$	24-Hour	0.01
			Annual	0.01
		NO_X	1-Hour	0.21
			Annual	0.21
GEN6	Alternate Horseshoe Dump Generator	$PM_{2.5}$	24-Hour	0.01
			Annual	0.01
		NO_X	1-Hour	0.21
			Annual	0.21
GEN1	Smith Pond Generator	$PM_{2.5}$	24-Hour	0.06
			Annual	0.06
		NO_X	1-Hour	1.30
			Annual	1.30

[a]Pound/hour emissions rate modeled is the potential/allowable emissions for the averaging period specified for the pollutant. NOTE: These pound/hour emission rates are effective rates.

4.1.2 Modeled Emissions Rates for Cumulative Impact Analyses

__X__Emissions rates in Table 4-5 are identical to those in the model input files for the cumulative NAAQS impact analyses.

__X__ Calculation of modeled emissions are thoroughly documented in this section (unless already described in Section 4.1.1), and any unique handling of emissions in the model have been described.

The new, modified, and existing sources as listed above in Table 4-1, constitute the SRM sources considered for the cumulative NAAQS modeling analyses. These emissions are also provided in DEQ's requested format below. Table 4-5 lists criteria pollutant emissions rates used in the cumulative NAAQS impact analyses for the SRM facility. The values in Table 4-5 are the representative pound-per-hour emission rates for each new and existing source. The annual emission values, for example, were calculated by dividing the total pound-per-year emission rate by 8,760 hours. The daily emission rates were calculated by dividing the pound-per-day values by 24 hours. The hourly emission rates were used directly. These pound-per-hour values for each averaging period were then converted to gram-per-second values for direct input to the modeling.

In accordance with communication with DEQ, the impacts from the nearby sources were not considered in the cumulative NAAQS analysis.

Table 4-5. Modeled Emissions Rates for Cumulative NAAQS Impact Analyses (SRM Facility)

Source ID	Source Description	Pollutant	Averaging Period	Emissions (lb/hr)[a]
GEN5	Haul Road Pond Generator	$PM_{2.5}$	24-Hour	0.01
			Annual	0.01
		NO_X	1-Hour	0.21
			Annual	0.21
GEN2	Primary Horseshoe Dump Generator	$PM_{2.5}$	24-Hour	0.10
			Annual	0.10
		NO_X	1-Hour	2.07
			Annual	2.07
GEN6	Alternate Horseshoe Dump Generator	$PM_{2.5}$	24-Hour	0.01
			Annual	0.01
		NO_X	1-Hour	0.21
			Annual	0.21
GEN3	Backup Horseshoe Dump Generator	$PM_{2.5}$	24-Hour	0.10
			Annual	0.10
		NO_X	1-Hour	2.07
			Annual	2.07
GEN1	Smith Pond Generator	$PM_{2.5}$	24-Hour	0.06
			Annual	0.06
		NO_X	1-Hour	1.30
			Annual	1.30

[a]Pound/hour emissions rate modeled is the potential/allowable emissions for the averaging period specified for the pollutant. NOTE: These pound/hour emission rates are effective rates.

4.1.3 NO_2/NO_X Ratio for NO_X Chemistry Modeling

The NO_X emissions from combustion sources are principally composed of nitrogen oxide (NO) and NO_2. Once in the atmosphere, the NO is converted to NO_2 through a chemical reaction with ambient O_3, as follows:

$$NO + O_3 \rightarrow NO_2 + O_2$$

Currently, EPA's Guideline on Air Quality Models (40 CFR 51, Appendix W) presents a three-tiered approach to convert annual NO_X impacts to annual NO_2 impacts for comparison to the annual NO_2 NAAQS. In EPA memoranda dated June 28, 2010, and March 1, 2011 (EPA 2010 and EPA 2011), the applicability of 40 CFR 51, Appendix W is further discussed in the context of modeling for compliance with the 1-hour NO_2 standard. To address the atmospheric conversion process, EPA recommends the following three-tiered screening approach for evaluating NO_2 impacts:

- Tier 1: Assume total conversion of NO to NO_2.
- Tier 2: Assume representative equilibrium NO_2/NO_X ratio (0.75 for annual and 0.80 for 1-hour).
- Tier 3: A detailed screening method may be used on a case-by-case basis.

The default Tier 1 method was used to estimate the NO_2 1-hour and annual impacts for this analysis.

4.1.4 Special Methods for Modeling Criteria Pollutant Emissions

The SRM modeling analyses do not require special handling of criteria pollutant emissions, such as the use of an external emissions file to handle emissions that vary in a unique manner, varying emissions by a specified factor, use of multiple operating scenarios, or other unique methods of handling emissions.

4.2 Toxic Air Pollutants

___N/A__ TAP emissions rates have been listed for each TAP that has project cumulative emissions exceeding the applicable EL.

__N/A__ Emissions rates are identical to those in the model input file for TAP analyses.

IDAPA 58.01.01 Section 161 states, "Any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation." DEQ may require toxics analyses on a case-by-case basis. However, per P4's discussion with DEQ and in accordance with IDAPA Section 210.20, all the sources associated with the SRM project's modifications are regulated by 40 CFR Part 60, Subpart IIII, and therefore are exempt from "further procedures for demonstrating preconstruction compliance" (IDAPA 58.01.01.210.20.b.) with toxic standards.

4.3 Emissions Release Parameters

___X___ Thorough justification/documentation of release parameters for all modeled sources is provided in this section.

__X__ The specific methods used to determine/calculate given release parameters is described in this section.

___X___ The release orientation of all point source stacks (horizontal, rain-capped, or uninterrupted vertical release) has been verified and is documented in this section.

A description of the source characterization is provided below. The locations of the modeled sources are shown in Figure 4-1. Detailed documentation of stack temperature and flow rates is provided as an appendix to the associated PTC application. Each modeled source is characterized in Table 4-6.

New Source Characterizations

The two new generator sets (GEN5 and GEN6) are located on the north side and east side of the existing mine pit, respectively. Each generator will be a Cummins Inc. engine rated at 314 horsepower (hp). These sources will be modeled as POINT sources with vertical release orientations at elevated temperatures in accordance with the manufacturer specifications.

Existing and Modified Source Characterizations

GEN2 and GEN3 are located on the east side of the existing mine pit and are both John Deere engines rated at 315 hp. GEN1 is located on the west side of the existing mine pit and is a John Deere engine rated at 197 hp. These sources will be modeled as POINT sources with vertical release orientations at elevated temperatures in accordance with manufacturer specifications.

Figure 4-1. Facility Layout Map

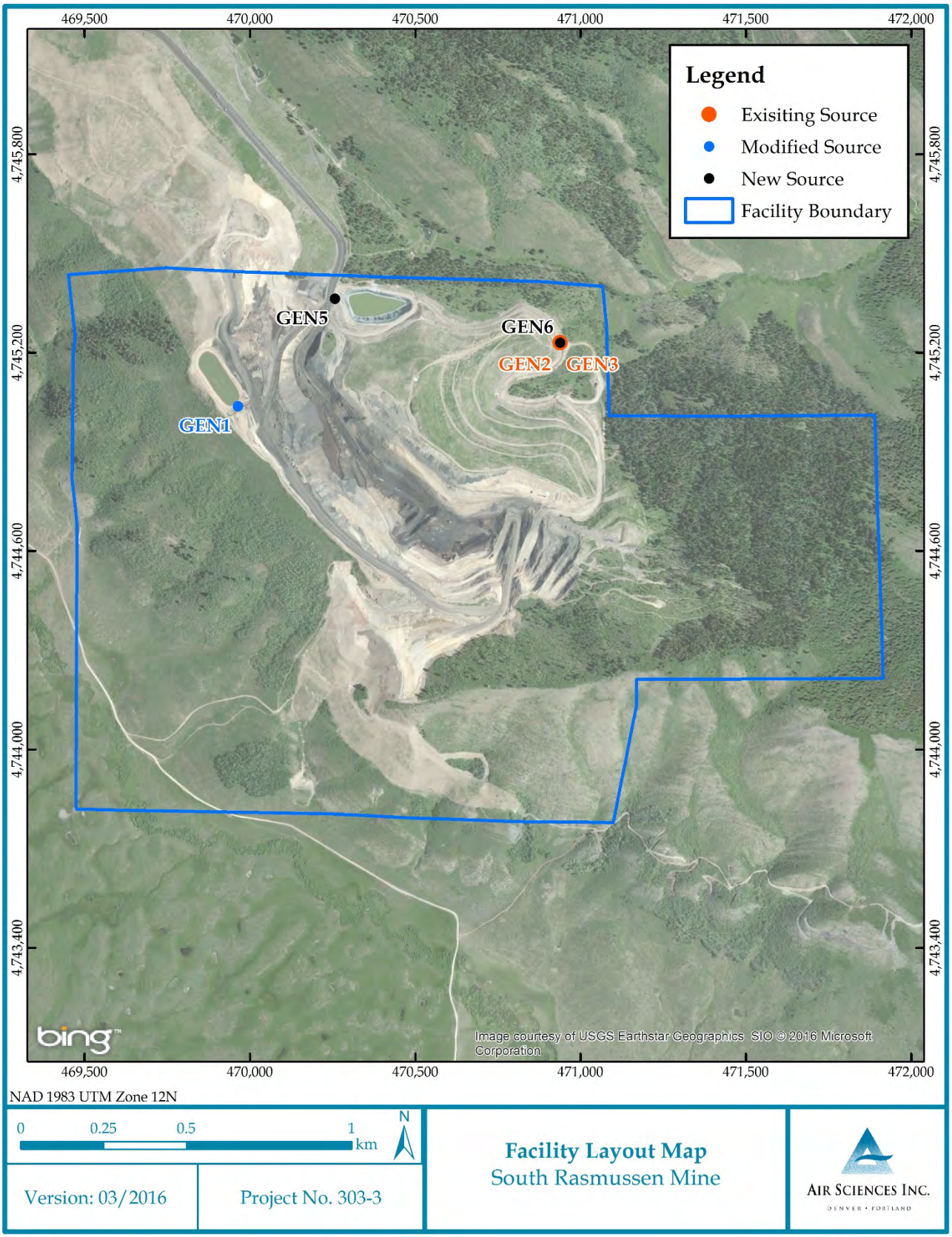


Table 4-6. Point Source Stack Parameters

Model ID	UTM Coordinates		Stack Height *(m)*	Stack Gas Flow Temp. *(K)*	Stack Gas Flow Velocity *(m/sec)*	Modeled Stack Diameter *(m)*	Orient. of Release
	Easting-X *(m)*	Northing-Y *(m)*					
GEN5	470,257	4,745,363	2.4	719.8	67.6	0.1	Vertical
GEN2	470,939	4,745,230	1.7	758.2	39.2	0.2	Vertical
GEN6	470,939	4,745,230	2.4	719.8	67.6	0.1	Vertical
GEN3	470,939	4,745,230	1.7	758.2	39.2	0.2	Vertical
GEN1	469,964	4,745,038	1.7	800.9	25.5	0.2	Vertical

5.0 Modeling Methodology

This section describes the specific methods and data used in the air impact analyses. Table 5-1 summarizes the key modeling parameters used in the impact analyses.

Table 5-1. Modeling Parameters

Parameter	Description/Values	Documentation/Addition Description
General Facility Location	20 miles northeast of Soda Springs, Idaho	Facility location is in an attainment or not classifiable for all criteria pollutants (i.e., facility is not located in a non-attainment area).
Model	AERMOD	AERMOD version 15181.
Meteorological Data	24156 surface data 24131 upper-air data	The meteorological model input files for this project were developed by DEQ. See Section 5.2 of this memorandum for additional details of the meteorological data.
Terrain	Considered	3-dimensional receptor coordinates were obtained from USGS National Elevation Dataset (NED) files and were used to establish elevation of ground level receptors. AERMAP was used to determine each receptor elevation and hill height scale.
Building Downwash	Not Considered	Due to the absence of buildings that might influence normal atmospheric flow in the proximity of the emission sources, no building downwash was accounted for.
NO_X Chemistry	Tier 1	See Section 4.1.3 explaining the treatment of NO_X chemistry.
Receptor Grid	**Significant Impact Analyses**	
	Grid 1	25-meter spacing along the ambient air boundary and along the Rasmussen Valley County Road in the southwest corner of the facility.
	Grid 2	50-meter spacing between the facility boundary and 2.5 kilometers from the facility boundary in elevated terrain.
	Grid 3	100-meter spacing between the facility boundary and 2.5 kilometers from the facility boundary not in elevated terrain.
	Grid 4	500-meter spacing between Grids 2 and 3 above, and 10 kilometers from the facility boundary.
	Grid 5	1,000-meter spacing between Grid 4 above, and 50 kilometers from the facility boundary.
	NAAQS Analyses	
	The same grid as above was used as the base grid to model for the NAAQS analysis. This base grid was then modified based on the SIA. The extent to which each pollutant was modeled for the NAAQS analysis was determined in accordance with DEQ/EPA guidance. The approximate significant impact extents are presented below.	
	Pollutant	**NAAQS Analysis Receptor Extent**
	$PM_{2.5}$ 24-hour & Annual	No Modeled Receptors Above SIL
	NO_2 1-hour	Explicit Receptors Above SIL (Out to 4.6 kilometers)
	NO_2 Annual	0.9-kilometer Radius from the Geometric Centroid of SRM Facility Boundary

5.1 Model Selection

__X__ The current versions of all models and associated programs were used in analyses, or alternate versions were specifically approved by DEQ.

__N/A__ Any non-default model options used were approved by DEQ in advance.

Air dispersion models are a collection of mathematical algorithms packaged into a computer program to simulate the atmospheric dispersion of an air pollutant. Air dispersion models typically require source data (emissions, location, physical characteristics, etc.) and meteorological data (wind speed and direction, temperature, mixing height, etc.) to predict pollutant concentrations at downwind receptor locations, as a result of a source's emissions. These air dispersion models are widely used to assess changes in the ambient air resulting from a project's air emissions and to demonstrate compliance with applicable ambient air quality standards.

This modeling analysis was conducted using the most recent version as of the date of this protocol (version 15181) of the AERMOD modeling system. AERMOD is an enhanced steady-state, Gaussian plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain (EPA 2004). The AERMOD modeling system is listed as the recommended model for short-range analysis (up to 50 kilometers) in the EPA-maintained Guideline on Air Quality Models, which is published as Appendix W to the Code of Federal Regulations, Title 40, Part 51 (40 CFR 51, Appendix W).

