Statement of Basis

Permit to Construct No. P-2019.0047
Project ID 62288

Perpetua Resources Idaho, Inc.
Stibnite, Idaho

Facility ID 085-00011

Final

June 17, 2022

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Permit Writer

The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01.et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
ANFO	ammonium nitrate/fuel oil
As	arsenic
ASTM	American Society for Testing and Materials
bkW	brake kilowatt
BT	Bradley Tailings
Btu	British thermal units
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CAS No.	Chemical Abstracts Service registry number
Cd	cadmium
CEMS	continuous emission monitoring systems
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CI	compression ignition
CMS	continuous monitoring systems
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent emissions
COC	contaminants of concern
COMS	continuous opacity monitoring systems
DEQ	Department of Environmental Quality
DR	development rock
DRSF	development rock storage facilities
dscf	dry standard cubic feet
EF	emission factors
EIS	Environmental Impact Statement required by the National Environmental Policy Act
EL	screening emission levels
EPA	United States Environmental Protection Agency
FDCP	Fugitive Dust Control Plan
FDRSF	Fiddle Development Rock Storage Facility
Forest Service	United States Forest Service
GACT	Generally Available Control Technology
gpm	gallons per minute
gr	grains (1 lb = 7,000 grains)
H_2SO_4	Sulfuric Acid
HAP	hazardous air pollutants
HFDRSF	Hangar Flats Development Rock Storage Facility
HFP	Hangar Flats Pit
Hg	mercury
hp	horsepower
hr/yr	hours per consecutive 12-calendar-month period
HVAC	heating, ventilation, and air conditioning
ICE	internal combustion engines
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometers
lb/hr	pounds per hour
lb/qtr	pound per quarter

LMP	lime manufacturing plant
MACT	Maximum Achievable Control Technology
MMGU	Middle Marble Geologic Unit
PRI	Perpetua Resources Idaho, Inc.
MMBtu	million British thermal units
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
Ni	nickel
NF	National Forest System road
NMMP	nonmetallic mineral processing
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
NSPS	New Source Performance Standards
NSR	New Source Review
O&M	operation and maintenance
O_2	oxygen
PAH	polycyclic aromatic hydrocarbons
Pb	lead
PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
POM	polycyclic organic matter
POX	pressure oxidation
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
PW	process weight rate
RICE	reciprocating internal combustion engines
Rules	*Rules for the Control of Air Pollution in Idaho*
SAG	semi-autogenous grinding
Sb	antimony
scf	standard cubic feet
SCL	significant contribution limits
Se	selenium
SGP	Stibnite Gold Project
SIP	State Implementation Plan
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO_2	sulfur dioxide
STKP	crusher stockpile
Subsection 210.20	HAP TAP exemption for NSPS and NESHAP sources in IDAPA 58.01.01.210.20
T/day	tons per calendar day
T/hr	tons per hour
T/yr	tons per consecutive 12-calendar-month period
TAP	toxic air pollutants
ULSD	ultra-low sulfur diesel
U.S.C.	United States Code
VOC	volatile organic compounds
WEDRSF	West End Development Rock Storage Facility

WEP	West End pit
YPDRSF	Yellow Pine Development Rock Storage Facility
YPP	Yellow Pine Pit
$\mu g/m^3$	micrograms per cubic meter

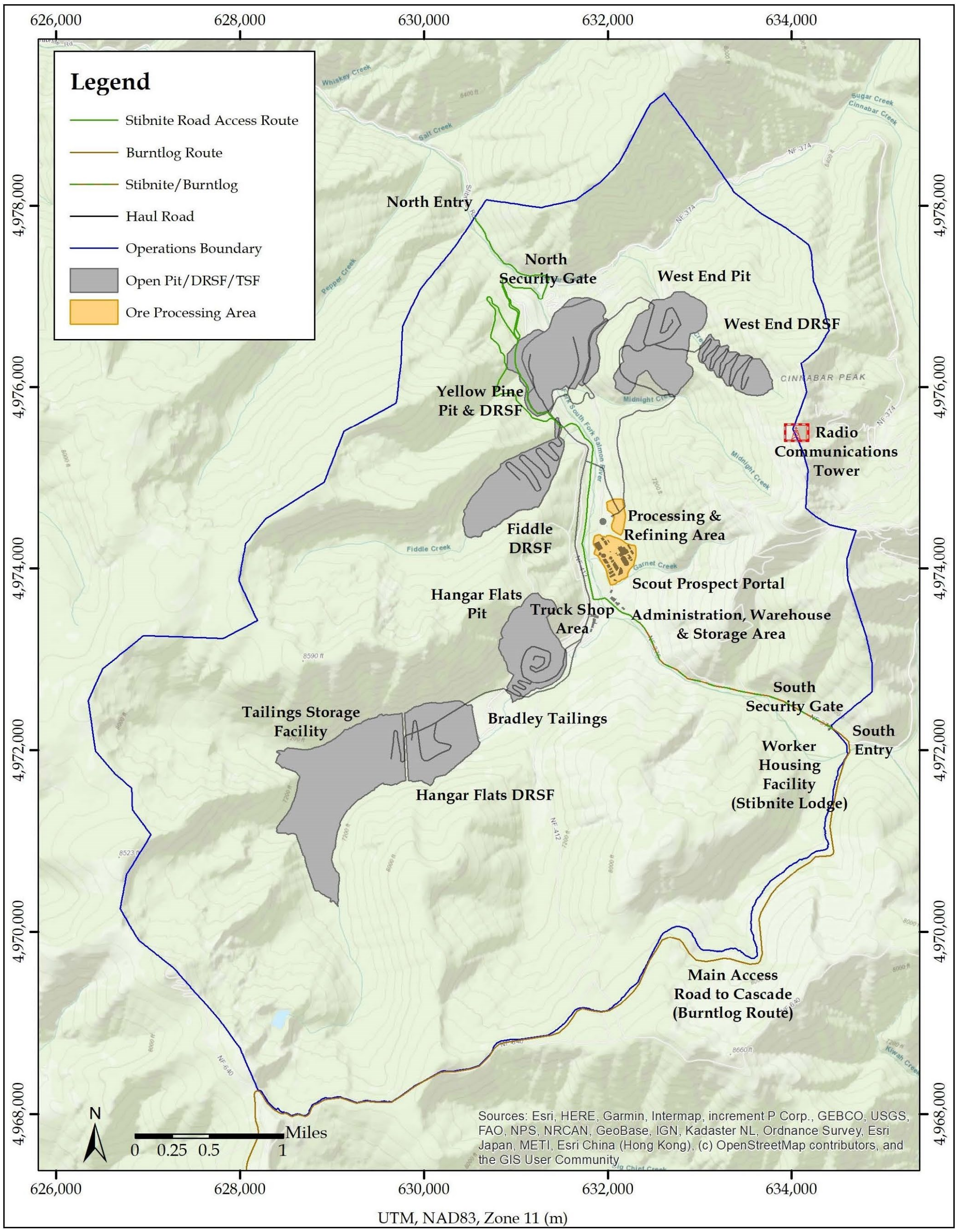
FACILITY INFORMATION

Description

Perpetua Resources Idaho, Inc. (PRI) proposes to construct and operate the Stibnite Gold Project (SGP), consisting of conventional open-pit mining, ore preparation, and gold extraction operations.

SGP is to be located in Valley County at the intersection Forest Service roads NF-374 and NF-412 (Stibnite Road), approximately 10 miles east of Yellow Pine. The proposed Burntlog Route access road will provide year-round access to the site. The project comprises a combination of public national forest and private lands. The mining operations boundary within which public access will be excluded is defined in Figure 1. This operations boundary also defines the ambient air boundary used in all ambient air quality impact analyses.

Figure 1 PROJECT AREA OF OPERATIONS

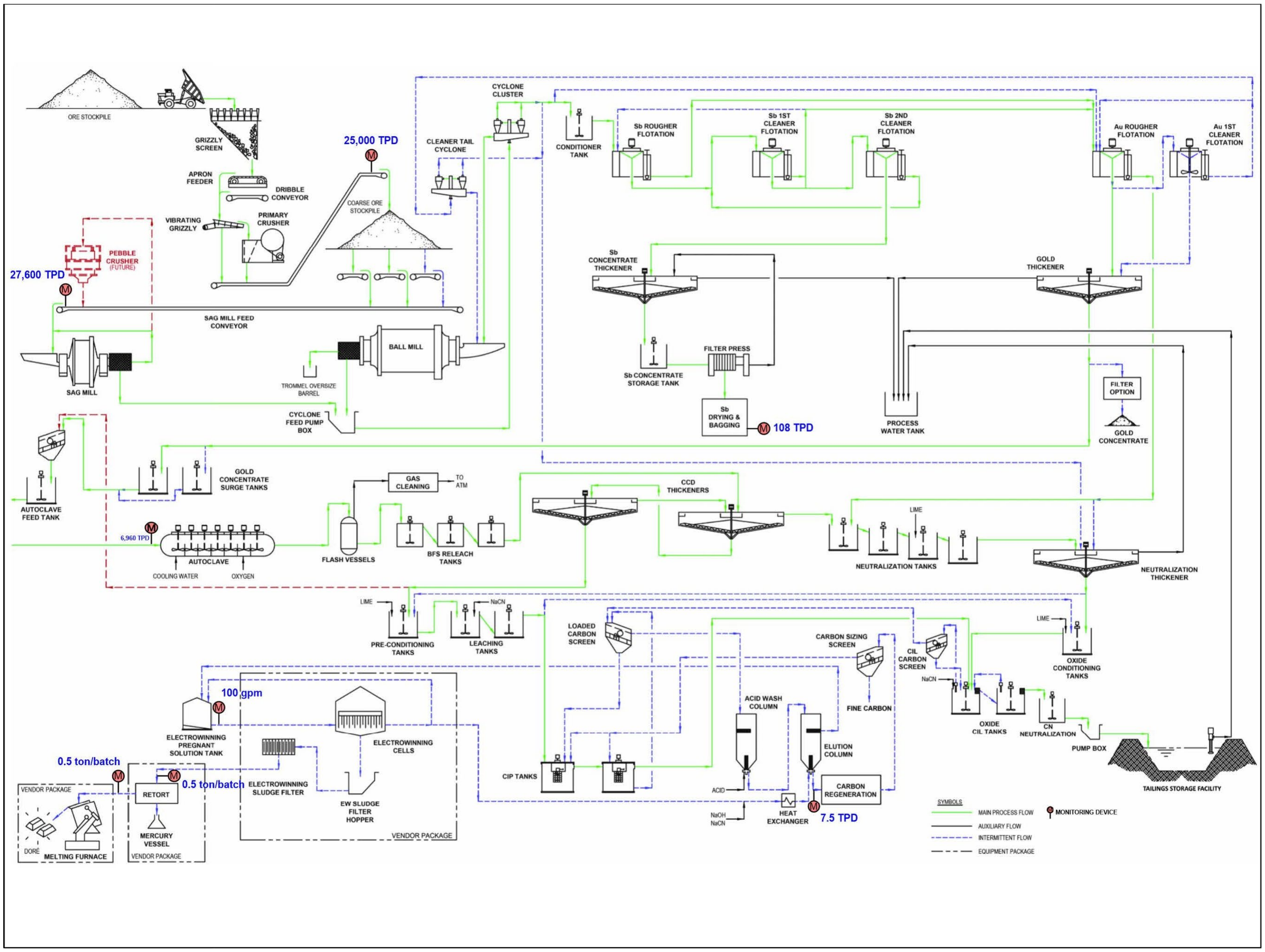


SGP will require the construction of significant infrastructure, including a power transmission line, a primary mine site access road, onsite haul roads, an ore processing facility, onsite workspaces, employee housing and recreation, water storage and distribution facilities, and sewage disposal facilities.