AERMOD has been routinely used for air quality analyses of facilities located in Idaho and elsewhere and is the appropriate model selection for this analysis.

5.2 Meteorological Data

__X__ Meteorological data files are provided with the application.

_N/A_ If meteorological data used for modeling were not provided by DEQ, then a detailed discussion of the data is provided along with documentation of the processing steps.

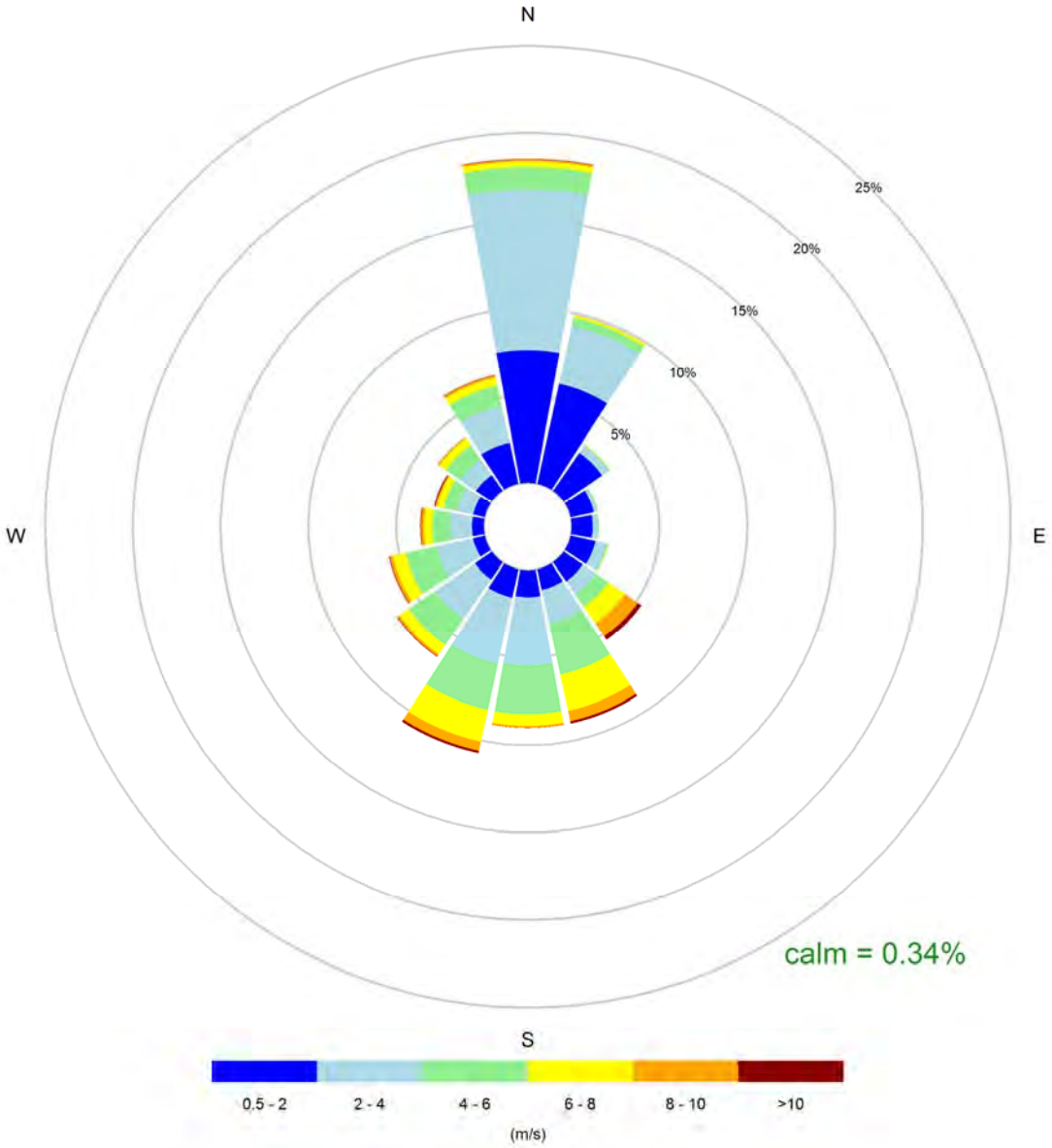
AERMOD requires the input of hourly meteorological data to estimate pollutant concentrations in the ambient air resulting from modeled source emissions. The EPA's Guideline on Air Quality Models (40 CFR 51, Appendix W) states that one year of site-specific data, or five years of representative hourly surface data, should be used for AERMOD dispersion modeling.

DEQ has provided SRM with five years (2004–2008) of AERMOD-ready meteorological data for modeling. The data provided are National Weather Service (NWS) surface meteorological data from the Pocatello Regional Airport in combination with upper-air data (soundings) from Boise, Idaho. The AERMOD-ready meteorological data provided to SRM were processed using AERMET version 06341,

not the most recent version of AERMET (version 15181). As suggested by DEQ, the version number was modified from 06341 to 15181 for this analysis.

The wind frequency distribution diagram for the Pocatello meteorological data set is shown in Figure 5-1.

Figure 5-1. Five-Year Wind Frequency Distribution Diagram for Pocatello (2004–2008)



5.3 Effects of Terrain

__X__ The terrain data, building corner locations, emissions sources, and the ambient air boundary are specified and are consistent such that the modeled plot plan accurately represents the facility and surroundings.

All receptors were processed with the AERMOD terrain preprocessor AERMAP (version 11103) to generate receptor terrain elevations and hill height values using 1/3-Arc-Second National Elevation Dataset (NED) elevation data obtained from the National Map Seamless Server[2] in a United States Geological Survey (USGS) GeoTIFF file format. AERMAP files are included in Attachment C.

5.4 Facility Layout

__X__ The facility layout plot plan is provided in this section that clearly and accurately depicts buildings, emissions points, and the ambient air boundary.

The emission points and ambient air boundary are located in Figure 4-1 in Section 4.3. No existing or proposed buildings are located at or near the SRM.

__X__ This section of the Modeling Report has thoroughly described how locations of emissions sources, building corners, and the ambient air boundary were determined, specifying the datum used.

The UTM coordinate system projected in NAD83, Zone 12, was used in the air quality modeling analysis to define all locations in the modeling domain (sources and receptors).

5.5 Effects of Building Downwash

There are no existing buildings located at or near SRM. Additionally, no buildings or structures are proposed to be constructed with this modification. Consistent with previous modeling of the facility in 2010, due to the absence of buildings that might influence normal atmospheric flow in the proximity of the emission sources, no building downwash was accounted for in AERMOD.

[2] http://www.mrlc.gov

5.6 Ambient Air Boundary

_N/A_ If any of the following apply, the effect on areas excluded from ambient air is thoroughly described in this section: a river/stream bisecting the facility; the facility is on leased property or is leasing property to another entity; the facility is not completely fenced; there are right-of-way areas on the facility; the nature of business is such that the general public have access to part or all of the facility.

__X__ This section thoroughly describes how the facility can legally preclude public access (and practically preclude access) to areas excluded from ambient air in the modeling analyses.

See Figure 4-1 in Section 4.3 for a plot of the SRM facility boundary relative to the SRM sources. The ambient air boundary is located around the SRM facility where public access is restricted through a combination of regular patrol by security personnel, surrounding private land ownership, gates, and signage. This ambient air boundary is consistent with the boundary utilized in the 2010 modeling analysis of the facility submitted to DEQ.

5.7 Receptor Network

__X__ This section of the Modeling Report provides justification that receptor spacing used in the air impact analyses was adequate to reasonably resolve the maximum modeled concentrations to the point that NAAQS or TAP compliance is assured.

The following receptor grid was utilized to sufficiently demonstrate that project areas of maximum pollutant concentration impact are below applicable standards. Figure 5-2 and Figure 5-3 show these receptors.

- Boundary receptors spaced at 25 meters along the facility boundary
- Receptors spaced at 25 meters along the Rasmussen Valley County Road in the southwest corner of the facility
- Fine grid receptors spaced at 100 meters between the facility boundary and 2.5 kilometers from the facility boundary, with receptors spaced at 50 meters in elevated terrain
- Medium grid receptors spaced at 500 meters between the fine grid and 10 kilometers from the facility boundary
- Coarse grid receptors spaced at 1,000 meters between the medium grid and 50 kilometers from the facility boundary

The maximum impacts from the SRM facility are located on the ambient air boundary where receptors were spaced at 25-meter intervals, assuring that maximum modeled impacts from the project were captured and no hot spot receptors were necessary. These receptor files are included in Attachment C.

Figure 5-2. Near-Field Receptors for Significant Impact Analysis

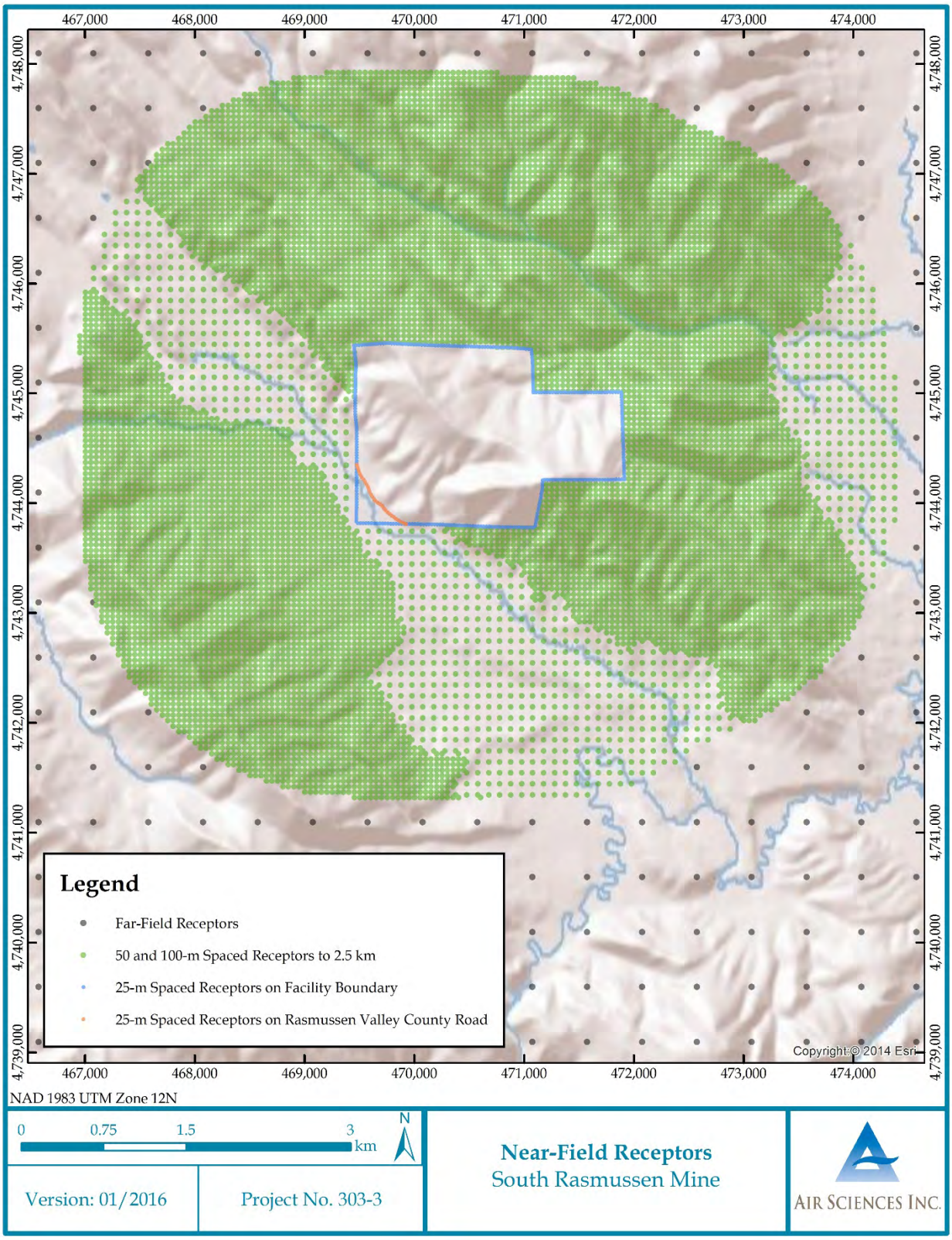
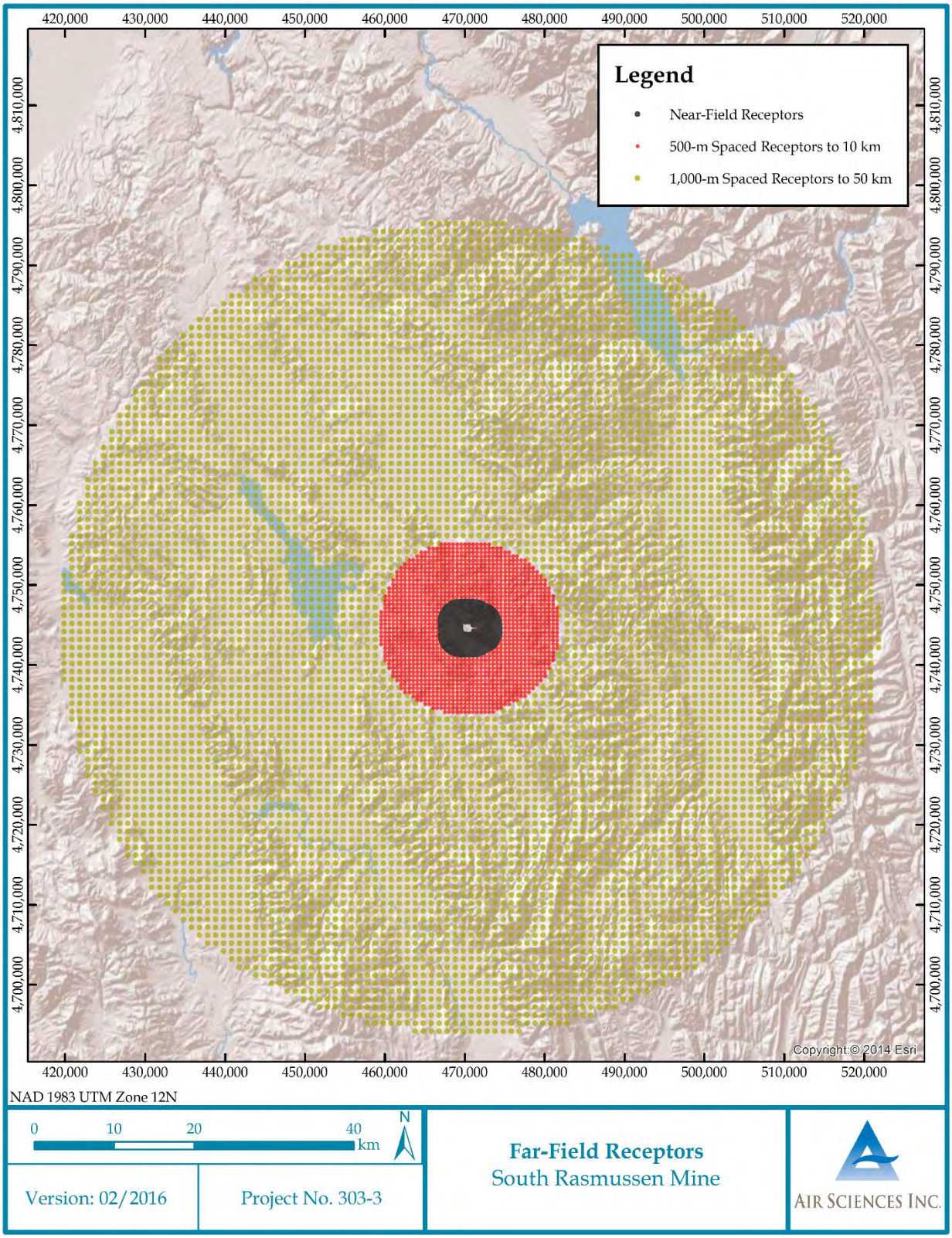