Conventional open-pit mining methods including drilling, blasting, excavating, and hauling will be used to extract ore and waste rock, termed development rock (DR). Hydraulic shovels and front-end loaders will be used to load ore and DR into haul trucks. DR will be used for construction, restoration, and backfilling, or hauled to the dedicated development rock storage facilities (DRSF). Approximately 340 million tons of DR will be handled over the life of the mine.

The SGP will include three years of pre-mining development and construction activities, followed by an operating mine life of approximately 12 years. Mining will occur in three open pits: Yellow Pine Pit (YPP), Hangar Flats pit (HFP), and West End pit (WEP). Although there will be overlap in mine development construction and operations, the general sequence of mining will be the YPP deposit, followed by the HFP and WEP deposits. Legacy tailings from the Meadow Creek valley (Bradley Tailings [BT]) will also be reclaimed and reprocessed during the initial project schedule. Surface exploration drilling will occur within the pits and within the Scout Prospect decline (underground exploration) throughout the mine operation period. Restoration and reclamation of other legacy mining features will occur prior to mining, throughout the life of the mine, and as part of the mine closure.

Figure 2 DIAGRAM OF PROCESS FLOWS



Ore will be hauled to the primary crusher area, where it will be fed directly into the crusher dump pocket or stockpiled. The ore crushing plant will be designed to operate at a maximum rate of 25,000 tons per calendar day (T/day). Approximately 100 million tons of ore will be mined from the three pits over the life of the project. The metal-recovery process from ore will include conventional crushing and grinding, followed by froth-flotation circuits that will generate separate gold-silver and antimony-silver concentrates. The antimony-silver concentrate will be shipped offsite for refining, whereas additional onsite processing of the gold-silver concentrate will include pressure oxidation, carbon-in-leach circuits, and refining processes to recover gold and minor amounts of silver. The finely ground leftover ore material from the mineral-recovery process, termed tailings, will be neutralized, thickened, and transported via a pipeline to the tailings storage facility. A diagram of ore processing and ore concentration and refining process flows is provided in Figure 2.

Permitting History

This is the initial PTC for a new facility, thus there is no permitting history.

Application Scope

This permit is the initial PTC for this facility.

The applicant has proposed to conduct mining operations and to install and operate ore processing, ore concentration and refining, and ancillary equipment:

- Drilling, blasting, excavating, hauling operations, rock dumps and storage piles, and prill silos;
- Ore processing operations (OC1–OC13);
- Ore concentration and refining operations (AC, EW, MR, MF, CKD);
- Process heating (ACB, CKB, PV, HS, LKC);
- Lime production operations (LS1–LS12, LSBM, LS-L/U, LK, LCR, LS1-L/U, MillS2-L/U, ACS1–ACS4);
- Aggregate production operations (PCSP1, PCSP2);
- Concrete production operations (CM; CS1–CS2-L/U, CA-L/U);
- Heating, Ventilation, and Air Conditioning heaters (H1M–H2M, HM, HAC, HR, HA, HMO, HTS, HW);
- Emergency generator engines (EDG1–EDG3, EDFP); and
- Fuel storage (TG1–TG2, TD3—TD10).

Application Chronology

August 20, 2019	DEQ received an application and an application fee.
August 29 – September 13, 2019	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
September 19, 2019	DEQ determined that the application was incomplete.
October 4, 2019	DEQ received a preliminary response and supplemental information from the applicant, including a request to delegate authority of responsible official.
October 9, 2019	DEQ approved the request to delegate authority of responsible official.
October 15, 2019	DEQ met with the applicant to review and discuss the preliminary response.
October 22, 2019	DEQ determined that the application remained incomplete while the applicant prepared a response to the remaining items previously identified (9/19/19), and included a summary of recommendations provided at the meeting (10/15/19).
November 8, 2019	DEQ requested additional information from the applicant via email, relating to items previously identified (9/19/19).
November 21, 2019	DEQ received a request from the applicant for extension until November 27, 2019 to respond.
November 27, 2019	DEQ received supplemental information from the applicant, including a revised application with updated emissions inventories and modeling analyses.
December 24, 2019	DEQ determined that the application was incomplete.
January 8, 2020	DEQ received a request from the applicant for extension until February 7, 2020 to respond.
January 31, 2020	DEQ requested additional information from the applicant via email, relating to items previously identified (12/24/19).
February 5, 2020	DEQ received supplemental information from the applicant, including a revised application with updated emissions inventories and modeling analyses.
March 6, 2020	DEQ determined that the application was incomplete.
April 2, 2020	DEQ received a request from the applicant for extension until April 15, 2020 to respond.
April 15, 2020	DEQ received supplemental information from the applicant, including updated modeling analyses.
May 15, 2020	DEQ determined that the application was complete.
June 24, 2020	DEQ received the final application including all updates.
July 6, 2020	DEQ made available the draft permit and statement of basis for peer and regional office review.
July 14, 2020	DEQ made available the draft permit and statement of basis for applicant review.
July 31, 2020	DEQ made available an updated draft statement of basis Appendix B for applicant review.

August 3 and 13, 2020	DEQ received comments from the applicant on the draft permit and statement of basis.
August 20, 2020	DEQ received the permit processing fee.
September 10 – October 12, 2020	DEQ provided a public comment period on the proposed action.
October 12, 2020	DEQ received substantive comments and a request to extend the public comment period.
October 13 – November 11, 2020	DEQ extended the public comment period on the proposed action.
October 27, 2020	DEQ provided an information meeting during the extended public comment period.
November 11, 2020	DEQ received substantive comments during the extended comment period.
November 20, 2020	DEQ requested additional information from the applicant to address substantive public comments received, including missing TAP and HAP emission estimates.
November 25 and December 11, 2020	DEQ extended the time required to respond to public comments received until February 22, 2021 to allow additional time for the applicant and DEQ to respond to substantive public comments.
December 17, 2020	DEQ received a response to the request for additional information from the applicant.[1]
December 18 and 21, 2020	DEQ received supplemental information from the applicant, including a response and HAP/TAP addendum to the application,[2] updated HAP and TAP emissions estimates,[3] updated TAP modeling analyses,[4] and supporting references.[5]
January 28, 2021	DEQ received updated modeling files with corrections for formaldehyde and sulfuric acid, and an updated figure showing TAP modeled impacts.
February 8, 2021	DEQ made available the draft permit, statement of basis, and response to comments for peer and regional office review.
February 18 – March 19, 2021	DEQ provided a public comment period on the proposed action as updated to address the HAP and TAP addendum and updates.
February 23, 2021	DEQ received notification from the applicant of a facility name change from Midas Gold Idaho, Inc. to Perpetua Resources Idaho, Inc.
March 3, 2021	DEQ provided an information meeting during the public comment period.
March 4, 18, and 19, 2021	DEQ received comments during the extended comment period.
April 5, 2021	DEQ received substantive comments during the extended comment period.

1 "Response to DEQ's Request for Information," PRI, December 17, 2020 (2020AAG2130).

2 "HAP/TAP Addendum," PRI, December 18, 2020. (2020AAG2150)

3 "20200623-Midas Gold SGP PTC EI - Final-TAPr2.2.xls," PRI, December 21, 2020. (2020AAG2152)

4 "Modeling Files 2020-12.zip," PRI, December 21, 2020. (2020AAG2154)

5 "References-20201222T020853Z-001.zip," PRI, December 21, 2020. (2020AAG2153)

April 6, 2021	DEQ extended the time required to respond to public comments received until June 4, 2021 to allow additional time for the applicant and DEQ to respond to substantive public comments.
April 6, 2021	DEQ requested additional information from the applicant to address Prevention of Significant Deterioration (PSD) emissions estimates and regulatory applicability for the lime manufacturing plant.
April 16, 2021	DEQ received a response to the request for additional information from the applicant, including identification of emission sources comprising the lime manufacturing plant.[6]
September 14, 2021	DEQ received an updated TAP modeling protocol addendum from the applicant.[7]
September 23, 2021	DEQ received supplemental information from the applicant regarding the lime plant source status determination.[8]
October 6, 2021	DEQ received an updated TAP/HAP addendum including an updated emission inventory and modeling files.[9]
December 9, 2021	DEQ made available the draft permit and statement of basis for applicant review.
January 13, 2022 – March 16, 2022	DEQ provided a public comment period with a 30 day extension on the proposed permit to address the TAP/HAP addendum and updates.
June 17, 2022	DEQ issued the final permit, first, second, and third responses to comments, and statement of basis.

[6] "Permit to Construct Request for Additional Information" PRI, April 16, 2021 (2021AAG646).

[7] "TAP Addendum Modeling Protocol" PRI, September 14, 2021 (2021AAG1757).

[8] "Limeplant PSD Source Discussion" PRI, September 23, 2021 (2021AAG1687).

[9] "Updated TAP/HAP Addendum" PRI, October 6, 2021 (2021AAG1766).

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 lists all sources of regulated emissions.