Figure 5-3. Far-Field Receptors for Significant Impact Analysis



5.8 Background Concentrations

__X__ Background concentrations have been thoroughly documented and justified for all criteria pollutants where a cumulative NAAQS impact analysis was performed.

Monitored pollutant concentrations, or background concentrations, are considered to be representative of the prevailing air pollution from the existing sources in the region. These background concentrations are added to the modeled ambient impacts from project emissions to estimate the total ambient concentrations at the modeled receptor locations.

The background concentrations used in the NAAQS analysis for SRM were obtained through the NW AIRQUEST Consortium (using the coordinate for the center of the facility) and are shown in Table 5-2.

Table 5-2. Background Concentrations for Compliance Demonstration

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)
$PM_{2.5}$	24-hour	5.9
	Annual	1.8
NO_2	1-hour	20.7
	Annual	1.9

5.9 NO_X Chemistry

___N/A__ If the Ozone Limiting Method (OLM) or the plume volume molar ratio method (PVMRM) were used to address NO_X chemistry, reasons for selecting one algorithm over the other are provided in this section.

Regulatory default options in AERMOD were used to estimate the ground-level concentrations for all the pollutants and averaging periods.

The NO_X emissions from combustion sources are principally composed of nitrogen oxide (NO) and NO_2. Once in the atmosphere, the NO is converted to NO_2 through a chemical reaction with ambient O_3, as follows:

$$NO + O_3 \rightarrow NO_2 + O_2$$

Currently, EPA's Guideline on Air Quality Models (40 CFR 51, Appendix W) presents a three-tiered approach to convert annual NO_X impacts to annual NO_2 impacts for comparison to the annual NO_2 NAAQS. In EPA memoranda dated June 28, 2010, and March 1, 2011 (EPA 2010 and EPA 2011), the applicability of 40 CFR 51, Appendix W, is further discussed in the context of modeling for compliance with the 1-hour NO_2 standard. To address the atmospheric conversion process, EPA recommends the following three-tiered screening approach for evaluating NO_2 impacts:

- Tier 1: Assume total conversion of NO to NO_2.
- Tier 2: Assume representative equilibrium NO_2/NO_X ratio (0.75 for annual and 0.80 for 1-hour).
- Tier 3: A detailed screening method may be used on a case-by-case basis.

The default Tier 1 method was used to estimate the NO_2 1-hour and annual impacts for this analysis.

6.0 Results and Discussion

6.1 Criteria Pollutant Impact Results

Based on the results provided in Table 6-2, the SRM facility is in compliance with the NAAQS for all modeled criteria pollutants.

6.1.1 Significant Impact Level Analyses

__X__ Model input and output files for SIL analyses have been provided with the application, with descriptions of the analyses associated with those files.

AERMOD was run for the SRM facility and the modeled impact added to the background concentration for comparison to the NAAQS.

For comparison to SILs, AERMOD was run for the proposed project sources (new and modified sources) for each pollutant and averaging time. If the maximum impact was less than the applicable SIL, then the analysis was assumed completed for that pollutant and averaging time. If the pollutant impact exceeded the SIL, a full impact analysis was conducted, which includes impacts from new, modified, and existing sources at the SRM facility.

Initially, the SIA is determined for every relevant averaging time for a particular pollutant. The final SIA for that pollutant is the largest area for each of the various averaging times. According to the EPA's *Draft – New Source Review Workshop Manual* (EPA 1990), the SIA is a circular area with a radius extending from the source to: 1) the most distant point where approved dispersion modeling predicts a significant ambient impact will occur, or 2) a modeling receptor distance of 50 kilometers, whichever is less. Therefore, an SIA cannot be greater than 50 kilometers for any pollutant. The SIA radius for SRM was limited to 50 kilometers because that is the upper limit of AERMOD's regulatory range, and EPA has clarified that an SIA radius should not exceed 50 kilometers.

For the 1-hour NO_2 SIA, following EPA guidance, the receptors to be considered for the 1-hour NO_2 analyses are based on the explicit receptors that have a multi-year average impact greater than the SILs, rather than a traditional impact area based on a circular radius.

Table 6-1 provides DEQ-requested information related to Class II SIAs from the proposed SRM project. Although not requested in DEQ's table, the results of the SIA analysis indicate an SIA for annual NO_2 of 0.9 km (as measured from the geometric centroid of the SRM facility). For the 1-hour NO_2 SIA analysis, explicit receptors above the 1-hour NO_2 SIL value were determined (out to 4.6 kilometers). Estimated $PM_{2.5}$ (24-hour and annual) values do not exceed the significant contribution level and therefore are considered completed and are not addressed further. The resulting receptor sets for the SIA were considered in the cumulative NAAQS model runs. The associated modeling files are included in Attachment C.

Table 6-1. Results for Significant Impact Analyses

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)	Significant Contribution Level ($\mu g/m^3$)	Impact Percentage of Significant Contribution Level	Cumulative NAAQS Analysis Required
$PM_{2.5}$	24-hour	0.4	1.2	29%	No
	Annual	0.1	0.3	20%	No
NO_2	1-hour	22.2	7.5	296%	Yes
	Annual	1.3	1.0	129%	Yes

6.1.2 Cumulative NAAQS Impact Analyses

__X__ Model input and output files for the cumulative NAAQS impact analyses are provided with the application.

__N/A__ If there were modeled NAAQS violations, all violations were analyzed and clearly show that the project did not significantly contribute to those modeled violations. If there were multiple violations at a given receptor, all cumulative impacts (including background) for the averaging period analyzed were ranked along with the project contribution, and the project contributions were below the applicable SIL. A table was included to show all ranked impacts above the NAAQS along with the project contribution.

There are no NAAQS violations, and all cumulative impacts are less than the NAAQS.

Table 6-2 provides results of the cumulative NAAQS impact analyses. Figure 6-1 and Figure 6-2 show the locations of the maximum modeled impacts from the cumulative NAAQS impact analyses. For all modeled pollutants and their respective averaging periods, the maximum impact locations are on the SRM facility fence line (25-meter spaced receptors). The associated modeling files are included in Attachment C.

Table 6-2. Results for Cumulative NAAQS Impact Analyses

Pollutant	Averaging Period	Modeled Design Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
NO_2	1-hour	85.3	20.7	106.0	188
	Annual	4.5	1.9	6.4	100

Figure 6-1. Map of Location of NO_2 1-hour Maximum Modeled Impact from NAAQS Analysis

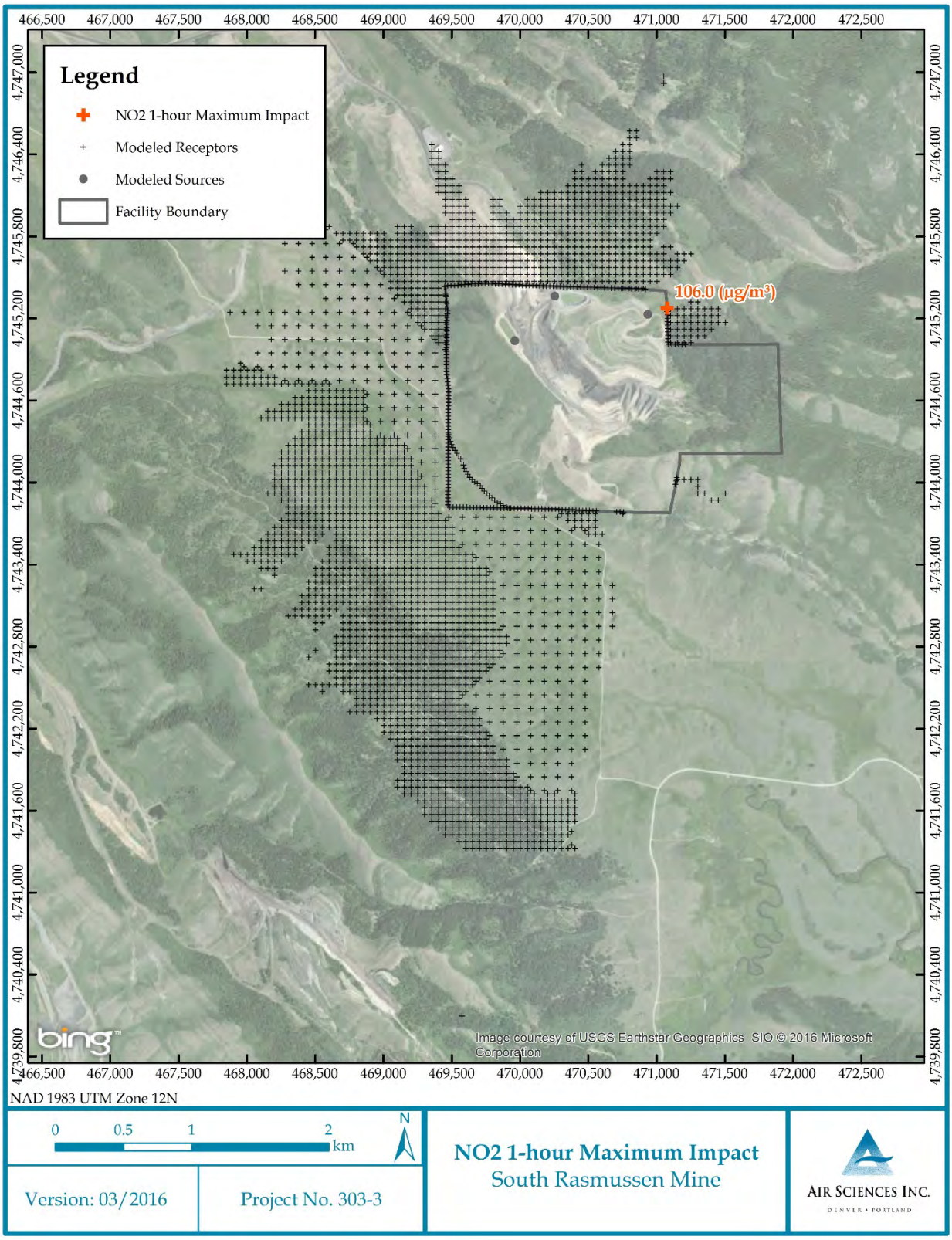
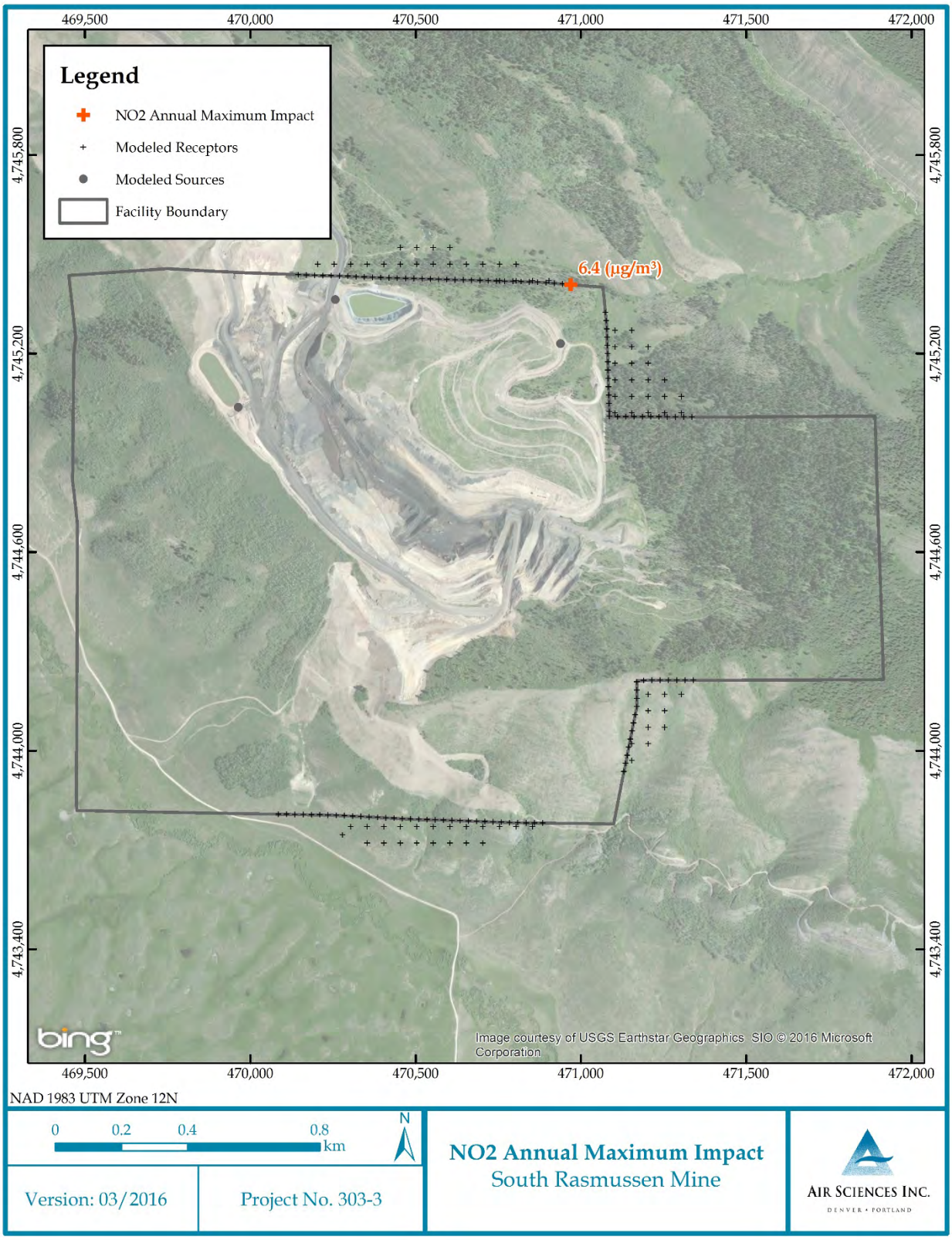


Figure 6-2. Map of Location of NO_2 Annual Maximum Modeled Impact from NAAQS Analysis



6.2 TAP Impact Analyses

IDAPA 58.01.01 Section 161 states, "Any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation." DEQ may require toxics analyses on a case-by-case basis. However, per P4's discussion with DEQ and in accordance with IDAPA Section 210.20, all the sources associated with the SRM project's modifications are regulated by 40 CFR Part 60, Subpart IIII, and therefore are exempt from "further procedures for demonstrating preconstruction compliance" (IDAPA 58.01.01.210.20.b.) with toxic standards.