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Source	Control Equipment	Maximum Process Rate
Mining			
	Drilling activities	Reasonable control and Fugitive Dust Control Plan (FDCP) Dust collection systems on drilling rigs Control efficiency: 90%	1,200 holes/day
	Blasting activities	Reasonable control & FDCP	2 blasts/day
	Excavating and hauling activities	Reasonable control & FDCP – Chemical suppression and water sprays Control efficiency: 93.3% for PM/PM_{10} (haul roads) Haul road capping with low-arsenic quartzite	180,000 T/day 135,000 T/day 5-year rolling average 788.4 MT of ore and rock from all deposits 394.2MT of ore and rock from the West End deposit
	Rock dumps and storage piles	Reasonable control & FDCP	n/a
PS1–2-L/U	(2) Prill Silos #1-2 Maximum capacity: 100 T (each)	Loading – None Unloading – None	200 T/day and 9,000 T/yr (combined)
Ore Processing			
OC1	Loader Transfer of Ore to Grizzly	Reasonable control & FDCP – Water sprays and moisture carryover	25,000 T/day
OC2	Grizzly to Apron Feeder		
OC3	Conveyor – Apron Feeder to Dribble		
OC4	Conveyor – Apron Feeder to Grizzly		
OC5	Conveyor – Dribble to Grizzly		
OC6	Grizzly to Primary Crusher or Coarse Ore Stockpile Feed		
OC7	Primary Crusher	Reasonable control & FDCP – Water sprays and moisture carryover	
OC8	Conveyor – Coarse Ore Stockpile Feed Transfer to Stockpile		
OC9	Stockpile Transfer to Reclaim Conveyors	Reasonable control & FDCP – Below-grade of storage piles Control efficiency: 80% for PM/PM_{10}	27,600 T/day
OC10	Conveyor – Reclaim Conveyors to SAG Mill Feed Conveyor		
OC11	Conveyor – SAG Mill Feed Transfer to SAG Mill	Reasonable control & FDCP – Enclosure Control efficiency: 80% for PM/PM_{10}	
OC12	Pebble Crusher	Reasonable control & FDCP – Water sprays and moisture carryover	
OC13	Pebble Discharge to SAG Mill Feed		
Ore Concentration and Refining			
CN Tanks	Cyanide Leach Tanks and Cyanide Detox Tanks	Chemical treatment (lime, caustic soda, hydrogen peroxide, copper sulfate, etc.)	1.99 T/yr of CN (facility-wide)
Float Tanks	Floatation Tanks	None	1,700 T/yr PAX

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

<table>
<tr><th>Source ID No.</th><th>Source</th><th>Control Equipment</th><th>Maximum Process Rate</th></tr>
<tr><td>AC</td><td>Autoclave (AC)</td><td>Venturi Scrubber (VS1)
Vent Gas Cleaning Tower (ST1)
Vent Gas Steam Condensation Tower (CT1)
Carbon Filter (CA5)
Type: sulfur-impregnated activated carbon
Form: granulated</td><td>6,960 T/day</td></tr>
<tr><td>EW</td><td>Electrowinning Cells and Pregnant Solution Tank</td><td>Shared Carbon Filter (CA2)
Type: sulfur-impregnated activated carbon
Form: granulated</td><td>100 gpm</td></tr>
<tr><td>MR</td><td>Mercury Retort</td><td>Condenser
Carbon Filter (CA3)
Type: sulfur-impregnated activated carbon
Form: granulated</td><td rowspan="2">1,000 lb/batch and 21 T/yr</td></tr>
<tr><td>MF</td><td>Induction Melting Furnace</td><td>Baghouse (BH2)
Carbon Filter (CA4)
Type: sulfur-impregnated activated carbon
Form: granulated</td></tr>
<tr><td>CKD</td><td>Carbon Regeneration Kiln (Drum)</td><td>Wet Scrubber (WS2)
Carbon Filter (CA1)
Type: sulfur-impregnated activated carbon
Form: granulated</td><td>7.2 T/day</td></tr>
<tr><td colspan="2">Tailings and Maintenance Pond activities</td><td>Chemical treatment, reasonable control & FDCP</td><td>1.99 T/yr of CN (facility-wide)</td></tr>
<tr><td colspan="4">Process Heating</td></tr>
<tr><td>ACB</td><td>POX Boiler (for AC)
Maximum capacity: 17 MMBtu/hr
Fuel: propane</td><td>None</td><td>operation is limited to AC startup only</td></tr>
<tr><td>HS</td><td>Strip Circuit Solution Heater
Maximum capacity: 5 MMBtu/hr
Fuel: propane</td><td>None</td><td>n/a</td></tr>
<tr><td>CKB</td><td>Carbon Regeneration Kiln Burners
Maximum capacity: 2.255 MMBtu/hr
Fuel: propane</td><td>None</td><td>n/a</td></tr>
<tr><td>PV</td><td>Propane Vaporizer
Maximum capacity: 0.1 MMBtu/hr
Fuel: propane</td><td>None</td><td>n/a</td></tr>
<tr><td>LKC</td><td>PFR Shaft Lime Kiln Combustion
Maximum capacity: 22.0 MMBtu/hr
Fuel: propane</td><td>None</td><td>n/a</td></tr>
</table>

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Source	Control Equipment	Maximum Process Rate
Lime Production			
LS1	Limestone transfer to Primary Crusher Hopper	Reasonable control & FDCP	1,130 T/day
LS2	Primary Crusher Maximum capacity: 1,130 T/day		
LS3	Primary Screen		
LS4	Secondary Crusher		
LS5	Secondary Screen		
LS6	Conveyor – Limestone to Ball Mill Feed Bin		
LS7	Conveyor – Limestone to Ball Mill Feed		
LS8	Conveyor – Ball Mill Feed to Ball Mill		
LSBM	Limestone Ball Mill	Reasonable control & FDCP Baghouse (BH3)	
LS9	Conveyor – Limestone to Kiln Feed Bin	Reasonable control & FDCP	267 T/day
LS10	Conveyor – Limestone to Lime Kiln Feed		
LS11	Fines Screen		
LS12	Conveyor – Kiln Feed to PFR Shaft Lime Kiln		
LK	Parallel Flow Regenerative (PFR) Shaft Kiln	Baghouse (BH4)	169 T/day and 52,377 T/yr
LCR	Lime Mill Crusher	Reasonable control & FDCP Baghouse (BH5)	
LS-L/U	Bucket Elevator – Pebble Lime Silo Loading	Loading – Bin Vent Filter	
	Pebble Lime Silo discharge to Lime Slaker	Unloading – Wet Scrubber (WS3)	
LS1-L/U	SAG Mill Lime Silo #1 Maximum capacity: 250 T/day	Loading – Bin Vent Filter Unloading – None	4,000 T/day and 70,000 T/yr (combined)
MillS2-L/U	SAG Mill Lime Silo #2 Maximum capacity: 250 T/day	Loading – Bin Vent Filter Unloading – None	
ACS1	AC Lime Silo #1 Maximum capacity: 1,000 T/day	Loading – Bin Vent Filter Unloading – None	
ACS2	AC Lime Silo #2 Maximum capacity: 1,000 T/day	Loading – Bin Vent Filter Unloading – None	
ACS3	AC Lime Silo #3 Maximum capacity: 1,000 T/day	Loading – Bin Vent Filter Unloading – None	
ACS4	AC Lime Silo #4 Maximum capacity: 500 T/day	Loading – Bin Vent Filter Unloading – None	
Aggregate Production			
PCSP1	Portable Crushing and Screening Plant 1 Crushers, screens, and conveyors	Reasonable control & FDCP – water sprays and moisture carryover	2,000 T/day (aggregate)
PCSP2	Portable Crushing and Screening Plant 2 Crushers, screens, and conveyors	Reasonable control & FDCP – water sprays and moisture carryover	2,000 T/day (aggregate)
Concrete Production			
CM	Central Mixer Loading Maximum capacity: 120 T/hr	Reasonable control & FDCP – Controls may include water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, and central duct collection systems.	2,480 T/day and 560,000 T/yr (cement + aggregate)
CS1-L/U	Cement/Shotcrete Silo #1 Maximum capacity: 80 T	Loading – Bin Vent Filter Unloading – None	
CS2-L/U	Cement/Shotcrete Silo #2 Maximum capacity: 80 T	Loading – Bin Vent Filter Unloading – None	
CA-L/U	Aggregate Bin Maximum capacity: 2,400 T	Loading – None Unloading – None	

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Source	Control Equipment	Maximum Process Rate
Heating, Ventilation, and Air Conditioning (HVAC)			
H1M	Mine Air Heater #1 Maximum capacity: 4 MMBtu/hr Fuel: propane	None	n/a
H2M	Mine Air Heater #2 Maximum capacity: 4 MMBtu/hr Fuel: propane	None	n/a
HM	(4) Mill HVAC Heaters #1-4 Maximum capacity: 1.0 MMBtu/hr (each) Fuel: propane	None	n/a
HAC	Autoclave HVAC Heater Maximum capacity: 0.25 MMBtu/hr Fuel: propane	None	n/a
HR	Refinery HVAC Heater Maximum capacity: 0.25 MMBtu/hr Fuel: propane	None	n/a
HA	Admin HVAC Heater Maximum capacity: 0.25 MMBtu/hr Fuel: propane	None	n/a
HMO	(2) Mine Ops. HVAC Heaters Maximum capacity: 0.25 MMBtu/hr (each) Fuel: propane	None	n/a
HTS	(2) Truck Shop HVAC Heaters Maximum capacity: 1.0 MMBtu/hr (each) Fuel: propane	None	n/a
HW	(3) Warehouse HVAC Heaters Maximum capacity: 1.0 MMBtu/hr (each) Fuel: propane	None	n/a

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Source	Control Equipment	Maximum Process Rate
Emergency Power Generation and Fire Suppression			
EDG1	Camp Emergency Generator Date of construction: 2007 or later Maximum capacity: 1,000 bkW Maximum operation: 100 hr/yr (non-emergency) Fuel: ultra-low sulfur diesel (ULSD) Displacement: <10 L/cyl	EPA Tier 2 certified	1 hr/day and 100 hr/yr
EDG2	Plant Emergency Generator #1 Date of construction: 2007 or later Maximum capacity: 1,000 bkW Maximum operation: 100 hr/yr (non-emergency) Fuel: ULSD Displacement: <10 L/cyl	EPA Tier 2 certified	1 hr/day and 100 hr/yr
EDG3	Plant Emergency Generator #2 Date of construction: 2007 or later Maximum capacity: 1,000 bkW Maximum operation: 100 hr/yr (non-emergency) Fuel: ULSD Displacement: <10 L/cyl	EPA Tier 2 certified	1 hr/day and 100 hr/yr
EDFP	Mill Fire Pump Date of construction: 2009 or later Maximum capacity: 200 bkW Maximum operation: 100 hr/yr (non-emergency) Fuel: ULSD Displacement: <10 L/cyl	None	1 hr/day and 100 hr/yr
Fuel Storage			
TG1–TG2	Mine Site Gasoline Tanks (#1 through #2) Maximum capacity: 5,000 gal each	Lids or other appropriate closure with gasketed seal and submerged filling	<100,000 gal/mo
TD3–TD10	Mine Site Diesel Tanks (#3 through #10)	Lids or other appropriate closure	n/a

Emissions Inventories

Potential to Emit

IDAPA 58.01.01 defines Potential to Emit (PTE) as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is state or federally enforceable. Secondary emissions did not count in determining the PTE of a facility or stationary source.

Using this definition of PTE, an emissions inventory was developed for the SGP (see Appendix A). Emissions estimates of criteria pollutant and hazardous air pollutant (HAP) PTE were based on project-specific activity rates (e.g., continuous operation with the exception of the POX Boiler and emergency generator engines, design production rates, material haul rates, blasting agent usage rates, reagent usage rates, etc.), process design (e.g., open-pit mining, process concentration and pH, parallel flow regenerative lime production, central mix concrete production, haul fleet, etc.), emission abatement techniques (e.g., dust suppressant, chemical treatment, carbon filter, baghouse, bin vent filtration, wet scrubber, venturi scrubber, vent gas cleaning tower, and vent gas steam condensation tower control equipment), material characteristics (e.g., moisture content, road silt content, haul route distances, etc.), site conditions (onsite meteorological data, precipitation, etc.), and emission factors based on AP-42,[10] representative source test emissions data, and representative emission limits. Estimated emissions from the autoclave and the carbon regeneration kiln relied on emissions data from representative source test emissions data, scaled to the proposed equipment capacity. Estimated emissions from fuel storage tanks relied on TANKS[11] emission estimation software and projected annual gasoline and ULSD usage rates. Estimated emissions from the emergency generator engines relied on the use of certified engine emission factors.