7.0 Quality Assurance/Control

The modeling inputs for sources, buildings, and receptors were developed from several sources of information such as source diagrams and aerial photos (Google Earth, other) to determine that their spatial representations were appropriate and accurate. SRM has also utilized third-party software (Lakes View from Lakes Environmental) to review the building/source/receptor configurations in three dimensions for reasonableness compared to other data sources prior to input to AERMOD. Modeling files are included in Attachment C.

8.0 References

EPA. 1990. *Draft – New Source Review Workshop Manual.* October 1990.

EPA. 2004. *AERMOD: Description of Model Formulation*. EPA-454/R-03-004. September 2004.

EPA. 2010. *Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard.* June 28, 2010.

EPA. 2011. *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-Hour NO_2 National Ambient Air Quality Standard.* March 1, 2011.

IDEQ. 2013. *State of Idaho Guideline for Performing Air Quality Impact Analyses*. September 2013.

Attachment A – Modeling Protocol

P4 Production, LLC

Soda Springs Plant
1853 Highway 34
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Soda Springs, Idaho 83276-0816
Phone: (208) 547-4300
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February 3, 2016

Kevin Schilling
Dispersion Modeling Coordinator
Air Quality Division
Idaho Department of Environmental Quality
1410 N. Hilton
Boise, ID 83706

Subject: Air Quality Modeling Protocol: South Rasmussen Mine (Permit to Construct P-2011.0015)

Mr. Schilling:

P4 Production, LLC (P4) is hereby submitting the enclosed air quality modeling protocol (protocol) for the South Rasmussen Mine (SRM). The modeling outlined in this protocol will support an application to modify the SRM permit to construct. Currently, only reclamation and remediation activities occur onsite. These activities include the use of pumps powered by four diesel-powered stationary generators. The proposed changes associated with this modification include the replacement, relocation, or removal of three of the four currently permitted diesel generators. The full air quality modeling protocol is provided in Attachment A.

As discussed during the pre-application meeting on January 26, 2016, IDEQ is reviewing the meteorological data approved in the final modeling in 2010 for SRM. It is P4's understanding that IDEQ will provide guidance regarding the acceptable meteorological data or meteorological data processing procedures to be utilized for this project.

P4 appreciates your review of this protocol. Should you have any questions or require additional information, please feel free to contact me at (208) 547-1395.

Sincerely,

Molly Prickett
Environmental Engineer
P4 Production, LLC

Enclosure: Attachment A – Air Quality Modeling Protocol
cc: Sabrina Pryor, Air Sciences Inc.

Attachment A – Air Quality Modeling Protocol

AIR SCIENCES INC.

DENVER • PORTLAND • LOS ANGELES

Air Quality Modeling Protocol: South Rasmussen Mine in Soda Springs, Idaho

PREPARED FOR:
P4 PRODUCTION, LLC

PROJECT NO. 303-3
FEBRUARY 2016

Attachment A

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Appendix A – Criteria Pollutant Emissions Inventory

1.0 INTRODUCTION AND PURPOSE

1.1 Facility Description and Location

The South Rasmussen Mine (SRM) is owned by P4 Production, LLC (P4) and was in production until 2013. Located approximately 20 miles northeast of Soda Springs, Idaho, currently only reclamation and remediation activities occur onsite. Four diesel-powered stationary generators are used to power the Horseshoe Overburden Pile Pumping System. Figure 1 shows the location of the SRM and surrounding vicinity. The center of the facility is located at 42° 51′ 12.6″ N and 111° 21′ 38.9″ W.

The Universal Transverse Mercator (UTM) coordinate system projected in North American Datum of 1983 (NAD83), Zone 12, will be used in the air quality modeling analysis to define all locations in the modeling domain (sources and receptors).

1.2 Project Overview

In general, the main proposed changes at the SRM facility will be to relocate, replace, or remove three of the four currently permitted diesel generators. A summary of the proposed changes to each generator is presented in Table 1.

Table 1. Proposed Actions to Generators

Model ID	Generator	Proposed Action	Proposed Name
GEN1	Current Haul Road Pond Generator	Relocate to Smith Pond	Smith Pond Generator
GEN2	Current Primary Horseshoe Pond Generator	Replace with New Generator (GEN6)	-
GEN3	Current Backup Horseshoe Pond Generator	No Proposed Action	Backup Horseshoe Pond Generator
GEN4	Current Horseshoe Pond Generator	Remove	-
GEN5	New Haul Road Pond Generator	New Generator	Haul Road Pond Generator
GEN6	New Primary Horseshoe Pond Generator	New Generator	Primary Horseshoe Pond Generator

1.3 Goals of the Air Quality Analysis

The air quality analysis described in this modeling protocol is intended to demonstrate that emissions from the proposed project will not result in criteria pollutant impacts that exceed state or federal ambient air quality standards.

1.4 Applicable Regulations and Requirements

From an air quality perspective, the existing facility is a minor source of air pollution and currently operates under a Permit to Construct. The SRM is located in an attainment area for all criteria air pollutants; that is, existing air pollutant levels are less than the National Ambient Air Quality Standards (NAAQS). The proposed facility expansion will be a minor modification because the emissions associated with the modification will be less than significant emission rates (e.g., 100 tpy CO, 40 tpy NO_X, 40 tpy SO_2, 15 tpy PM_{10}, 10 tpy $PM_{2.5}$, etc.), in accordance with the Idaho Air Rules (IDAPA 58.01.01) Section 006.108.

Figure 1. Project Location Map

Pollutants of Concern

Criteria Pollutants – Following Idaho Department of Environmental Quality's (IDEQ) modeling guidelines (IDEQ 2013), modeling needs to be conducted when the facility's or project's pollutant emissions exceed modeling thresholds. The preliminary facility criteria pollutant emission increases associated with the proposed modification, along with the IDEQ modeling thresholds, are shown in Table 2. Based on Air Sciences' review of emissions from SRM's new project sources, Air Sciences asserts that only NO_X and $PM_{2.5}$ need to be modeled. The CO, SO_2, PM_{10}, and Pb emission increases from the project do not exceed modeling thresholds and modeling is not required. The NAAQS for the criteria pollutants to be modeled (NO_X and $PM_{2.5}$) are provided in Section 4.2. A detailed emissions inventory is provided in Appendix A.

Table 2. Estimated SRM Criteria Pollutant Emissions and Modeling Thresholds

Pollutant	Type	Estimated Emissions from SRM's New Project Sources	Units	IDEQ Level 1 Modeling Threshold[1]	Units	Modeling Required?
CO	Short-Term	4.75	*lb/hr*	15	*lb/hr*	No
NO_X	Short-Term	1.71	*lb/hr*	0.2	*lb/hr*	**Yes**
	Long-Term	7.49	*ton/yr*	1.2	*ton/yr*	**Yes**
SO_2	Short-Term	0.01	*lb/hr*	0.21	*lb/hr*	No
	Long-Term	0.04	*ton/yr*	1.2	*ton/yr*	No
PM_{10}	Short-Term	0.09	*lb/hr*	0.22	*lb/hr*	No
$PM_{2.5}$	Short-Term	0.09	*lb/hr*	0.054	*lb/hr*	**Yes**
	Long-Term	0.37	*ton/yr*	0.35	*ton/yr*	**Yes**
Pb	-	0.12	*lb/mo*	14	*lb/mo*	No

[1] IDEQ's Level 1 thresholds in Table 2 of the modeling guidelines.

Toxics – IDAPA 58.01.01 Section 161 states, "Any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation." IDEQ may require toxics analyses on a case-by-case basis. However, per P4's discussion with IDEQ and in accordance with the Idaho Air Rules Section 210.20, all the sources associated with the SRM project's modifications are regulated by 40 CFR Part 60, Subpart IIII and therefore are exempt from "further procedures for demonstrating preconstruction compliance" (IDAPA 58.01.01.210.20.b.) with toxic standards.

2.0 EMISSIONS AND SOURCE DATA

2.1 Description of Facility Processes and Emission Controls

It is anticipated that the entire facility may need to be modeled for this analysis. Thus, both new and existing sources will need to be considered.

2.1.1 Existing Facility Process

While in operation, the South Rasmussen Mine provided phosphate ore for further refining into elemental phosphorous. During mining, activities included topsoil and rock stockpiling, crushing, screening, hauling, drilling and blasting, loading and dumping, wind erosion, and other miscellaneous activities; however, in 2013, mining operations ended. Reclamation has continued onsite since mine closure and is expected to continue until at least 2022.

2.1.2 New Facility Process

The generator replacement and modification project will add two new generators and will relocate one existing generator. No immediate changes to the pumping activities are expected. The engine ratings of all proposed onsite generators are provided in Table 3.

Table 3. Onsite Generator Engine Ratings

Generator	Rating (*hp*)	New, Modified, or Existing
Haul Road Pond Generator	314	New
Primary Horseshoe Pond Generator	314	New
Backup Horseshoe Pond Generator	315	Existing
Smith Pond Generator	197	Modified[1]

[1] Modified source due to change of location.

2.2 Emission Sources

Table 4 shows the existing and proposed emission sources and their associated modeling IDs for the modeling analysis. Table 5 shows the NO_X and $PM_{2.5}$ emissions for each source. Table 6 shows a comparison of annual facility-wide Potential-to-Emit (PTE) emissions pre- and post-project. The locations of the sources are shown in Figure 2. Note that the emissions and source parameter information provided in this protocol are preliminary and subject to change prior to submittal of the permit application.

Table 4. SRM Emission Sources and Modeling Identification

Model ID	Description	New, Modified, or Existing
GEN5	Haul Road Pond Generator	New
GEN6	Primary Horseshoe Pond Generator	New
GEN3	Backup Horseshoe Pond Generator	Existing
GEN1	Smith Pond Generator	Modified[1]

[1] Modified source due to change of location.

Table 5. SRM Emission Rates for Existing and Proposed Sources

	NO_X		$PM_{2.5}$	
Model ID	*lb/hr*	*ton/yr*	*lb/hr*	*ton/yr*
GEN5	0.21	0.91	0.01	0.05
GEN6	0.21	0.91	0.01	0.05
GEN3	2.07	9.07	0.10	0.45
GEN1	1.30	5.67	0.06	0.28

Table 6. SRM Annual Emission Rates for Pre- and Post-Project

Annual Emissions	**CO** *ton/yr*	**NO_X** *ton/yr*	**SO_2** *ton/yr*	**PM_{10}** *ton/yr*	**$PM_{2.5}$** *ton/yr*
Pre-Project PTE Minus Fugitive Emissions	24.35	26.33	2.51	1.41	1.41
Post-Project PTE Minus Fugitive Emissions	28.73	16.57	0.05	0.83	0.83
Changes in PTE	4.38	-9.76	-2.45	-0.58	-0.58

Figure 2. Proposed Facility Layout Map

2.3 Source Parameters

Each modeled source is characterized in Table 7. For new sources, release characteristics are determined by engineering design and vendor specifications. These parameters are preliminary and subject to change prior to the submittal of the permit application for the project.

New Source Characterizations

The two new generator sets (GEN5 and GEN6) are located on the north side and east side of the existing mine pit, respectively. Each generator will be a Cummins Inc. engine rated at 314 horsepower (hp). These sources will be modeled as POINT sources with vertical release orientations at elevated temperatures in accordance with the manufacturer specifications.

Existing and Modified Source Characterizations

The existing and modified generator sets (GEN3 and GEN1) are located on the east side and west side of the existing mine pit, respectively. GEN3 and GEN1 are John Deere engines, rated at 315 hp and 197 hp, respectively. These sources will be modeled as POINT sources with vertical release orientations at elevated temperatures in accordance with manufacturer specifications.

Table 7. SRM Source Characterizations

Model ID	UTM E	UTM N	Elevation	Height	Temp.	Velocity	Diameter	New, Modified, or Existing
	m	*m*	*m*	*m*	*K*	*m/s*	*m*	
GEN5	470,257	4,745,363	2,155	2.4	719.8	30.1	0.2	New
GEN6	470,939	4,745,230	2,155	2.4	719.8	30.1	0.2	New
GEN3	470,939	4,745,230	2,155	2.4	758.2	39.2	0.2	Existing
GEN1	469,964	4,745,038	2,155	2.4	800.9	25.5	0.2	Modified[1]

[1] Modified source due to change of location.