Uncontrolled PTE

Using the definition of PTE, uncontrolled PTE is then defined as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall **not** be treated as part of its design **since** the limitation or the effect it would have on emissions **is not** state or federally enforceable.

The uncontrolled PTE is used to determine if a facility is a "synthetic minor" source of emissions. Synthetic minor sources are facilities that have an uncontrolled PTE for regulated air pollutants or HAP above an applicable major source threshold without permit limits.

For PRI, uncontrolled PTE was based upon a worst-case for operation of the facility of continuous operation at proposed maximum material throughput and fuel input rates (Table 1), without consideration of control equipment. For batch operations, the number of operations necessary to achieve the proposed daily throughput rates was assumed in estimating emissions (MR, MF). Silo loading and unloading operations were assumed to occur at most once per day (LS1-L/U, MillS2-L/U, LS-L/U, PS-L/U, ACS1–ACS4-L/U, CS1–CS2-L/U, CA-L/U). Fuel storage was based on estimated facility-wide fuel usage rates (TG1, TG2 and TD3—TD10). For the purposes of maintenance and testing, emergency power generation operations were assumed to occur 1 hour per day and 100 hours per year (EDG1–EDG3, EDFP). With the exception of the POX Boiler in which operation is limited to AC startup only, continuous operation at maximum fuel input rates was assumed for all process heating and HVAC equipment.

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[10] Compilation of Air Pollutant Emission Factors, AP-42, Volume I, Fifth Edition (AP-42), Section 1.3 –Fuel Oil Combustion, 1.4 – Natural Gas Combustion, 1.5 – LPG Combustion, 3.2 – Natural Gas-Fired Reciprocating Engines, 3.3 – Gasoline and Diesel Industrial Engines, 3.4 – Large Stationary Diesel and All Stationary Dual-Fuel Engines, 8.3 – Ammonium Nitrate, 11.9 – Western Surface Coal Mining, 11.12 – Concrete Batching, 11.17 – Lime Manufacturing, 11.19 – Construction and Aggregate Processing, 13.2 – Fugitive Dust Sources, and 13.3 – Explosives Detonation, Office of Air Quality Planning and Standards Office of Air and Radiation (OAQPS), EPA, updated as of August 2011.

[11] TANKS Storage Tank Emissions Calculation Software Version 4.09D, OAQPS, EPA, released October 5, 2006.

The following table presents the uncontrolled PTE for regulated air pollutants as submitted by the applicant and verified by DEQ staff. Refer to Appendix A for a summary of the calculations and the assumptions used to determine emissions for each source, and the Facility Classification section for a review of facility classification based on uncontrolled and controlled PTE.

Table 2 UNCONTROLLED POTENTIAL TO EMIT FOR CRITERIA AIR POLLUTANTS

Source	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	VOC	SO_2
	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
OC1	13.69	5.02	0.78				
OC2	13.69	5.02	0.78				
OC3	13.69	5.02	0.78				
OC4	13.69	5.02	0.78				
OC5	13.69	5.02	0.78				
OC6	13.69	5.02	0.78				
OC7	24.64	10.95	1.64				
OC8	13.69	5.02	0.78				
OC9	15.11	5.54	0.86				
OC10	15.11	5.54	0.86				
OC11	15.11	5.54	0.86				
OC12	27.20	12.09	1.81				
OC13	15.11	5.54	0.86				
PS-L	0.07	0.03	0.004				
PS-U	0.07	0.03	0.004				
AC	74.10	74.10	74.10				2.86
MF	1.77	1.77	1.77				
CKD (EW, MR)	6.13	6.13	6.13	0.53	0.05	0.48	
LS1	0.48	0.17	0.03				
LS2	0.86	0.38	0.06				
LS3	3.97	1.38	0.21				
LS4	0.86	0.38	0.06				
LS5	3.97	1.38	0.21				
LS6	0.48	0.17	0.03				
LSBM	64.22	53.89	19.23				
LS7	0.48	0.17	0.03				
LS8	0.48	0.17	0.03				
LS9	0.12	0.05	0.007				
LS10	0.12	0.05	0.007				
LS11	1.03	0.36	0.05				
LS12	0.12	0.05	0.007				
LS-L	0.23	0.23	0.23				
LS-U	0.02	0.02	0.02				
LK	34.05	34.05	34.05	11.78	6.29		0.03
LCR	10.58	8.88	3.17				
LS1-L	1.60	1.03	0.16				
LS1-U	0.01	0.006	0.001				
MillS2-L	1.60	1.03	0.16				
MillS2-U	0.01	0.006	0.001				
ACS1-L	6.39	4.11	0.62				
ACS1-U	0.04	0.02	0.004				
ACS2-L	6.39	4.11	0.62				
ACS2-U	0.04	0.02	0.004				
ACS3-L	6.39	4.11	0.62				
ACS3-U	0.04	0.02	0.004				
ACS4-L	3.19	2.06	0.31				
ACS4-U	0.02	0.01	0.002				
PCSP1	27.67	10.11	1.54				
PCSP2	27.67	10.11	1.54				
CM	17.16	4.68	0.71				
CS1-L	21.90	14.10	2.14				
CS1-U	0.14	0.08	0.01				
CS2-L	21.90	14.10	2.14				

Table 2 UNCONTROLLED POTENTIAL TO EMIT FOR CRITERIA AIR POLLUTANTS

Source	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	VOC	SO_2
	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
CS2-U	0.14	0.08	0.01				
CA-L	1.73	0.83	0.13				
CA-U	1.73	0.83	0.13				
ACB	0.002	0.002	0.002	0.02	0.04	0.002	0.004
CKB	0.08	0.08	0.08	0.81	1.40	0.09	0.17
PV	0.003	0.003	0.003	0.04	0.06	0.004	0.008
HS	0.17	0.17	0.17	1.80	3.11	0.19	0.38
LKC	0.63	0.63	0.63	6.72	11.65	0.72	1.42
H1M	0.13	0.13	0.13	1.44	2.49	0.15	0.30
H2M	0.13	0.13	0.13	1.44	2.49	0.15	0.30
HM	0.13	0.13	0.13	1.44	2.49	0.15	0.30
HAC	0.008	0.008	0.008	0.09	0.16	0.01	0.02
HR	0.008	0.008	0.008	0.09	0.16	0.01	0.02
HA	0.008	0.008	0.008	0.09	0.16	0.01	0.02
HMO	0.02	0.02	0.02	0.18	0.31	0.02	0.04
HTS	0.07	0.07	0.07	0.72	1.24	0.08	0.15
HW	0.10	0.10	0.10	1.08	1.87	0.11	0.23
EDG1	0.02	0.02	0.02	0.39	0.71	0.14	0.001
EDG2	0.02	0.02	0.02	0.39	0.71	0.14	0.001
EDG3	0.02	0.02	0.02	0.39	0.71	0.14	0.001
EDFP	0.004	0.004	0.004	0.08	0.09	0.09	0.0001
TG1–TG2						1.91	
TD3—TD10						0.06	
Total	**560**	**337**	**164**	**29.47**	**36.16**	**4.68**	**6.27**

Although not explicitly calculated, it was confirmed by PRI in the response to a request for additional information[1] that the uncontrolled HAP PTE for SGP is estimated to exceed 25 tons per year (T/yr) without application of the specified control equipment (Table 1). Arsenic HAP PTE from haul roads at a controlled emission rate of 0.464 pounds per hour (lb/hr) and accounting for 93.3% control efficiency exceeds 20 T/yr, supporting that uncontrolled HAP PTE exceeds 10 T/yr of single HAP and 25 T/yr of total HAP.

Pre-Project PTE

Pre-project PTE is used to establish the change in emissions at a facility as a result of this project. Because this is a new facility, pre-project emissions are set to zero for all criteria pollutants.

Post-Project PTE

Post-project PTE is used in determining the change in emissions at a facility and in determining the facility's classification as a result of this project. Post-project PTE includes all permit limits resulting from this project.

In addition to assuming continuous operation of the facility at the proposed material throughput and fuel input rates, post-project emissions estimates account for the use of dust suppressant, chemical treatment, carbon filter, baghouse, bin vent filtration, wet scrubber, venturi scrubber, vent gas cleaning tower, and vent gas steam condensation tower control equipment.

A variety of factors impact emissions from unpaved roadways, and it was recognized that accurate determination of site-specific parameters characterizing road conditions and vehicle traffic was critical to estimating particulate matter emissions and ambient air impacts. PRI provided site-specific information to support parameters such as silt content, mean vehicle weight, and dust suppressant control efficiencies, and provided an analysis evaluating the conservatism of the resulting emission factor (AP-42).[12] To ensure operation consistent with these parameters and to reasonably control fugitive emissions, compliance with requirements identified in the FDCP is required by

[12] Appendix A – Model Parameter / Assumption / Data Level of Conservatism IDEQ Forms to the Stibnite Gold Project Permit to Construct Application, PRI, revised June 23, 2020 (2020AAG1078).

the permit. Further discussion of the sensitivity of predicted air quality impacts is provided in the Ambient Air Quality Impact Analyses section.

The following table presents the post-project PTE for criteria pollutants from all emissions units at the facility as determined by DEQ staff. Because this is a new facility, the post-project PTE is equivalent to the facility-wide PTE. Refer to Appendix A for a summary of the calculations and the assumptions used to determine emissions from each source, and the Facility Classification section for a review of facility classifications based on uncontrolled and controlled PTE.

Table 3 POST-PROJECT POTENTIAL TO EMIT FOR CRITERIA AIR POLLUTANTS

Source	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	VOC	SO_2
	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]
POINT SOURCE EMISSIONS							
OC1	0.64	0.21	0.06				
OC2	0.64	0.21	0.06				
OC3	0.64	0.21	0.06				
OC4	0.64	0.21	0.06				
OC5	0.64	0.21	0.06				
OC6	0.64	0.21	0.06				
OC7	5.48	2.46	0.46				
OC8	0.64	0.21	0.06				
OC9	3.02	1.11	0.17				
OC10	3.02	1.11	0.17				
OC11	3.02	1.11	0.17				
OC12	6.04	2.72	0.50				
OC13	0.71	0.23	0.07				
PS-L	0.07	0.03	0.004				
PS-U	0.07	0.03	0.004				
AC	22.23	22.23	22.23				2.86
EW	0.31	0.31	0.31				
MR	0.006	0.006	0.006				
MF	0.89	0.89	0.89				
CKD	1.84	1.84	1.84	0.53	0.05	0.48	
LS1	0.48	0.18	0.03				
LS2	0.86	0.38	0.06				
LS3	3.97	1.38	0.21				
LS4	0.86	0.38	0.06				
LS5	3.97	1.38	0.21				
LS6	0.48	0.18	0.03				
LSBM	6.42	5.39	1.92				
LS7	0.48	0.18	0.03				
LS8	0.48	0.18	0.03				
LS9	0.12	0.05	0.01				
LS10	0.12	0.05	0.01				
LS11	1.03	0.36	0.06				
LS12	0.12	0.05	0.01				
LS-L	0.02	0.02	0.02				
LS-U	0.002	0.002	0.002				
LK	3.40	3.40	3.40	11.79	6.29		0.03
LCR	1.06	0.89	0.32				
LS1-L	0.002	0.001	0.0001				
LS1-U	0.01	0.006	0.001				
MillS2-L	0.002	0.001	0.0001				
MillS2-U	0.01	0.006	0.001				
ACS1-L	0.009	0.003	0.0004				
ACS1-U	0.04	0.02	0.004				
ACS2-L	0.009	0.003	0.0004				
ACS2-U	0.04	0.02	0.004				
ACS3-L	0.009	0.003	0.0004				
ACS3-U	0.04	0.02	0.004				
ACS4-L	0.004	0.001	0.0002				