3.0 AIR QUALITY MODELING METHODOLOGY

This section presents the air quality analysis methodology, data sets, and modeling techniques to be used to estimate the worst-case changes in ambient air quality levels that could result from the SRM facility.

3.1 Model Selection

Air dispersion models are a collection of mathematical algorithms packaged into a computer program to simulate the atmospheric dispersion of an air pollutant. Air dispersion models typically require source data (emissions, location, physical characteristics, etc.) and meteorological data (wind speed and direction, temperature, mixing height, etc.) to predict pollutant concentrations at downwind receptor locations, as a result of a source's emissions. These air dispersion models are widely used to assess changes in the ambient air resulting from a project's air emissions and to demonstrate compliance with applicable ambient air quality standards.

The proposed modeling analysis will be conducted using the most recent version as of the date of this protocol (version 15181) of the AERMOD (American Meteorological Society/ Environmental Protection Agency Regulatory Model) modeling system. AERMOD is an enhanced steady-state, Gaussian plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain (EPA 2004). The AERMOD modeling system is listed as the recommended model for short-range analysis (up to 50 kilometers) in the United States Environmental Protection Agency (EPA)-maintained Guideline on Air Quality Models, which is published as Appendix W to the Code of Federal Regulations, Title 40, Part 51 (40 CFR 51, Appendix W).

AERMOD has been routinely used for air quality analyses of facilities located in Idaho and elsewhere and is the appropriate model selection for this analysis.

All receptors will be processed with the AERMOD terrain preprocessor AERMAP (version 11103) to generate receptor terrain elevations and hill height values using 1/3-Arc-Second National Elevation Dataset (NED) elevation data obtained from the National Map Seamless Server (http://www.mrlc.gov/) in a United States Geological Survey (USGS) GeoTIFF file format.

3.2 Model Setup and Application

3.2.1 Model Options

Regulatory default options in AERMOD will be used to estimate the ground-level concentrations for all the pollutants and averaging periods.

3.2.2 Averaging Times

Emissions will be adjusted to account for the appropriate averaging periods in the modeling analysis. For example, for pollutants with a 1-hour averaging period (e.g., NO_2), emissions in lb/hr will be converted to g/sec for input to the model. For pollutants with 24-hour averaging periods (e.g., $PM_{2.5}$), daily emissions in lb/day will be divided by 24 hours/day to arrive at a daily average lb/hr value. For pollutants with annual averaging periods (e.g., $PM_{2.5}$ and NO_2), annual emissions in lb/year will be divided by 8,760 hours/year to arrive at an annual average lb/hr value.

3.2.3 Land Use

Consistent with previous AERMOD modeling of the SRM facility and based on a review of the current land use surrounding the SRM facility today, the land use in the vicinity of the facility is considered rural under the Auer land use scheme. The land immediately surrounding the project is characterized as primarily undeveloped, agricultural, inactive mining area, or active mining area.

3.2.4 Building Downwash

There are no existing buildings located at or near the South Rasmussen Mine. Additionally, no buildings or structures are proposed to be constructed with this modification. Consistent with previous modeling of the facility in 2010, due to the absence of buildings that might influence normal atmospheric flow in the proximity of the emission sources, no building downwash will be accounted for in AERMOD.

3.2.5 Chemical Conversion

The NO_X emissions from combustion sources are principally composed of nitrogen oxide (NO) and nitrogen dioxide (NO_2). Once in the atmosphere, NO is converted to NO_2 through a chemical reaction with ambient ozone (O_3), as follows:

$$NO + O_3 \rightarrow NO_2 + O_2$$

Currently, EPA's Guideline on Air Quality Models (40 CFR 51, Appendix W) presents a three-tiered approach to convert annual NO_X impacts to annual NO_2 impacts for comparison to the annual NO_2 NAAQS. In EPA memoranda dated June 28, 2010, and March 1, 2011 (EPA 2010 and EPA 2011), the applicability of 40 CFR 51, Appendix W is further discussed in the context of modeling for compliance with the 1-hour NO_2 standard. To address the atmospheric conversion process, EPA recommends the following three-tiered screening approach for evaluating NO_2 impacts:

- Tier 1: Assume total conversion of NO to NO_2.
- Tier 2: Assume representative equilibrium NO_2/NO_X ratio (0.75 for annual and 0.80 for 1-hour).
- Tier 3: A detailed screening method may be used on a case-by-case basis.

For 1-hour NO_2, the model will be initially run assuming full conversion of NO to NO_2, and a second-tier approach (using 0.80 as a default ambient ratio for the 1-hour NO_2 standard and 0.75 as a default ambient ratio for the annual NO_2 standard) may be utilized.

If compliance cannot be demonstrated with either of these two tiers, the non-default option of the Ozone Limiting Method (OLM), a Tier 3 method from 40 CFR 51, Appendix W, may be employed to estimate the NO_2 1-hour and annual impacts for this analysis. The OLM determines the limiting factor for NO_2 formation by comparing the estimated maximum NO_X concentration and the ambient O_3 concentration. The model assumes a total NO to NO_2 conversion when the ambient O_3 concentration is greater than the estimated maximum NO_X concentration; otherwise it is limited by the ambient O_3 concentration.

It should be noted that AERMOD NO_2 concentrations can be simulated using either OLM or PVMRM. However, EPA guidance (EPA 2011) indicates that preliminary model evaluation results show that the PVMRM option in AERMOD is not inherently superior to the OLM for purposes of estimating cumulative NO_2 concentrations. According to EPA (EPA 2011):

> *"The PVMRM algorithm as currently implemented may also have a tendency to overestimate the conversion of NO to NO_2 for low-level plumes by overstating the amount of ozone available for the conversion due to the manner in which the plume volume is calculated. The plume volume calculation in PVMRM does not account for the fact that the vertical extent of the plume based*

on the vertical dispersion coefficient may extend below ground for low-level plumes. This overestimation of the volume of the plume could contribute to overestimating conversion to NO_2."

In addition, results of monitor-to-monitor comparisons from recent studies show generally good model results with the use of OLM with the combined plume option OLM (keywords OLMGROUP ALL).

Given PVMRM's tendency to over-predict NO_2 concentrations, the combined plume option (keywords OLMGROUP ALL) of the OLM is appropriate and may be used for this analysis. Key model inputs for the OLM option in AERMOD are the in-stack ratios of NO_2/NO_X emissions and background ozone concentrations.

Additional input parameters for the OLM option include the following:

- Background O_3 Concentrations – The use of the PVMRM or OLM option in AERMOD requires the input of background O_3 concentrations. The O_3 concentration values may be input as a single value, as hourly values to correspond with the meteorological data, or as a temporally varying profile. Air Sciences will utilize the single background ozone concentration provided by IDEQ. If it is necessary to refine the ozone concentrations to utilize hourly ozone concentration profiles, Air Sciences will discuss this further with IDEQ.
- Ambient Equilibrium NO_2/NO_X Ratio – The AERMOD default NO_2/NO_X ambient equilibrium ratio of 0.90 will be used for this analysis.
- In-Stack NO_2/NO_X Ratio – The San Joaquin Valley Air Pollution Control District (SJVAPCD) has provided recommended NO_2/NO_X in-stack ratios for a variety of source categories in the California Air Pollution Control Officers Association's (CAPCOA) guidance document for NO_2 1-hour modeling (CAPCOA 2011). The SJVAPCD recommends an NO_2/NO_X in-stack ratio of 20 percent for diesel engines.

3.3 Receptors and Ambient Air Boundary

The following receptor grid is proposed to sufficiently demonstrate that project areas of maximum pollutant concentration impact are below applicable standards. Figure 3 and Figure 4 show these receptors (with the exception of the hot spot receptors).

- Boundary receptors spaced at 25 meters along the facility boundary
- Receptors spaced at 25 meters along the Rasmussen Valley County Road in the southwest corner of the facility

- Fine grid receptors spaced at 100 meters between the facility boundary and 2.5 kilometers from the facility boundary, with receptors spaced at 50 meters in elevated terrain

- Medium grid receptors spaced at 500 meters between the fine grid and 10 kilometers from the facility boundary

- Coarse grid receptors spaced at 1,000 meters between the medium grid and 50 kilometers from the facility boundary

- Hot spot receptors will be spaced at 25 meters, if necessary, to fully capture all impacts above applicable ambient air quality standards not located on the facility boundary

This ambient air boundary is located around the SRM facility where public access is restricted through a combination of regular patrol by security personnel, surrounding private land ownership, gates, and signage. Receptors within the ambient air boundary will not be modeled, with the exception of the receptors placed along the Rasmussen Valley County Road in the southwest corner of the facility. This ambient air boundary is consistent with the boundary utilized in the 2010 modeling analysis of the facility submitted to IDEQ.

Figure 3. Near-Field Receptors

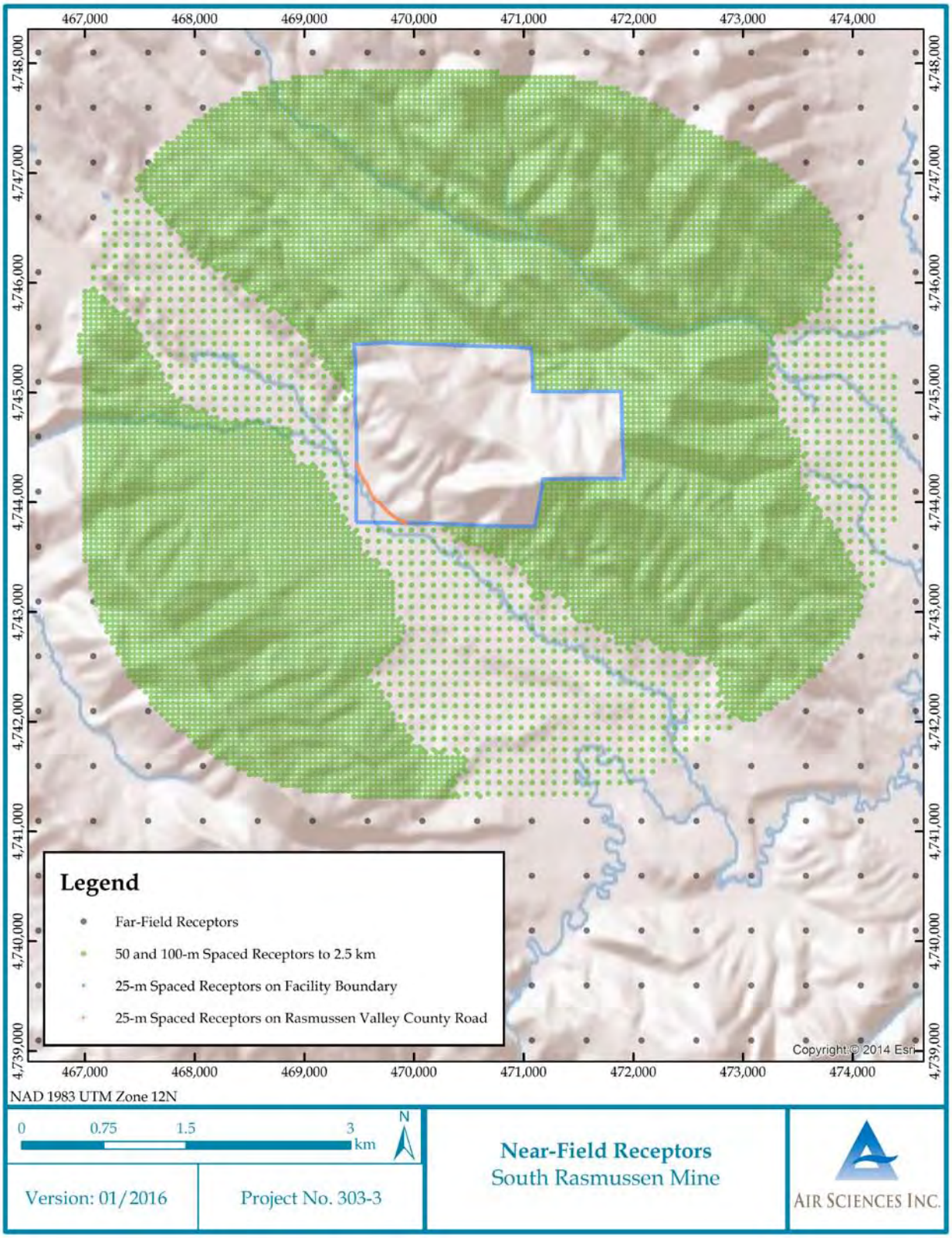
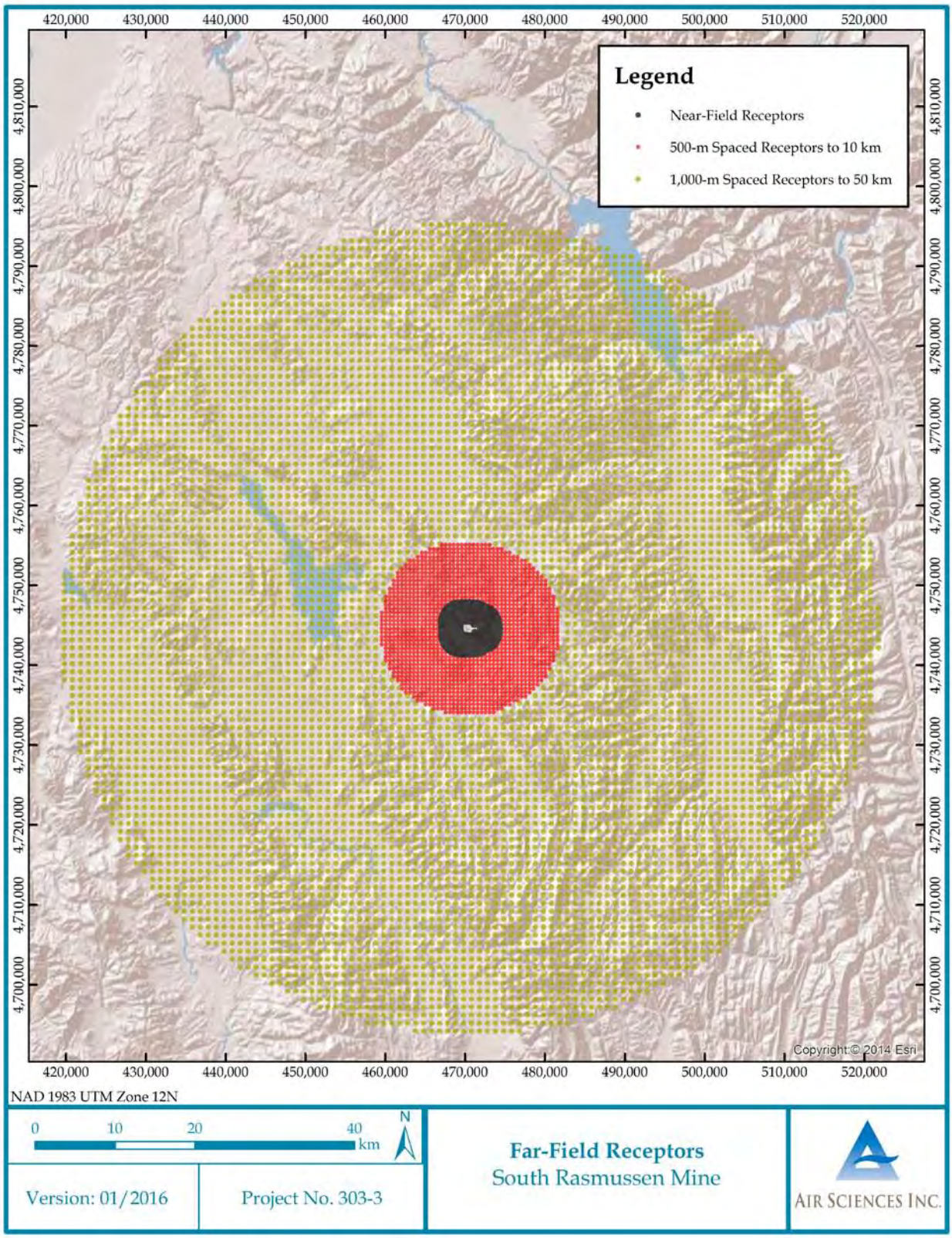