Table 3 POST-PROJECT POTENTIAL TO EMIT FOR CRITERIA AIR POLLUTANTS

Source	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	VOC	SO_2
	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]
ACS4-U	0.02	0.01	0.002				
PCSP1	2.74	1.02	0.13				
PCSP2	2.74	1.02	0.13				
CM	0.55	0.17	0.02				
CS1-L	0.03	0.01	0.002				
CS1-U	0.14	0.08	0.01				
CS2-L	0.03	0.01	0.002				
CS2-U	0.14	0.08	0.01				
CA-L	1.73	0.83	0.13				
CA-U	1.73	0.83	0.13				
ACB	0.002	0.002	0.002	0.02	0.04	0.002	0.004
CKB	0.08	0.08	0.08	0.81	1.40	0.09	0.17
PV	0.003	0.003	0.003	0.04	0.06	0.004	0.008
HS	0.17	0.17	0.17	1.80	3.11	0.19	0.38
LKC	0.63	0.63	0.63	6.72	11.65	0.72	1.42
H1M	0.13	0.13	0.13	1.44	2.49	0.15	0.30
H2M	0.13	0.13	0.13	1.44	2.49	0.15	0.30
HM	0.13	0.13	0.13	1.44	2.49	0.15	0.30
HAC	0.008	0.008	0.008	0.09	0.16	0.01	0.02
HR	0.008	0.008	0.008	0.09	0.16	0.01	0.02
HA	0.008	0.008	0.008	0.09	0.16	0.01	0.02
HMO	0.02	0.02	0.02	0.18	0.31	0.02	0.04
HTS	0.07	0.07	0.07	0.72	1.24	0.08	0.15
HW	0.10	0.10	0.10	1.08	1.87	0.12	0.23
EDG1	0.02	0.02	0.02	0.39	0.71	0.14	0.001
EDG2	0.02	0.02	0.02	0.39	0.71	0.14	0.001
EDG3	0.02	0.02	0.02	0.39	0.71	0.14	0.001
EDFP	0.004	0.004	0.004	0.08	0.09	0.09	0.0001
TG1–TG2						1.91	
TD3—TD10						0.06	
Post-Project PTE [(c)]	**86.6**	**55.7**	**35.8**	**29.5**	**36.2**	**4.7**	**6.3**
MINING FUGITIVE EMISSIONS							
Blasting activities	117.35	61.02	3.52	635.83	17.08		0.03
Drilling activities	284.70	148.04	8.54				
Hauling	2901.27	712.95	71.29				
Material load / unload (L/UL) [(b)]	15.00	7.10	1.07				
Dozing	103.56	19.78	10.87				
Grading	36.80	11.04	1.14				
Water Truck Travel	109.27	26.85	2.69				
Access Roads	6.95	1.72	0.17				
Wind Erosion [(b)]	5.72	2.86	0.43				
Surface Exploration	1.12	0.39	0.06				
Underground Exploration	0.002	0.001	0.0001				
Fugitive Total [(b)]	**3,569**	**986**	**100**	**636**	**17.1**		**0.03**

a) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating scenarios and annual limits.

b) Estimated emissions from the "W3" scenario resulted in the most emissions across most activities, with the exception of material load/unload and wind erosion activities, which occurred in the Y1, H1, W1, and B1 scenarios. Totals reported are for the "W3" scenario.

c) In the response to a request for additional information, PRI confirmed that antimony process dryer and bagging operation emission sources (Sb1 and Sb2) initially proposed would be replaced by a dewatering/packaging circuit. As a result, these emission sources have been removed from the permit and post-project PTE.

Fourteen operational scenarios were evaluated by the applicant and verified by DEQ in order to estimate maximum hourly, daily, and annual potential emissions from sources. These scenarios encompassed all feasible origin and destination location combinations for locating ore and development rock. A summary of these scenarios is provided in Table 4. Although drilling, blasting, excavating, and hauling activities are not expected to be confined to a single scenario in practice, emissions in each scenario were conservatively estimated at the maximum daily proposed processing rate (180,000 of ore and rock) to allow for maximum operational flexibility, and to evaluate potential air quality impacts. Scenarios having the greatest potential emissions (i.e., the top seven) were those with the longest origin-to-destination distances, which resulted in increased emissions evident in onsite hauling and material loading and unloading activities. Consequently, the W3 scenario having the maximum origin-to-destination distance (16,415 daily vehicle miles traveled) is representative of maximum potential emissions.

Table 4 OPERATING SCENARIOS

Scenario	Origin [(a)]	Destination [(a)]
Y1	YPP	STKP
Y2	YPP	FDRSF
Y3	YPP	HFDRSF
H1	HFP	STKP
H2	HFP	FDRSF
H3	HFP	HFDRSF
H4	HFP	YPDRSF
W1	WEP	STKP
W2	WEP	FDRSF
W3	WEP	HFDRSF
W4	WEP	YPDRSF
W5	WEP	WEDRSF
B1	BT	STKP
B2	BT	HFDRSF

a) Where ore and rock origin and destination locations as depicted in Figure 1 are abbreviated as follows:
YPP = Yellow Pine Pit, HFP = Hangar Flats pit, WEP = West End pit,
BT = Bradley Tailings, STKP = Primary Crusher Stockpile,
FDRSF = Fiddle DRSF, HFDRSF = Hangar Flats DRSF,
YPDRSF = Yellow Pine DRSF, WEDRSF = West End DRSF, and
DRSF = development rock storage facilities.

There are numerous sources of fugitive dust emissions at the facility, including drilling and blasting activities, crushing and ore handling equipment, ore and rock storage piles, and unpaved roadways. Calculated at maximum daily processing rates, emissions from these sources would tend to be conservatively estimated. But it is also recognized that uncertainties exist in some of the emission factors used, and that predicted modeled impacts may be sensitive to emissions from such sources. In particular, it may prove challenging to consistently and continuously achieve the targeted level of fugitive dust control for emissions from traffic on unpaved roadways, with over 55 miles of haul truck routes within the mining operations boundary, a fleet of 32 haul trucks weighing between 37 and 357 tons, and a targeted dust control efficiency of 93.3% accomplished by application of both dust suppressant and water controls. Based on this, and the scale of operations, a detailed Fugitive Dust Control Plan (FDCP) was required (Permit Conditions 2.6). It is noted that PRI projected actual annual production at approximately 42.7 million T/yr, or 65% of the permitted annual production limit of 65.7 million T/yr (Permit Condition 3.5), and that as a result actual emissions are expected to be lower than presented.

<u>Change in PTE</u>

The change in facility-wide PTE is used to determine if a public comment period may be required and to determine the processing fee per IDAPA 58.01.01.225. The following table presents the facility-wide change in the potential to emit for criteria pollutants, which for a new source is equivalent to the facility-wide and post-project PTE.

Table 5 CHANGES IN PTE FOR REGULATED AIR POLLUTANTS

Source	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	VOC	SO_2
	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]
Pre-Project PTE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post-Project PTE	86.6	55.7	35.8	29.5	36.2	4.7	6.3
Changes in Potential to Emit	**86.6**	**55.7**	**35.8**	**29.5**	**36.2**	**4.70**	**6.30**

a) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating scenarios and annual limits.

Controlled Hazardous and Toxic Air Pollutant Emissions

A summary of the estimated PTE for hazardous air pollutants (HAP) and emissions increases (PTE) for non-carcinogenic and carcinogenic toxic air pollutants (TAP) and for potential is provided in the following table (Table 6). This table and the Ambient Air Quality Impact Analyses were updated to include new and updated TAP emission estimates from additional emission sources identified in public comments and in a response and HAP/TAP addendum to the application provided by PRI.[2,3]

All permitted fugitive and point emission sources were evaluated in the new HAP and TAP emission estimates. In Table 6 below, HAP and TAP PTE emissions estimates are for the highest emissions year Scenario "W3" referenced from Table B1-W3 of Appendix B to the HAP/TAP addendum and 'TblB1' worksheet in the supporting spreadsheet. Process and production activities include ore processing; ore concentration and refining; process heating; aggregate production; concrete production; heating, ventilation, and air conditioning (HVAC); emergency power generation and fire suppression; and fuel storage. Mining and leaching activities include drilling, blasting, excavating, hauling, prill silos, rock dumps and storage piles, and tailings. Metal HAP and TAP emissions from process materials were based on metal concentration profiles from onsite core samples of ore and limestone materials, including 98 samples of SGP limestone[13] and over 55,000 samples of SGP ore.[14,15] As a conservative assumption, the limestone profile was also used for emissions from aggregate materials. Mercury emissions from the LK were estimated by assuming all mercury in the limestone feed is volatilized and emitted. For each non-mercury metal HAP and TAP, emissions from the LK were calculated as PM emissions multiplied by the median metal concentration measured. Elemental analysis of core samples was complemented with an evaluation of whether each result represented a regulated HAP and/or TAP substance (element or compound) in Table 2 of the HAP/TAP addendum.[2]

TAP also classified as HAP emitted from sources addressed by New Source Performance Standards (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAP) were not required to be evaluated for compliance with TAP increments in accordance with IDAPA 58.01.01.210.20 (Subsection 210.20). Guidance and clarification of Subsection 210.20 source exemptions were included in the Subsection 210.20 (IDAPA 58.01.01.210.20) section and in the response to public comments document that is part of the final permit package for this permitting action. Some of the screening levels for non-carcinogenic and carcinogenic TAP were exceeded as a result of this project and required modeling. Modeling was required for aluminum, barium, calcium carbonate, calcium oxide, cyanide, iron, manganese, phosphorus, sulfuric acid, thallium, and vanadium because the 24-hour average non-carcinogenic screening emission levels (EL) in IDAPA 58.01.01.585 were exceeded. Modeling was required for arsenic, beryllium, cadmium, formaldehyde, and nickel because the annual average carcinogenic EL in IDAPA 58.01.01.586 were exceeded. Refer to the Ambient Air Quality Impact Analyses section and Appendix B for additional discussion.