Figure 4. Far-Field Receptors



3.4 Meteorological Data

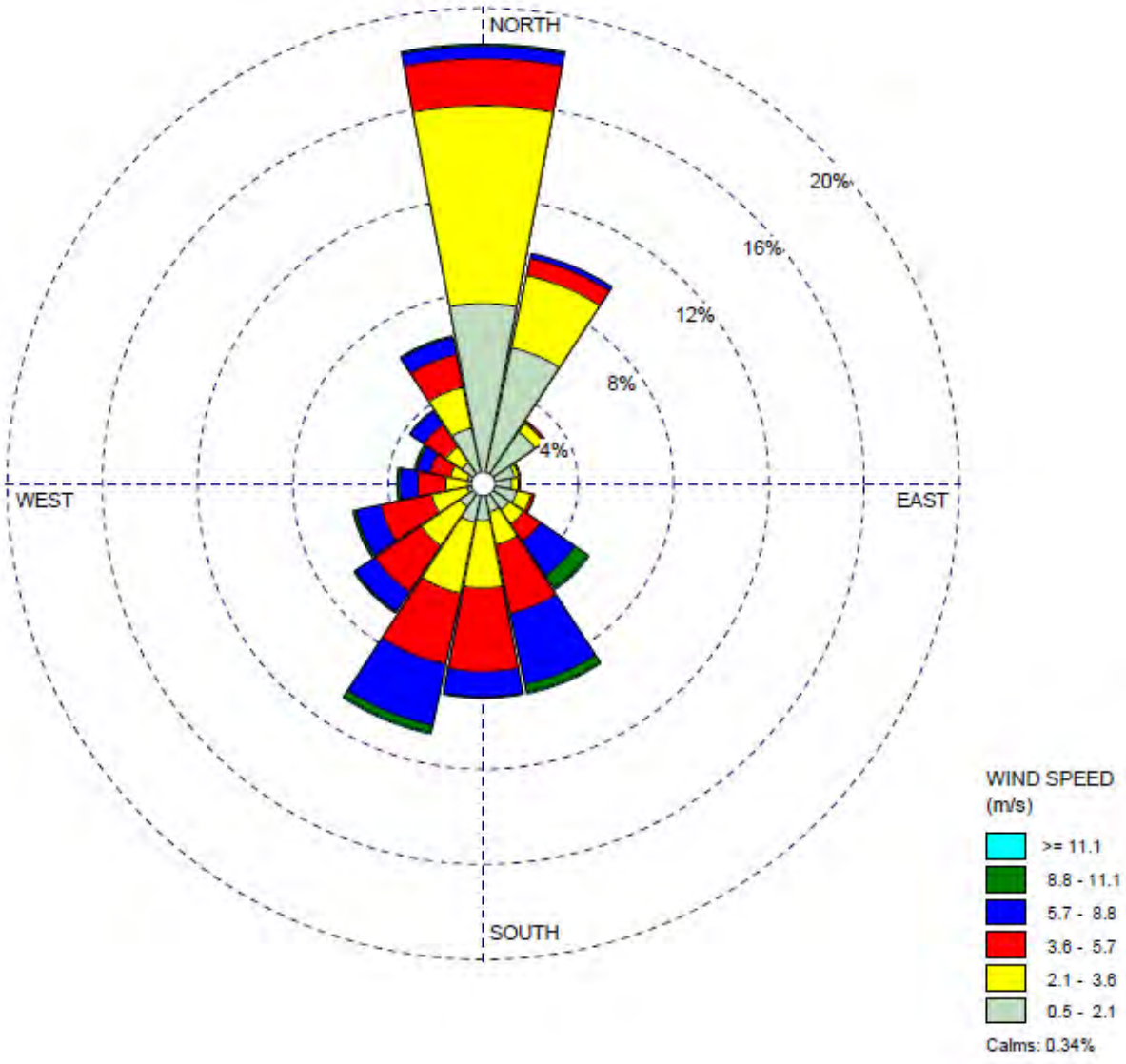
AERMOD requires the input of hourly meteorological data to estimate pollutant concentrations in the ambient air resulting from modeled source emissions. The EPA's Guideline on Air Quality Models (40 CFR 51, Appendix W) states that one year of site-specific data, or five years of representative hourly surface data, should be used for AERMOD dispersion modeling.

For the modeling analysis, SRM proposes to use five years (2004–2008) of AERMOD-ready meteorological data obtained at the nearby P4 Soda Springs facility. This data set was used in SRM's AERMOD modeling analysis in 2010 and is considered representative of the climatology and topography of the facility location. The data to be utilized are on-site meteorological data obtained at the nearby P4 Soda Springs facility, National Weather Service (NWS) surface meteorological data from the Pocatello Regional Airport, and upper-air data (soundings) from Boise, Idaho. Data from all three levels (65 m, 37 m, and 10 m) will be used for the on-site data.

Please note that the AERMOD-ready meteorological data provided to IDEQ in 2010 were processed using AERMET version 12345, not the most recent version of AERMET (version 15181). Per discussion with IDEQ at the pre-application meeting for this current SRM project, IDEQ is reviewing the data approved in the final modeling of the 2010 project. IDEQ will provide guidance to Air Sciences/P4 regarding the acceptable meteorological data or meteorological data processing procedures to be utilized for this project.

The wind frequency distribution diagram for the P4 meteorological data set is shown in Figure 5.

Figure 5. Five-Year Wind Frequency Distribution Diagram for SRM Project (2004–2008)



3.5 Background Concentrations

Monitored pollutant concentrations, or background concentrations, are considered to be representative of the prevailing air pollution from the existing sources in the region. These background concentrations are added to the modeled ambient impacts from project emissions to estimate the total ambient concentrations at the modeled receptor locations.

The background concentrations to be used in the NAAQS analysis for SRM were obtained through the NW AIRQUEST Consortium (using the coordinate for the center of the facility) and are shown in Table 8. SRM will utilize the single background values for the NAAQS compliance demonstration. If it is necessary to refine the background concentrations to demonstrate compliance (i.e., by season or time of day), SRM will discuss this further with IDEQ.

Table 8. Background Concentrations for Compliance Demonstration

Pollutant	Averaging Period	Background Concentration $\mu g/m^3$
NO_2	1-hour	20.7
	Annual	1.9
$PM_{2.5}$	24-hour	5.9
	Annual	1.8

4.0 APPLICABLE REGULATORY LIMITS

4.1 Methodology for Evaluation of Compliance with Standards

AERMOD (version 15181) will be run for the SRM facility, and for competing sources (as needed), and the impact will be added to the background concentration for comparison to the NAAQS.

4.1.1 Significant Impact Level (SIL) Analysis

4.1.1.1 Comparison to SILs

AERMOD will be run for the SRM expansion project sources (new and modified sources) for each pollutant and averaging time. If the maximum impact is less than the applicable SIL, then the analysis is assumed completed for that pollutant and averaging time. Table 9 provides the SILs to be considered for the criteria pollutants. If the pollutant impact exceeds the SIL, a full impact analysis will be conducted, which includes impacts from nearby sources.

Table 9. Significant Impact Levels

Pollutant	Averaging Period	SIL $\mu g/m^3$
NO_2	1-hour[1]	7.5
	Annual[2]	1
$PM_{2.5}$	24-hour [3]	1.2
	Annual[3]	0.3

[1] For the 1-hour NO2, the explicit receptors above the preliminary 1-hour NO2 SILs (multi-year average on a receptor-by-receptor basis) are considered in the full NAAQS analysis.
[2] For annual NO2, the maximum modeled concentrations are used to determine the significant impact areas (SIAs).
[3] For PM2.5, the average of the maximum modeled impacts averaged over five years on a receptor-by-receptor basis is utilized to determine the SIA.

Initially, the SIA is determined for every relevant averaging time for a particular pollutant. The final SIA for that pollutant is the largest area for each of the various averaging times. According to the EPA's Draft New Source Review Workshop Manual (EPA 1990), the SIA is a circular area with a radius extending from the source to: 1) the most distant point where approved dispersion modeling predicts that a significant ambient impact will occur, or 2) a modeling receptor distance of 50 kilometers, whichever is less. Therefore, a SIA cannot be greater than 50 kilometers for any pollutant. The SIA radius for SRM will be limited to 50 kilometers because that is the upper limit of AERMOD's regulatory range and EPA has clarified that an SIA radius should not exceed 50 kilometers.

For the 1-hour NO_2 SIA, following EPA guidance, the receptors to be considered for the 1-hour NO_2 analyses are based on the explicit receptors that have a multi-year average impact greater than the SILs, rather than a traditional impact area based on a circular radius.

4.2 Cumulative NAAQS Impact Analysis

4.2.1 Ambient Air Quality Standards

Ambient air quality standards are maximum concentrations of pollutants in ambient air that are considered protective of the public health. These standards are established by EPA for air pollutants with known or anticipated human health effects. The estimated total ambient concentrations (modeled concentrations plus applicable background concentrations) from the modeling analysis will be compared with the NAAQS for compliance demonstration.

IDEQ's modeling guidelines (IDEQ 2013) mention that the NAAQS levels for modeling consideration are incorporated into Idaho Air Rules Section 107.03.b. (revised as of July 1, 2014). This rule incorporates the federal NAAQS listed in 40 CFR 50 by direct reference into the Idaho air quality regulations. Since the Idaho modeling guidelines are dated 2013 and because the NAAQS for annual PM_{10} have been revoked by EPA, SRM assumes that the NAAQS to be considered in the modeling analysis, as listed in Table 10, only include the current federal NAAQS levels.

Table 10. NAAQS for Compliance Demonstration

Pollutant	Averaging Period	NAAQS $\mu g/m^3$	Form
NO_2	1-hour	188	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Annual	100	Annual mean
$PM_{2.5}$	24-hour	35	98th percentile, averaged over 3 years
	Annual	12	Annual mean, averaged over 3 years

The SRM project emissions of CO, SO_2, PM_{10}, and Pb do not trigger modeling, and these pollutants are not addressed further.

4.2.2 Competing Sources

If the pollutant impact exceeds the SIL, a full impact analysis will be conducted, which could include impacts from nearby sources. It is anticipated that the facility will have significant impacts and a competing source inventory will be needed. Given preliminary modeling testing of the facility, $PM_{2.5}$ is not expected to be significant beyond the facility boundary. The SIAs for 1-hour and annual NO_2 are approximately 11 km and 1 km from the center of the SRM facility, respectively. SRM requests that IDEQ provide competing nearby source inventories for NO_X

and $PM_{2.5}$. This inventory will be screened to identify the appropriate sources for use in a full impact model. A common long-term practice for selecting the "nearby" sources for explicit modeling was to follow a very prescriptive procedure in EPA's draft New Source Review Workshop Manual (EPA 1990). If the source is within SRM's SIA, then it will be explicitly modeled. For sources beyond the SIA, a Range of Influence (ROI) from the competing source will be determined from the emissions (Q - in TPY) divided by 20 following North Carolina's "20D" approach. The ROI radius for competing sources will be limited to 50 kilometers because that is the upper limit of AERMOD's regulatory range. If a competing source's long-term ROI overlaps SRM's long-term SIA, then that competing source will be modeled.

For the short-term analysis (e.g., 1-hour NO_2), an additional review step may be conducted. EPA recently clarified that "following such [Manual] procedures in a literal and uncritical manner may in many cases result in cumulative impact assessments that are overly conservative" (EPA 2011). The Guideline on Air Quality Models (40 CFR 51, Appendix W) is consistent with this approach, stating that professional judgment is required for ascertaining which sources should be explicitly modeled and which sources can be represented through ambient monitoring data. Per Section 8.2.3 of Appendix W, "all sources expected to cause a significant concentration gradient in the vicinity of the [applicant's source] should be explicitly modeled." This does not mean that a distant source could not have an overlapping impact. Rather, it suggests that this overlapping impact can be addressed using available monitoring data and incorporated in the background concentration, rather than by explicitly modeling the distant source. Thus, the concentration gradient screen, if applied, will be addressed on a source-by-source basis.

Once screened, the competing sources will then be included in the modeling for all pollutants and averaging times that are over the SIL. Only receptors within the SIA will be evaluated. For the short-term and long-term NO_2 evaluation, the SIL will be based on the NO_2 concentration.

4.3 Model Results and Compliance with NAAQS

For the cumulative NAAQS analysis, following IDEQ modeling guidance (IDEQ 2013), the following design concentrations will be used when demonstrating the SRM facility's compliance with the NAAQS.