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[13] "M3-PN170045 Stibnite Gold Feasibility Study RE: M3-MGI-029E Lime Kiln Analysis Memo" and MGI-17-431-FullGeochem - MB.xlsx, M3 Engineering & Technology, June 14, 2018. (ref. M3 2018; 2020AAG2153)

[14] "Geochemistry Statistics" email R. McCluskey to E. Memon, Stibnite Gold Project, Air Sciences, September 26, 2017. (ref. PRI 2017c; 2020AAG205)

[15] "Re: Te-2" and 2020-12-09_Fe and Se data.xlsx, Stibnite Gold Project, December 9, 2020. 1,500 of these samples were tested for selenium. (ref. PRI 2020; 2020AAG2153)

Table 6 POTENTIAL TO EMIT FOR HAZARDOUS & TOXIC AIR POLLUTANTS (HAP/TAP) [a]

HAP/TAP	Mining and Leaching Emissions		Processing and Production Emissions		Facility-Wide Total Emissions		Adjusted TAP Emissions	Screening Emission Level
	lb/hr [b]	T/yr [c]	lb/hr [b]	T/yr [c]	lb/hr [b]	T/yr [c]	lb/hr [b,d]	lb/hr [d]
1,3-Butadiene [e]	0	0	8.4E-07	3.7E-06	8.4E-07	3.7E-06	0	2.4E-05
2-Methylnaphthalene [e,f]	0	0	1.1E-06	4.6E-06	1.1E-06	4.6E-06	0	9.1E-05
3-Methylcholanthrene [e]	0	0	7.8E-08	3.4E-07	7.8E-08	3.4E-07	4.5E-08	2.5E-06
7,12-Dimethylbenz(a)anthracene[e,f]	0	0	7.6E-07	3.0E-06	7.6E-07	3.0E-06	0	9.1E-05
Acenaphthene [e,f]	0	0	5.7E-06	7.1E-06	5.7E-06	7.1E-06	0	9.1E-05
Acenaphthylene [e,f]	0	0	1.1E-05	1.4E-05	1.1E-05	1.4E-05	0	9.1E-05
Acetaldehyde [e]	0	0	2.5E-05	1.1E-04	2.5E-05	1.1E-04	0	3.0E-03
Acrolein	0	0	1.6E-05	2.0E-05	1.6E-05	2.0E-05	0	0.017
Anthracene [e,f]	0	0	1.7E-06	2.4E-06	1.7E-06	2.4E-06	0	9.1E-05
Antimony	0.019	0.082	5.7E-04	2.5E-03	0.019	0.085	0.019	0.033
Arsenic [e]	0.544	2.381	4.5E-03	0.020	0.548	2.400	**0.544**	1.5E-06
Benzene [e]	0	0	7.4E-03	0.032	7.4E-03	0.032	5.3E-05	8.0E-04
Benzo(a)pyrene [e,f]	0	0	1.4E-07	6.1E-07	2.0E-06	8.8E-06	2.9E-07	2.0E-06
Benz(a)anthracene [e,f]	0	0	3.1E-07	1.4E-06				
Benzo(b)fluoranthene [e,f]	0	0	4.4E-07	1.9E-06				
Benzo(k)fluoranthene [e,f]	0	0	1.5E-07	6.6E-07				
Chrysene [e,f]	0	0	5.8E-07	2.5E-06				
Dibenz(a,h)anthracene [e,f]	0	0	1.8E-07	7.7E-07				
Indeno(1,2,3-cd)pyrene [e,f]	0	0	2.2E-07	9.6E-07				
Benzo(g,h,i)perylene [e,f]	0	0	7.5E-07	1.1E-06	7.5E-07	1.1E-06	0	9.1E-05
Beryllium [e]	2.6E-03	0.011	4.3E-04	1.9E-03	3.0E-03	0.013	**2.6E-03**	2.8E-05
Biphenyl	0	0	4.4E-05	1.9E-04	4.4E-05	1.9E-04	0	0.1
Cadmium [e]	4.1E-04	1.8E-03	4.6E-04	2.0E-03	8.7E-04	3.8E-03	**4.4E-04**	3.7E-06
Carbon disulfide	0.014	0.063	0	0	0.014	0.063	0.014	2
Chromium	7.3E-03	0.032	6.8E-04	2.8E-03	8.0E-03	0.035	7.4E-03	0.033
Chromium (VI) [e]	0	0	3.4E-07	1.5E-06	3.4E-07	1.5E-06	3.4E-07	5.6E-07
Cobalt	3.3E-03	0.014	4.7E-04	2.0E-03	3.7E-03	0.016	3.26E-03	3.3E-03
Cyanide	0.453	1.983	1.2E-03	5.3E-03	0.454	1.988	**0.454**	0.333
Dichlorobenzene	0	0	5.7E-05	2.3E-04	5.7E-05	2.3E-04	3.1E-05	20 [j]
Fluoranthene [e,f]	0	0	5.5E-06	7.0E-06	5.5E-06	7.0E-06	0	9.1E-05
Fluorene [e,f]	0	0	1.7E-05	2.1E-05	1.7E-05	2.1E-05	0	9.1E-05
Formaldehyde [e]	0	0	3.3E-03	0.015	3.3E-03	0.015	**1.9E-03**	5.1E-04
Hexane	0	0	0.117	0.480	0.117	0.48	0.046	12
Hydrogen Chloride	0	0	0.986	3.666	0.986	**3.666**	0	0.05
Lead	6.5E-03	0.029	4.8E-04	2.1E-03	7.0E-03	0.031	0	
Manganese	0.244	1.067	4.6E-03	0.017	0.248	1.085	**0.244**	0.067
Mercury [g]	1.3E-03	5.7E-03	7.1E-04	2.9E-03	*< 0.028*	*< 0.122*	*0.108 lb/yr*	*25 lb/yr*
Naphthalene	0	0	2.1E-03	8.8E-03	2.1E-03	8.8E-03	1.6E-05	3.33
Nickel [e]	1.6E-03	7.1E-03	5.5E-04	2.4E-03	2.2E-03	9.5E-03	**1.7E-03**	2.7E-05
Phenanthrene [e,f]	0	0	5.1E-05	6.3E-05	5.1E-05	6.3E-05	0	9.1E-05
Phenol	0	0	2.4E-04	1.1E-03	2.4E-04	1.1E-03	0	1.27
Phosphorus	0.53	2.32	5.6E-03	0.023	0.535	2.343	**0.053**	7.0E-03
Pyrene [e,f]	0	0	5.0E-06	6.6E-06	5.0E-06	6.6E-06	0	9.1E-05
Selenium	3.3E-04	1.4E-03	4.1E-04	1.8E-03	7.4E-04	3.2E-03	3.3E-04	0.013
Toluene	0	0	0.032	0.139	0.032	0.139	8.8E-05	25
Xylene	0	0	0.032	0.138	0.032	0.138	0	29
Total HAP [h]	1.83	8.00	1.20	4.57	3.05	12.68	1.39	

Table 6 POTENTIAL TO EMIT FOR HAZARDOUS & TOXIC AIR POLLUTANTS (HAP/TAP) [(a)]

HAP/TAP	Mining and Leaching Emissions		Processing and Production Emissions		Facility-Wide Total Emissions		Adjusted TAP Emissions	Screening Emission Level
	lb/hr [(b)]	T/yr [(c)]	lb/hr [(b)]	T/yr [(c)]	lb/hr [(b)]	T/yr [(c)]	lb/hr [(b,d)]	lb/hr [(d)]
Aluminum [(i)]	57.855	253	0.648	2.577	58.504	256	**58.504**	0.667
Barium [(i)]	0.652	2.855	6.8E-03	0.028	0.659	2.883	**0.659**	0.033
Calcium Carbonate [(i)]	11.408	49.967	2.244	8.125	13.652	58.092	**13.652**	0.667
Calcium Oxide [(i)]	0	0	0.696	0.952	0.696	0.952	**0.696**	0.133
Copper [(i)]	4.1E-03	0.018	5.3E-04	2.2E-03	4.6E-03	0.020	0.0046	0.067
Cyclohexane [(i)]	0	0	1.0E-03	4.6E-03	1.0E-03	4.6E-03	0.0010	70
Hydrogen Sulfide [(i)]	0	0	0.900	3.942	0.900	3.942	0.900	0.933
Iron [(i)]	14.831	64.958	0.213	0.812	15.043	65.770	**15.043**	0.067
Molybdenum [(i)]	8.1E-04	3.6E-03	4.7E-04	2.0E-03	1.3E-03	5.6E-03	0.0013	0.333
Pentane [(i)]	0	0	0.123	0.495	0.123	0.495	0.123	118
Silver [(i)]	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-4	3.6E-03	0.00082	7.0E-03
Sulfuric Acid [(i)]	0	0	2.030	8.891	2.030	8.891	**2.030**	0.067
Thallium [(i)]	8.1E-03	0.036	5.2E-04	2.2E-03	8.7E-03	0.038	**0.0087**	0.007
Uranium [(i)]	8.1E-03	0.036	5.2E-04	2.2E-03	8.7E-03	0.038	0.0087	0.013
Vanadium [(i)]	0.023	0.100	8.4E-04	3.5E-03	0.024	0.103	**0.024**	0.003
Trimethyl Benzene [(i)]	0	0	0.011	0.048	0.011	0.048	0.011	8.2
Tungsten [(i)]	8.1E-03	0.036	5.2E-04	2.2E-03	8.7E-03	0.038	0.0087	0.333
Zinc [(i)]	0.029	0.125	2.2E-03	8.8E-03	0.031	0.134	0.031	0.667

a) HAP and TAP PTE emissions estimates are for the highest emissions year Scenario W3, referenced from Table B1-W3 of Appendix B to the HAP/TAP addendum and 'TblB1' worksheet in the supporting spreadsheet. Process and production activities include ore processing; ore concentration and refining; process heating; aggregate production; concrete production; heating, ventilation, and air conditioning (HVAC); emergency power generation and fire suppression; and fuel storage. Mining and leaching activities include drilling, blasting, excavating, hauling, prill silos, rock dumps and storage piles, and tailings.

b) Controlled average emissions rates in pounds per hour (lb/hr). Emissions rates for non-carcinogens are daily averages, based on the proposed daily operating scenarios and limits. Emissions rates for carcinogens are annual averages, based on the proposed annual operating scenarios and limits.

c) Controlled average emissions rates in tons per year (T/yr) are annual averages, based on the proposed annual operating scenarios and annual limits.

d) Adjusted TAP emissions and screening emission levels (EL) as specified in IDAPA 58.01.01.585-586 for purposes of TAP preconstruction compliance demonstrations. For TAP, adjusted emissions do not include sources addressed by NSPS and NESHAP in accordance with IDAPA 58.01.01.210.20 Table 9.

e) Carcinogenic TAP as identified in IDAPA 58.01.01.586.

f) Polycyclic aromatic hydrocarbon (PAH). The group of seven PAH with a single EL are regulated as polycyclic organic matter (POM) equivalent in potency to benzo(a)pyrene as specified in IDAPA 58.01.01.586.

g) Adjusted mercury emissions (which are not TAP) are reported in pounds per year (lb/yr) and do not include fugitive sources and sources addressed by NESHAP 40 CFR 63 for comparison to the Mercury Emission Standard threshold of 25 lb/yr. Facility-wide mercury PTE emission rates were calculated as annual average based on federally-enforceable NESHAP Subpart EEEEEEE limits, and exceed values referenced from Table B1-W3 of Appendix B to the HAP/TAP addendum and 'TblB1' worksheet in the supporting spreadsheet (which account for the proposed mercury control devices for refinery process sources AC, EW, MR, MF, CKD).

h) Total hazardous air pollutant (HAP) emissions from all permitted sources and activities (combined). The maximum potential emissions of any single HAP is hydrogen chloride.

i) Toxic air pollutant that is not also a hazardous air pollutant (i.e., non-HAP TAP) and is not included in HAP totals.

j) Dichlorobenzene is regulated as both the ortho- and para- isomers (o-dichlorobenzene and 1,4-dichlorobenzene). For the purposes of TAP compliance, the lowest EL (and therefore most conservative) is listed.

HAP and TAP particulate metals are indirectly regulated via facility-wide fugitive dust requirements for particulate matter (PM) (Permit Conditions 2.1–2.8, 3.10, 5.10), material throughput and operational limits (Permit Conditions 3.3–3.9, 4.6–4.12, 5.4–5.9, 6.2-6.3, 6.5), PM emission limits (Permit Conditions 4.3, 5.3), control device requirements (Permit Conditions 3.11–3.13, 4.13–4.17, 5.12–5.16), and associated testing, monitoring, recordkeeping, and reporting requirements. Because usage of process reagents were not correlated to material throughput rates and not otherwise inherently limited, HAP emissions limits and usage limits were established for potassium amyl xanthate (PAX) and sodium cyanide (Permit Conditions 4.4–4.6). Cyanide emissions were sensitive to leachant concentration and basicity, and monitoring of these parameters was established (Permit Condition 4.5) to ensure compliance with the emission limit. Monitoring of these limits and process parameters also ensure compliance with the major threshold for each individual HAP of 10 tons per year (T/yr).

Ambient Air Quality Impact Analyses

The applicant has demonstrated preconstruction compliance to DEQ's satisfaction that emissions from this facility will not cause nor significantly contribute to a violation of any ambient air quality standard. The applicant has also demonstrated preconstruction compliance to DEQ's satisfaction that the emissions increase due to this permitting action will not exceed any acceptable ambient concentration (AAC) or acceptable ambient concentration for carcinogens (AACC) for toxic air pollutants (TAP). A summary of the Ambient Air Impact Analysis for TAP is provided in Appendix B.

As presented in the modeling memorandum in Appendix B, the estimated emission rates of PM_{10}, $PM_{2.5}$, SO_2, CO, NO_x, and certain TAP from this project exceeded applicable screening emission levels (EL) and published DEQ modeling thresholds established in IDAPA 58.01.01.585-586 and in the State of Idaho Air Quality Modeling Guideline.[16] The facility-wide emission rate of lead (Pb) was determined to be below the "below regulatory concern" (BRC) threshold level of less than 10% of the "significant" emission rate defined in IDAPA 58.01.01.006 (i.e., less than 0.06 T/yr) and therefore modeling was not required.[16] Refer to the Emissions Inventories section for additional information concerning the emissions inventories.

New and updated TAP increment compliance demonstrations[4] were provided after evaluation of fugitive particulate TAP emissions from emission sources (Table 6) as identified in public comments and in a response and HAP/TAP addendum to the application provided by PRI.[2] For non-HAP TAP, all sources were evaluated for TAP compliance by comparison of facility-wide emissions to applicable screening emission levels (EL). After exclusion of sources addressed by NSPS and NESHAP (Table 9), applicable concrete production, HVAC emission sources, and gold mining operations were evaluated for HAP TAP compliance by comparison of adjusted emissions to applicable EL. Refer to the Emissions Inventories section for estimates of HAP and TAP emissions (as summarized in Table 6) and to the Subsection 210.20 (IDAPA 58.01.01.210.20) section for relevant guidance and discussion of sources addressed by NSPS and NESHAP. With the exception of 16 TAP, estimated emission increases of non-carcinogenic and carcinogenic TAP demonstrated preconstruction compliance with TAP standards in accordance with IDAPA 58.01.01.210.07 using controlled average emission rates. Modeling analyses conducted in the development of TAP rules supports that if controlled average emission rates do not exceed applicable screening emission levels (EL) in IDAPA 58.01.01.585–586, controlled ambient concentrations are expected to be below the applicable acceptable ambient concentration (AAC/AACC).

Estimated emission increases of aluminum, arsenic, barium, beryllium, cadmium, calcium carbonate, calcium oxide, cyanide, formaldehyde, iron, manganese, nickel, phosphorus, sulfuric acid, thallium, and vanadium (16 TAP) demonstrated preconstruction compliance with TAP standards in accordance with IDAPA 58.01.01.210.08 for controlled ambient concentrations. Modeling analyses demonstrated preconstruction compliance with the acceptable ambient concentrations for the eleven non-carcinogenic TAP (AAC) in IDAPA 58.01.01.585. Emission limits (Permit Condition 4.3), operational and material throughput limits (Permit Conditions 3.3–3.9, 4.6–4.12, 5.4–5.9), fugitive dust control requirements (Permit Conditions 2.1–2.8), and control equipment requirements (Permit Conditions 2.6, 3.11–3.13, 4.13–4.17, and 5.12–5.16) limit these TAP emissions in accordance with IDAPA 58.01.01.210.08.c, limit Pb to BRC, and limit PM, PM_{10} ,and $PM_{2.5}$ to below the emission rates relied upon in the NAAQS evaluation of ambient air impacts in the modeling analyses. The remaining five carcinogenic TAP were modeled using an emission inventory that includes T-RACT controls and other emission inventory refinements (see the T-RACT Analysis section).

Arsenic represented the single greatest HAP TAP emission; adjusted arsenic HAP TAP emissions at 0.544 pounds per hour (lb/hr) did not exceed 42% of the applicable AACC. Iron (Fe) represented the greatest single non-HAP TAP emission at over 15 lb/hr, which did not exceed 4% of the applicable AAC. Any uncertainties in metal TAP emission estimates are not expected to affect compliance with TAP provisions.

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[16] Criteria pollutant thresholds in Table 2, State of Idaho Guideline for Performing Air Quality Impact Analyses, Doc ID AQ-011, September 2013, criteria pollutant BRC thresholds as provided in IDAPA 58.01.01.221.01, and DEQ guidance pertaining to BRC (2014ACF3).

It was recognized that accurately defining the mining operations boundary and controlling public access within that boundary was critical to estimating ambient air impacts. To ensure operation consistent with the defined mining operations boundary, site-specific access control measures will be employed. PRI has committed to identifying and complying with these site-specific access control measures in an Access Management Plan (AMP, as required by Permit Condition 2.7).[17] Refer to Appendix E for a description and discussion of the mining operations boundary and control measures that may be included in this plan.

An ambient air quality impact analyses document has been crafted by DEQ based on a review of the modeling analysis submitted in the application. That document is part of the final permit package for this permitting action (refer to Appendix B). Refer to the Emissions Inventories section and Appendix A for additional information concerning development of the emissions inventories.

T-RACT Analysis

Further evaluation of the sources of HAP emissions that were previously considered addressed by the NESHAP Subpart EEEEEEE per IDAPA 58.01.01.210.20(b), specifically the mining emissions, was conducted by SGP. Estimated emission increases of aluminum, arsenic, barium, beryllium, cadmium, calcium carbonate, calcium oxide, cyanide, formaldehyde, iron, manganese, nickel, phosphorus, sulfuric acid, thallium, and vanadium (16 TAP) exceeded the screening emission levels. Modeling analyses demonstrated preconstruction compliance with the acceptable ambient concentrations for the eleven non-carcinogenic TAP (AAC) in IDAPA 58.01.01.585. The remaining five carcinogenic TAP were modeled using an emission inventory that includes T-RACT controls, long-term mining production limits (Permit Conditions 3.5 and 3.6), constructing the Burntlog access road with offsite material containing minimal level arsenic concentrations, updating the bulldozing emission factor using the SGP site-specific silt content of 4 percent, and the elimination of modeling scenario W5 as a potential operating scenario as the West End DRSF will not be constructed.

In accordance with IDAPA 58.01.01.210.12, the proposed T-RACT ambient concentrations at the point of compliance for each applicable TAP are less than, or equal to, the T-RACT ambient concentration (i.e., less than 10 times the applicable AACC listed in IDAPA 58.01.01.586).

In accordance with IDAPA 58.01.01.210.14, this T-RACT analysis included consideration of available control technologies and/or “The application of a design, equipment, work practice or operational requirement, or combination thereof”, for compliance with the T-RACT requirements. This included a search of EPA’s RACT, BACT, LAER Clearinghouse to identify available control technologies. To meet the T-RACT requirements, the permit requires the control measures determined to meet T-RACT as summarized in the following table. These control measures were selected based upon consideration of the technological feasibility for this process/operation, the economic feasibility, energy requirements, and environmental impacts.

Table 7 T-RACT CONTROL MEASURES

TAP	Proposed T-RACT Control Measures	Permit Conditions
Arsenic, Beryllium, Cadmium, Formaldehyde, Nickel	Drilling rigs dust control system	3.11
Arsenic	Chemical dust suppressant with frequent watering on roads Haul road capping	2.1 – 2.6 3.13

In accordance with IDAPA 58.01.01.210.12.d and 58.01.01.210.14.e, emission limits and other permit conditions for each T-RACT pollutant have been incorporated into the permit as summarized in the table above to assure that the facility will be operated in the manner described in the preconstruction compliance demonstration. A detailed T-RACT analysis is provided in the updated HAP/TAP addendum[9] and is included in Appendix G.

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[17] Attachment 2 – Stibnite Road Access Management Plan to the Stibnite Gold Project Permit to Construct Application, PRI, revised June 23, 2020 (2020AAG1078).

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Valley County, which is designated as attainment or unclassifiable for $PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, and Ozone. Refer to 40 CFR 81.313 for additional information.

Facility Classification

The AIRS/AFS facility classification codes are as follows:

For HAP (hazardous air pollutants) only:

A	=	Use when any one HAP has permitted emissions > 10 T/yr or if the aggregate of all HAP (Total HAP) has permitted emissions > 25 T/yr.
SM80	=	Use if a synthetic minor (uncontrolled HAP emissions are > 10 T/yr or if the aggregate of all uncontrolled HAP (Total HAP) emissions are > 25 T/yr and permitted emissions fall below applicable major source thresholds) and the permit sets limits > 8 T/yr of a single HAP or ≥ 20 T/yr of Total HAP.
SM	=	Use if a synthetic minor (uncontrolled HAP emissions are > 10 T/yr or if the aggregate of all uncontrolled HAP (Total HAP) emissions are > 25 T/yr and permitted emissions fall below applicable major source thresholds) and the permit sets limits < 8 T/yr of a single HAP and/or < 20 T/yr of Total HAP.
B	=	Use when the potential to emit (i.e. uncontrolled emissions and permitted emissions) are below the 10 and 25 T/yr HAP major source thresholds.
UNK	=	Class is unknown.

For All Other Pollutants:

A	=	Use when permitted emissions of a pollutant are > 100 T/yr.
SM80	=	Use if a synthetic minor for the applicable pollutant (uncontrolled emissions are > 100 T/yr and permitted emissions fall below 100 T/yr) and permitted emissions of the pollutant are ≥ 80 T/yr.
SM	=	Use if a synthetic minor for the applicable pollutant (uncontrolled emissions are > 100 T/yr and permitted emissions fall below 100 T/yr) and permitted emissions of the pollutant are < 80 T/yr.
B	=	Use when the potential to emit (i.e. uncontrolled emissions and permitted emissions) are below the 100 T/yr major source threshold.
UNK	=	Class is unknown.