NO_2

- 1-hour averaging period – maximum of 5-year averages (at each modeled receptor) of the 98th percentile of the annual distribution (equal to the 8th high) of maximum daily 1-hour ambient concentrations
- Annual averaging period – maximum of ambient concentrations at each receptor

For the cumulative NAAQS analyses for $PM_{2.5}$, Air Sciences proposes an alternate approach from the IDEQ modeling guidelines (IDEQ 2013). Regarding cumulative $PM_{2.5}$ modeling, IDEQ

modeling guidelines have not been updated to reflect EPA's current/final modeling guidance on $PM_{2.5}$. Current IDEQ guidelines request the use of the maximum (high-first-high) modeled concentrations in the cumulative NAAQS analysis. However, since the time the IDEQ modeling guidelines were written in 2013, EPA has released final modeling guidance that allows the use of the 98th percentile (high-eighth-high) 24-hour modeled $PM_{2.5}$ concentrations in the cumulative NAAQS analysis (EPA 2014). Thus, Air Sciences proposes the following for $PM_{2.5}$ modeling of the expansion project:

$PM_{2.5}$

- 24-hour averaging period – maximum of 5-year averages (at each modeled receptor) of the 98th percentile of the annual distribution (equal to the 8th high) of 24-hour concentrations
- Annual averaging period – maximum of multi-year average of annual ambient concentrations at each receptor

For these criteria pollutants, the maximum modeled design concentrations will be determined and added to the background concentrations. These estimated total ambient concentrations (modeled concentrations plus background concentrations) will be compared to the applicable NAAQS and presented in tabular form (along with impact receptor locations). The locations of the maximum modeled impacts will also be presented in graphical form.

5.0 REFERENCES

CAPCOA. 2011. *Modeling Compliance of The Federal 1-Hour NO_2 NAAQS*. October 27, 2011.

EPA. 1990. *Draft – New Source Review Workshop Manual*. October 1990.

EPA. 2004. *AERMOD: Description of Model Formulation*. EPA-454/R-03-004. September 2004.

EPA. 2010. *Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard*. June 28, 2010.

EPA. 2011. *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-Hour NO_2 National Ambient Air Quality Standard*. March 1, 2011.

EPA. 2014. *Guidance for $PM_{2.5}$ Permit Modeling*. Memorandum from Stephen D. Page (EPA Director) to Regional Air Division Directors, Regions 1-10. May 20, 2014.

IDEQ. 2013. *State of Idaho Guideline for Performing Air Quality Impact Analyses*. September 2013.

Appendix A – Criteria Pollutant Emissions Inventory

Air Sciences Inc.	PROJECT TITLE: South Rasmussen Mine	BY: S. Pryor		
	PROJECT NO: 303-3-1	PAGE: 1	OF: 5	SHEET: Criteria
AIR EMISSION CALCULATIONS	SUBJECT: South Rasmussen Mine	DATE: February 2, 2016		

EMISSIONS SUMMARY

Permitted		Haul Road Pond Generator	Primary Horseshoe Pond Generator	Backup Horseshoe Pond Generator	Horseshoe Pond Generator	Total
Total Output	*hp*	180	315	315	53	-
CO	*lb/hr*	1.47	1.81	1.81	0.48	**5.56**
	ton/yr	6.43	7.91	7.91	2.10	**24.35**
NO_X	*lb/hr*	1.19	2.08	2.08	0.65	**6.01**
	ton/yr	5.21	9.13	9.13	2.87	**26.33**
$PM/PM_{10}/PM_{2.5}$	*lb/hr*	0.09	0.10	0.10	0.03	**0.32**
	ton/yr	0.38	0.46	0.46	0.11	**1.41**
SO_2	*lb/hr*	0.26	0.12	0.12	0.08	**0.57**
	ton/yr	1.16	0.51	0.51	0.34	**2.51**
VOC	*lb/hr*	0.07	0.13	0.13	0.03	**0.36**
	ton/yr	0.32	0.56	0.56	0.14	**1.58**

Modification		GEN5 Haul Road Pond Generator[a]	GEN6 Primary Horseshoe Pond Generator[a]	GEN3 Backup Horseshoe Pond Generator[b]	GEN4 Horseshoe Pond Generator	GEN1 Smith Pond Generator[c]	Total
Total Output	*hp*	314	314	315	REMOVED	197	-
CO	*lb/hr*	1.81	1.81	1.81	-	1.13	**6.56**
	ton/yr	7.91	7.91	7.94	-	4.96	**28.73**
NO_X	*lb/hr*	0.21	0.21	2.07	-	1.30	**3.78**
	ton/yr	0.91	0.91	9.07	-	5.67	**16.57**
$PM/PM_{10}/PM_{2.5}$	*lb/hr*	1.04E-2	1.04E-2	0.10	-	6.48E-2	**0.19**
	ton/yr	4.55E-2	4.55E-2	0.45	-	0.28	**0.83**
SO_2	*lb/hr*	3.39E-3	3.39E-3	3.40E-3	-	2.13E-3	**1.23E-2**
	ton/yr	1.49E-2	1.49E-2	1.49E-2	-	9.32E-3	**5.40E-2**
VOC	*lb/hr*	9.69E-2	9.69E-2	0.67	-	0.42	**1.29**
	ton/yr	0.42	0.42	2.95	-	1.84	**5.64**
Pb	*lb/hr*	6.37E-5	6.37E-5	6.39E-5	-	4.00E-5	**2.31E-4**
	ton/yr	2.79E-4	2.79E-4	2.80E-4	-	1.75E-4	**1.01E-3**

[a] *New engine*
[b] *Existing engine*
[c] *Existing engine, moved to new location*

Modeling Applicability	CO	NO_X		PM_{10}	$PM_{2.5}$		SO_2		Pb
	lb/hr	*lb/hr*	*ton/yr*	*lb/hr*	*lb/hr*	*ton/yr*	*lb/hr*	*ton/yr*	*lb/month*
Haul Road Pond Generator - NEW ENGINE	1.81	0.21	0.91	1.04E-2	1.04E-2	4.55E-2	3.39E-3	1.49E-2	4.65E-2
Primary Horseshoe Pond Generator - NEW ENGINE	1.81	0.21	0.91	1.04E-2	1.04E-2	4.55E-2	3.39E-3	1.49E-2	4.65E-2
Smith Pond Generator - NEW LOCATION	1.13	1.30	5.67	6.48E-2	6.48E-2	0.28	2.13E-3	9.32E-3	2.92E-2
Total Emissions for Modeling Applicability [a]	4.75	1.71	7.49	8.55E-2	8.55E-2	0.37	8.92E-3	3.90E-2	0.12
Level I Thresholds [b]	15	0.20	1.20	0.22	0.054	0.35	0.21	1.2	14
Modeling Triggered?	No	**Yes**	**Yes**	No	**Yes**	**Yes**	No	No	No

[a] *The Backup Horseshoe Pond Generator is not included because it is an existing source*
[b] *IDEQ, Guideline for Performing Air Quality Impact Analyses Table 2, September-2013*

Conversions	
453.592	*g/lb*
2,000	*lb/ton*
1.34	*hp/kW*
3.281	*ft/m*
1,000,000	*Btu/MMBtu*

Assumptions			Reference
Ultra Low Sulfur Diesel (ULSD)	15	*ppm*	*Sulfur Content*
Distillate Oil Density	7.05	*lb/gal*	*AP-42, Appendix A*
Brake Specific Fuel Consumption	7,000	*Btu/hp-hr*	*AP-42, Table 3.3-1, Footnote a*
Diesel Fuel Heat Rate	137,000	*Btu/gal*	*AP-42, Appendix A*

SO_2 Emission Factor Calculation

SO_2 0.0049 *g/hp-hr* 0.0066 *g/kW-hr*

$$0.00490\ g/hp\text{-}hr = \frac{15\ \cancel{part\ S}}{1.00E+06\ \cancel{parts}} \cdot \frac{7.05\ \cancel{lb\ Fuel}}{\cancel{gal\ Fuel}} \cdot \frac{7{,}000\ \cancel{Btu}}{hp\text{-}hr} \cdot \frac{\cancel{gal\ Fuel}}{137{,}000\ \cancel{Btu}} \cdot \frac{2\ \cancel{lb}\text{-}SO_2}{\cancel{lb\ S}} \cdot \frac{453.6\ g}{\cancel{lb}}$$

Numbers in blue are direct entries.

Air Sciences Inc.	PROJECT TITLE: South Rasmussen Mine	BY: S. Pryor		
	PROJECT NO: 303-3-1	PAGE: 2	OF: 5	SHEET: Criteria
AIR EMISSION CALCULATIONS	SUBJECT: South Rasmussen Mine	DATE: February 2, 2016		

HAUL ROAD POND GENERATOR

CURRENT ENGINE		**MOVED TO THE SMITH POND SEE PAGE 5**	
Make/Model		John Deere/6068HF285	
Output (gross)	*Prime*	180 *hp*	*PTC No. P-2011.0015*
Model ID		GEN1	
NEW ENGINE			
Make/Model		Cummins Inc. QSB7-G9, C150D2RE	
Output (gross)	*Standby*	314 *hp*	*Man. Spec. Sheet: Cummins Power Generation, Exhaust Emission Data Sheet, C150D2RE*
		234 *kW*	
EPA Tier Rating		4	
Heat Input Rate		2.2 *MMBtu/hr*	
Fuel Type		Ultra Low Sulfur Diesel (ULSD)	
Fuel Consumption	*Standby*	11 *gal/hr*	*Man. Spec. Sheet*
		96,360 *gal/yr*	
Operation		24 *hr/day*	
		8,760 *hr/yr*	
Control		None	

Emission Factors			Reference
CO	2.61	*g/hp-hr*	*Man. Spec. Sheet*
NO_X	0.30	*g/hp-hr*	*Man. Spec. Sheet*
$PM_{2.5}/PM_{10}/PM$	0.015	*g/hp-hr*	*Man. Spec. Sheet*
VOC	0.14	*g/hp-hr*	*Man. Spec. Sheet*
SO_2	0.00490	*g/hp-hr*	*SO_2 Emission Factor Calculation*
Pb	2.90E-5	*lb/MMBtu*	*EPA, L & E for Lead* [a]

[a] *EPA 454/R-98-006, Locating and Estimating Air Emissions from Sources of Lead and Lead Compounds, Section 5.2.2, May 1998*

Modification Emissions	*lb/hr*	*lb/day*	*ton/yr*
CO	1.81	43.36	7.91
NO_X	0.21	4.98	0.91
$PM_{2.5}/PM_{10}/PM$	1.04E-2	0.25	4.55E-2
VOC	9.69E-2	2.33	0.42
SO_2	3.39E-3	8.14E-2	1.49E-2
Pb	6.37E-5	1.53E-3	2.79E-4

Modeling Parameters				Reference
Model ID	GEN5			
Discharge Height	8 *ft*	2.44 *m*		*Assumption based on Statement of Basis for GEN1*
Exhaust Gas Temp	836 *F*	719.8 *K*		*Man. Spec. Sheet*
Exhaust Gas Flow	1,162 *CFM*	33 *ACMM*		*Man. Spec. Sheet*
Exhaust Velocity	98.6 *ft/s*	30.06 *m/s*		
Stack Direction	Vertical			*Assumption based on Statement of Basis for GEN1*
Stack Shape	Circular			*Assumption based on Statement of Basis for GEN1*
Stack Diameter	0.50 *ft*	0.15 *m*		*Assumption based on Statement of Basis for GEN1*

Sample Calculations

NO_X Emissions

$$0.21\ lb/hr = \frac{0.30\ g}{hp\text{-}hr} \cdot \frac{314\ hp\text{-}hr}{hr} \cdot \frac{lb}{453.6\ g}$$

Numbers in blue are direct entries.

Air Sciences Inc.	PROJECT TITLE: South Rasmussen Mine	BY: S. Pryor		
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PRIMARY HORSESHOE POND GENERATOR

CURRENT ENGINE		**BEING REPLACED**	
Make/Model		John Deere/6068HF485	
Output (gross)	*Standby*	315 *hp*	*John Deere, 6068HF485, Nov-2007*
	Standby	235 *kW*	
EPA Tier Rating		3	
Model ID		GEN2	

NEW ENGINE			
Make/Model		Cummins Inc. QSB7-G9, C200D2RE	
Output (gross)	*Standby*	314 *hp*	*Man. Spec. Sheet: Cummins Power Generation, Exhaust Emission Data Sheet, C200D2RE*
		234 *kW*	
EPA Tier Rating		4	
Heat Input Rate		2.2 *MMBtu/hr*	
Fuel Type		Ultra Low Sulfur Diesel (ULSD)	
Fuel Consumption	*Standby*	11 *gal/hr*	*Man. Spec. Sheet*
		96,360 *gal/yr*	
Operation		24 *hr/day*	
		8,760 *hr/yr*	
Control		None	

Emission Factors		**Reference**
CO	2.61 *g/hp-hr*	*Man. Spec. Sheet*
NO_X	0.30 *g/hp-hr*	*Man. Spec. Sheet*
$PM_{2.5}/PM_{10}/PM$	0.015 *g/hp-hr*	*Man. Spec. Sheet*
VOC	0.14 *g/hp-hr*	*Man. Spec. Sheet*
SO_2	0.00490 *g/hp-hr*	*SO_2 Emission Factor Calculation*
Pb	2.90E-5 *lb/MMBtu*	*EPA, L & E for Lead* [a]

[a] *EPA 454/R-98-006, Locating and Estimating Air Emissions from Sources of Lead and Lead Compounds, Section 5.2.2, May 1998*

Modification Emissions	***lb/hr***	***lb/day***	***ton/yr***
CO	1.81	43.36	7.91
NO_X	0.21	4.98	0.91
$PM_{2.5}/PM_{10}/PM$	1.04E-2	0.25	4.55E-2
VOC	9.69E-2	2.33	0.42
SO_2	3.39E-3	8.14E-2	1.49E-2
Pb	6.37E-5	1.53E-3	2.79E-4

Modeling Parameters			**Reference**
Model ID	GEN6		
Discharge Height	8 *ft*	2.44 *m*	*Assumption based on Statement of Basis for GEN1*
Exhaust Gas Temp	836 *F*	719.8 *K*	*Man. Spec. Sheet*
Exhaust Gas Flow	1,162 *CFM*	33 *ACMM*	*Man. Spec. Sheet*
Exhaust Velocity	98.6 *ft/s*	30.06 *m/s*	
Stack Direction	Vertical		*Assumption based on Statement of Basis for GEN1*
Stack Shape	Circular		*Assumption based on Statement of Basis for GEN1*
Stack Diameter	0.50 *ft*	0.15 *m*	*Assumption based on Statement of Basis for GEN1*

Sample Calculations

NO_X Emissions

$$0.21\ lb/hr = \frac{0.30\ \frac{g}{\cancel{hp\text{-}hr}}}{} \cdot \frac{314\ \cancel{hp\text{-}hr}}{hr} \cdot \frac{lb}{453.6\ g}$$

Numbers in blue are direct entries.

Air Sciences Inc.	PROJECT TITLE: South Rasmussen Mine	BY: S. Pryor		
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BACKUP HORSESHOE POND GENERATOR

CURRENT ENGINE		**HIGHLIGHTED ITEMS ARE BEING MODIFIED**			
Make/Model		John Deere/6068HF485			
Output (gross)	*Standby*	315 *hp*	*Man. Spec. Sheet: John Deere, 6068HF485, Nov-2007*		
	Standby	235 *kW*		As Information Only:	
EPA Tier Rating		3		*From Permit PTC No. P-2011.0015*	
Heat Input Rate		2.2 *MMBtu/hr*		*Prime*	315 *hp*
Fuel Type		Ultra Low Sulfur Diesel (ULSD)		*Max Capacity*	185 *kW*
Fuel Consumption	*Standby*	110 *lb/hr*	*Man. Spec. Sheet*		
		16 *gal/hr*	*Using density of 7.05 lb/gal*	*From John Deere, 6068HF485, Nov-2007*	
		136,681 *gal/yr*		*Prime*	286 *hp*
Operation		24 *hr/day*		*Prime*	213 *kW*
		8,760 *hr/yr*			
Control		None			

Emission Factors			**Reference**
CO	3.5	*g/kW-hr*	*40 CFR 89.112, Table 1*
NO_X	4.0	*g/kW-hr*	*40 CFR 89.112, Table 1*
$PM_{2.5}/PM_{10}/PM$	0.20	*g/kW-hr*	*40 CFR 89.112, Table 1*
VOC	1.3	*g/kW-hr*	*40 CFR 89.112, Table 1*
SO_2	0.0066	*g/kW-hr*	*SO_2 Emission Factor Calculation*
Pb	2.90E-5	*lb/MMBtu*	*EPA, L & E for Lead* [a]

[a] *EPA 454/R-98-006, Locating and Estimating Air Emissions from Sources of Lead and Lead Compounds, Section 5.2.2, May 1998*

Current EF, From SOB, 4/5/2011				
CO	2.6	*g/hp-hr*	3.49	*g/kW-hr*
NO_X	3.0	*g/hp-hr*	4.02	*g/kW-hr*
PM_{10}	0.150	*g/hp-hr*	0.20	*g/kW-hr*
VOC	0.1836	*g/hp-hr*	0.25	*g/kW-hr*
SO_X	0.166	*g/hp-hr*	0.22	*g/kW-hr*
$PM_{2.5}$	0.1455	*g/hp-hr*	0.20	*g/kW-hr*
SO_X EF Calculated				
SO_X	0.6651	*g/hp-hr*	0.89	*g/kW-hr*
Sulfur	2,000	ppm		

$PM_{2.5}$ emissions were assumed to be 97% of PM_{10}

Modification Emissions	*lb/hr*	*lb/day*	*ton/yr*
CO	1.81	43.50	7.94
NO_X	2.07	49.71	9.07
$PM_{2.5}/PM_{10}/PM$	0.10	2.49	0.45
VOC	0.67	16.16	2.95
SO_2	3.40E-3	8.17E-2	1.49E-2
Pb	6.39E-5	1.53E-3	2.80E-4

Modeling Parameters					**Reference**
Model ID	GEN3				
Discharge Height	8	*ft*	2.44	*m*	*Assumption based on Statement of Basis for GEN1*
Exhaust Gas Temp	905	*F*	758.2	*K*	*Man. Spec. Sheet*
Exhaust Gas Flow	1,514	*CFM*	43	*ACMM*	*Man. Spec. Sheet*
Exhaust Velocity	128.5	*ft/s*	39.17	*m/s*	
Stack Direction	Vertical				*Assumption based on Statement of Basis for GEN1*
Stack Shape	Circular				*Assumption based on Statement of Basis for GEN1*
Stack Diameter	0.50	*ft*	0.15	*m*	*Assumption based on Statement of Basis for GEN1*

Sample Calculations

NO_X Emissions

$$2.1\ lb/hr = \frac{4.00\ g}{\cancel{kW\text{-}hr}} \cdot \frac{235\ \cancel{kW\text{-}hr}}{hr} \cdot \frac{lb}{453.6\ g}$$

Numbers in blue are direct entries.

Air Sciences Inc.	PROJECT TITLE: South Rasmussen Mine	BY: S. Pryor		
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SMITH POND GENERATOR

CURRENT ENGINE		**NEW AT THIS LOCATION, CURRENTLY PERMITTED AT HAUL ROAD POND**			
Make/Model		John Deere/6068HF285		As Information Only:	
Output (gross)	*Prime*	180 *hp*	*PTC No. P-2011.0015*	*From Permit PTC No. P-2011.0015*	
	Prime	134 *kW*		*Prime*	180 *hp*
EPA Tier Rating		3		*Prime*	134 *kW*
				Max Capacity	115 *kW*

REVISED ENGINE		**HIGHLIGHTED ITEMS ARE BEING MODIFIED**			
Make/Model		John Deere/6068HF285			
Output (gross)	*Standby*	197 *hp*	*Man. Spec. Sheet: John Deere, 6068HF285, March-2008*		
	Standby	147 *kW*		*From John Deere, 6068HF285, March-2008*	
EPA Tier Rating		3		*Standby*	197 *hp*
Heat Input Rate		1.4 *MMBtu/hr*		*Standby*	147 *kW*
Fuel Type		Ultra Low Sulfur Diesel (ULSD)		*Standby*	70 *lb/hr*
Fuel Consumption	*Standby*	70 *lb/hr*	*Man. Spec. Sheet*	*Prime*	180 *hp*
		10 *gal/hr*	*Using density of 7.05 lb/gal*	*Prime*	134 *kW*
		86,979 *gal/yr*		*Prime*	66 *lb/hr*
Operation		24 *hr/day*			
		8,760 *hr/yr*			
Control		None			

Emission Factors			**Reference**
CO	3.5	*g/kW-hr*	*40 CFR 89.112, Table 1*
NO_X	4.0	*g/kW-hr*	*40 CFR 89.112, Table 1*
$PM_{2.5}/PM_{10}/PM$	0.20	*g/kW-hr*	*40 CFR 89.112, Table 1*
VOC	1.3	*g/kW-hr*	*40 CFR 89.112, Table 1*
SO_2	0.00657	*g/kW-hr*	*SO_2 Emission Factor Calculation*
Pb	2.90E-5	*lb/MMBtu*	*EPA, L & E for Lead* [a]

[a] *EPA 454/R-98-006, Locating and Estimating Air Emissions from Sources of Lead and Lead Compounds, Section 5.2.2, May 1998*

Current EF, From SOB, 4/5/2011		
CO	3.7 *g/hp-hr*	4.96 *g/kW-hr*
NO_X	3.0 *g/hp-hr*	4.02 *g/kW-hr*
PM_{10}	0.220 *g/hp-hr*	0.30 *g/kW-hr*
VOC	0.1836 *g/hp-hr*	0.25 *g/kW-hr*
SO_X	0.6651 *g/hp-hr*	0.89 *g/kW-hr*
$PM_{2.5}$	0.2134 *g/hp-hr*	0.29 *g/kW-hr*
Sulfur	2,000 ppm	

$PM_{2.5}$ emissions were assumed to be 97% of PM_{10}

Modification Emissions	*lb/hr*	*lb/day*	*ton/yr*
CO	1.13	27.20	4.96
NO_X	1.30	31.09	5.67
$PM_{2.5}/PM_{10}/PM$	6.48E-2	1.55	0.28
VOC	0.42	10.10	1.84
SO_2	2.13E-3	5.11E-2	9.32E-3
Pb	4.00E-5	9.60E-4	1.75E-4

Modeling Parameters				**Reference**
Model ID	GEN1			
Discharge Height	8 *ft*	2.44 *m*		*Assumption based on Statement of Basis for GEN1*
Exhaust Gas Temp	982 *F*	800.9 *K*		*Man. Spec. Sheet*
Exhaust Gas Flow	985 *CFM*	28 *ACMM*		*Man. Spec. Sheet*
Exhaust Velocity	83.6 *ft/s*	25.48 *m/s*		
Stack Direction	Vertical			*Assumption based on Statement of Basis for GEN1*
Stack Shape	Circular			*Assumption based on Statement of Basis for GEN1*
Stack Diameter	0.50 *ft*	0.15 *m*		*Assumption based on Statement of Basis for GEN1*

Sample Calculations

NO_X Emissions

$$1.30\ lb/hr = \frac{4.00\ g}{\cancel{kW\text{-}hr}} \cdot \frac{147\ \cancel{kW\text{-}hr}}{hr} \cdot \frac{lb}{453.6\ g}$$

Numbers in blue are direct entries.

Attachment B – DEQ Protocol Approval Letter

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1410 NORTH HILTON, BOISE, ID 83706 · (208) 373-0502

C. L. "BUTCH" OTTER, GOVERNOR
JOHN TIPPETS, DIRECTOR

March 11, 2016

Molly Prickett
Environmental Engineer
P4 Production, LLC

RE: Modeling Protocol for Modification of the South Rasmussen Mine Facility near Soda Springs, Idaho

Molly:

DEQ received your dispersion modeling protocol submitted to on February 5, 2016. The modeling protocol was submitted on behalf of P4 Production, LLC (P4). The modeling protocol proposes methods and data for use in the ambient impact analyses of a Permit to Construct application for proposed modifications to their South Rasmussen Mine facility near Soda Springs, Idaho.

The modeling protocol has been reviewed and DEQ has the following comments:

- **Comment 1: Emissions Increase Calculation**. It is important to consider that the emissions modeled for a facility modification must be the change in allowable potential to emit (PTE). This can be substantially different from simply modeling the change from what was modeled in a previous analysis. Existing allowable PTE is the lesser of design capacity or emissions associated with the most restrictive permit provisions. The following is a hypothetical example:

  > Emissions from a specific engine are limited in a permit by both a pound per hour emissions limit and an hour per day operational restriction. After initial permitting, the $PM_{2.5}$ emissions factor for the engine decreases. The facility then decides to make a modification that requires increasing the hour per day limit. When calculating the change in allowable PTE, the existing pre-modification emissions must be calculated using the operational hours and the new, lower emissions factor rather than the higher emissions factor that was used in the previous analysis. However, if there is no limit on operational hours, then the change in emissions would simply be the difference between the emissions limit in the permit and the post-modification emissions limit needed.

- **Comment 2: Modeled Source Parameters**. The modeled point source release parameters (stack height, stack diameter, stack gas temperature, and flow velocity) appear to be reasonable; however, the application must provide documentation and justification of parameters used. Statements claiming that parameters were provided by equipment manufacturers is not adequate documentation and justification. The application must state how values were derived. If measurements were made, documentation of such measurements should be provided. If parameters were determined on the basis of estimations or calculations, these calculations should be provided. The level of documentation/justification necessary is somewhat dependent on the nature of the project and how close modeled impacts could be to applicable standards. If detailed documentation is not available for a source, the applicant/consultant may use values that can clearly be supported as conservative (values that will result in over-estimation of impacts). For example, it is likely that stack temperatures of 500 K and velocities of 25 meters/second could be easily defended as conservative for most operations of engines. If there is uncertainty with regard to what values will be acceptable on the basis of being clearly conservative, please contact the DEQ modeling coordinator.

- **Comment 3: Meteorological Data**: DEQ strives to use the most representative meteorological data available. DEQ concurs that meteorological data from the P4 station are reasonably representative for the application site for a minor source permit.

- **Comment 4: Background Concentrations**: DEQ concurs that use of the NWAIRQUEST 2009-2011 design values of criteria pollutants lookup tool is appropriate for the site. These values were generated from regional-scale airshed modeling.

- **Comment 5: Estimated Emissions Rates**: The protocol provided estimated emissions rates. The modeling group reviews modeling methods and data proposed, but does not review emissions calculation methods prior to receipt of the application. If you have questions on emissions calculations you should contact Bill Rogers (William.rogers@deq.idaho.gov 208-373-0437) or call the DEQ permitting hotline at 877-573-7648)

- **Comment 6: General Documentation:** Every permit application analysis must be complete in itself. Even though certain aspects of the analyses may have been addressed in a previous permitting project, the modification application cannot simply reference the materials of the previous application. Those materials/discussions must be resubmitted for the current application. For example, documentation/justification of stack parameters cannot involve simply stating that the previous application provided such documentation and conditions have not changed.

DEQ modeling staff considers the submitted dispersion modeling protocol, with consideration and resolution of the additional items noted above, to be approved. It should be noted, however, that the approval of this modeling protocol is not meant to imply approval of a completed dispersion modeling analysis. Please refer to the *State of Idaho Air Quality Modeling Guideline*, which is available on the Internet at http://www.deq.state.id.us/air/permits_forms/permitting/modeling_guideline.pdf, for further guidance.

If air impact analyses are required for the proposed project, a modeling analysis report must be submitted with the application. DEQ has developed an Air Impact Modeling Analyses Report Template Form (available on the DEQ webpage) and requests that it be used to submit model results and detailed descriptions of the analyses and inputs to DEQ as part of the permit application process. DEQ modeling staff also request submission of electronic copies of all modeling input and output files (including BPIP and AERMAP input and output files) with the analysis report. If DEQ provided model-ready meteorological data files, then resubmission of these files to DEQ with the application is not required.

If you have any further questions or comments, please contact me at (208) 373-0112.

Sincerely,

Kevin Schilling

Kevin Schilling
Stationary Source Air Modeling Coordinator
Idaho Department of Environmental Quality
208 373-0112
kevin.schilling@deq.idaho.gov

Attachment C – Modeling Files CD