Table 8 REGULATED AIR POLLUTANT FACILITY CLASSIFICATION

Pollutant	Uncontrolled PTE (T/yr)	Permitted PTE (T/yr)	Major Source Thresholds (T/yr)	AIRS/AFS Classification
PM	560	86.6	**100**	SM80
PM_{10}	337	55.7	**100**	SM
$PM_{2.5}$	164	35.8	**100**	SM
SO_2	6.27	6.3	**100**	B
NO_x	36.16	36.2	**100**	B
CO	29.47	29.5	**100**	B
VOC	4.68	4.7	**100**	B
HAP (single)	>20	3.666	**10**	SM
Total HAP	>25	12.68	**25**	SM

Based on the uncontrolled PTE summarized in Table 2 and controlled PTE summarized above and in Table 3, Table 6, and Appendix A, the permittee will be a "synthetic minor" source of PM, PM_{10}, $PM_{2.5}$, and HAP emissions for new source review and Title V (Tier I) permitting purposes. The uncontrolled PTE for the remaining criteria pollutants (SO_2, NO_x, CO, VOC) confirm PRI will be a natural minor source for these emissions.

Permit to Construct (IDAPA 58.01.01.201)

The permittee has requested that a PTC be issued to the facility for the proposed new emission sources. Therefore, a permit to construct is required in accordance with IDAPA 58.01.01.201. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

Tier II Operating Permit (IDAPA 58.01.01.401)

IDAPA 58.01.01.401 .... Tier II Operating Permit

The application was submitted for a permit to construct (refer to the Permit to Construct (IDAPA 58.01.01.201) section), and an optional Tier II operating permit has not been requested. Therefore, the procedures of IDAPA 58.01.01.400–410 were not applicable to this permitting action.

Subsection 210.20 (IDAPA 58.01.01.210.20)

IDAPA 58.01.01.210.20...................................... NSPS and NESHAP Sources

No demonstration of compliance with the TAP provisions is required to obtain a PTC or to demonstrate PTC exemption criteria for a new source or for modification of an existing source if the TAP is also a listed HAP from:

> *The equipment or activity covered by a NSPS or NESHAP; or*
>
> *The source category of equipment or activity addressed by a NSPS or NESHAP even if the equipment or activity is not subject to compliance requirements under the federal rule.*

Emission sources covered or addressed by NSPS or NESHAP are identified in the following table, and guidance on interpretation of "addressed" is provided in Appendix F. For the sources identified, emissions of TAP that are also HAP (HAP TAP) were excluded from TAP compliance demonstrations (i.e., excluded from comparison to TAP EL and from modeling to demonstrate compliance with TAP AAC/AACC, as discussed in the Ambient Air Quality Impact Analyses).

Table 9 NSPS and NESHAP Sources

NESHAP / NSPS	Source Category Covered & Addressed	Sources
NESHAP Subpart ZZZZ [a] NSPS Subpart IIII	Any industry using a stationary internal combustion engine	*Emergency Power Generation* EDG1, EDG2, EDG3, EDFP
NESHAP Subpart AAAAA [a] NSPS Subpart HH	Any lime manufacturing plant	*Lime Production* LK, LKC, LS12, LS-L/U, LCR
NESHAP Subpart CCCCCC [a]	Any gasoline dispensing facility Includes any operation that transfers and stores gasoline	*Gasoline Fuel Storage and Dispensing* TG1–TG2
NESHAP Subpart EEEEEEE [a]	Gold ore mining Includes an establishment engaged in developing the mine site, mining, and/or beneficiating ores valued chiefly for their gold content, or in transformation of gold into bullion or doré bar in combination with mining activities	*Ore Concentration and Refining* AC, EW, MR, MF, CKD
NSPS Subpart LL	Any metallic mineral plant Includes any combination of equipment that extracts aluminum, copper, gold, iron, lead, molybdenum, silver, titanium, tungsten, uranium, zinc, and zirconium	*Ore Processing* OC1–OC13
NSPS Subpart OOO	Any nonmetallic mineral plant Includes plants processing crushed and broken stone, crushed and broken limestone, lime plants, sand and gravel, clay, etc.	*Aggregate Production* PCSP1, PCSP2 *Concrete Production* CA-L/U *Lime Production* LS1–LS11, LSBM
Source category that may not be subject to or may not be addressed by NSPS or NESHAP		*Concrete Production* CM, CS1-L/U, CS2-L/U *Heating, Ventilation, and Air Conditioning* H1M–H2M, HM, HAC, HR, HA, HMO, HTS, HW *Process Heating* ACB, CKB, PV, HS *Mining* drilling, blasting, excavating, hauling, prill silos, rock dumps and storage piles, tailings *Lime Storage and Crushing* LS1-LU, Mills2-L/U, ACS1-ASC4

a) NESHAP in 40 CFR 63.

NESHAP 40 CFR 63, Subpart EEEEEEE applies only to the following affected sources: each collection of “ore pretreatment processes” at a gold mine ore processing and production facility, each collection of “carbon processes with mercury retorts” at a gold mine ore processing and production facility, each collection of “carbon processes without mercury retorts” at a gold mine ore processing and production facility, and each collection of “non-carbon concentrate processes” at a gold mine ore processing and production facility. Ore pretreatment processes include the autoclave (AC). Carbon processes with mercury retort include the electrowinning cells and pregnant solution tank (EW), the mercury retort (MR), induction melting furnace (MF), and the carbon regeneration kiln (CKD). These sources are covered by NESHAP, as referenced in IDAPA 58.01.01.210.20.

Emissions of TAP from the gold mining operations such as drilling, blasting, excavating, hauling, prill silos, rock dumps and storage piles, and tailings are not covered by NESHAP Subpart EEEEEEE, as referenced in IDAPA 58.01.01.210.20. Further evaluation was conducted by SGP for these sources of HAP TAP emissions.

After exclusion of sources addressed by NSPS and/or NESHAP, the remaining sources were evaluated for compliance with TAP provisions. Emissions of each TAP from these sources (non-NESHAP-covered-or-addressed) were estimated and compared to the applicable screening emission level (as summarized in Table 6).

Mercury Emission Standard (IDAPA 58.01.01.215)

IDAPA 58.01.01.215... Mercury Emission Standard for New or Modified Sources

No owner or operator may commence construction or modification of a stationary source or facility that results in an increase in annual potential emissions of mercury of 25 pounds or more unless the owner or operator has obtained a PTC under Sections 200–228 of the Rules. The PTC application shall include an MBACT analysis for the new or modified source or sources for review and approval by DEQ. A determination of applicability under Section 215 shall be based upon the best available information.

Fugitive emissions shall not be included in a determination of applicability under Section 215.

New or modified stationary sources within a source category subject to 40 CFR 63 are exempt from the requirements of Section 215.

IDAPA 58.01.01.215 sets requirements for mercury emissions. For this standard, fugitive emissions and sources in a source category subject to 40 CFR 63 are exempt. As identified in Table 9, emission sources within a source category subject to NESHAP 40 CFR 63, including Subpart ZZZZ, Subpart AAAAA, Subpart CCCCCC, and Subpart EEEEEEE were therefore exempt from this standard. Although non-applicable to area sources of HAP such as PRI, as a source category lime manufacturing plants are subject to NESHAP 40 CFR 63, Subpart AAAAA and associated sources (identified in Table 9) therefore exempt from this standard. Fugitive emissions from drilling, blasting, excavating, roadways (hauling), dozing, grading, storage piles, tailings and other fugitive and mobile emission sources were also exempt from this standard. Refer to the MACT/GACT Applicability (40 CFR 63) section for regulatory applicability analysis. No mercury emissions are expected from fuel storage, emergency power generation, and fire suppression sources.

After exclusion of sources within a source category subject to an area source NESHAP (40 CFR 63), aggregate production (crushers, screens, and conveyors), concrete production (aggregate bin), and heating, ventilation, and air conditioning (HVAC) units comprise the remaining sources that are applicable to the Mercury Emission Standard. Mercury emissions from these sources (non-fugitive and non-NESHAP-addressed) were estimated at less than 0.041 pounds per year (lb/yr), below the level at which MBACT review is required. Mercury emissions from propane combustion in HVAC sources are uncontrolled. Mercury emissions from materials processed in aggregate production and concrete production are controlled via water sprays and moisture carryover. As such controls are required for the portable crushing and screening plant, central mixer, and cement/shotcrete silos (Permit Conditions 2.1–2.8, 5.11, 5.12, and 5.16).

For the autoclave, electrowinning cells and pregnant solution tank, mercury retort, and induction melting furnace refinery sources (AC, EW, MR, MF) with enforceable NESHAP Subpart EEEEEEE mercury emission limits, potential emissions estimates (PTE) calculated consistent with these limits were included in the facility-wide mercury emission totals in Table 6. These values were substituted in lieu of the controlled emission estimates referenced from Table B1-W3 of Appendix B to the HAP/TAP addendum and ‘TblB1’ worksheet in the supporting spreadsheet. Although the mercury emissions from these sources are ultimately not included in the adjusted mercury emission totals for the purposes of the Mercury Emission Standard, these were used for the purposes of estimating HAP PTE consistent with enforceable limits.

Particulate Matter – New Equipment Process Weight Limitations (IDAPA 58.01.01.701)

IDAPA 58.01.01.701... Particulate Matter – New Equipment Process Weight Limitations

IDAPA 58.01.01.700 through 703 set PM emission limits for process equipment based on when the piece of equipment commenced operation and the piece of equipment’s process weight (PW) in pounds per hour (lb/hr). IDAPA 58.01.01.701 establishes PM emission limits for equipment that commenced operation on or after October 1, 1979.

For equipment commencing operation on or after October 1, 1979, the PM allowable emission rate (E) is based on one of the following equations:

IDAPA 58.01.01.701.01.a: If PW is < 9,250 lb/hr; $E = 0.045 (PW)^{0.60}$

IDAPA 58.01.01.701.01.b: If PW is ≥ 9,250 lb/hr; $E = 1.10 (PW)^{0.25}$

For the new ore processing, ore concentration and refining, lime production, aggregate production, and concrete production equipment sources (Table 1) emissions (E) were calculated at the proposed maximum throughput rates (Table 1), and estimated emissions from all sources demonstrated compliance with this requirement. Compliance with operational and material throughput limits (Permit Conditions 3.3–3.9, 4.6–4.12, 5.4–5.9) and control equipment requirements (Permit Conditions 2.6, 3.11–3.13, 4.13–4.17, and 5.12–5.16) assure compliance with this standard, resulting in much lower emission rates.

Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)

IDAPA 58.01.01.301 .... Requirement to Obtain Tier I Operating Permit

Any source subject to 40 CFR 63, Subpart EEEEEEE is a Tier I source as defined in IDAPA 58.01.01.006.122.c. In accordance with IDAPA 58.01.01.313.01.b., the permittee must submit a complete application to DEQ for an initial Tier I operating permit within 12 months of becoming a Tier I source.

PRI has committed to applying for a Tier I permit. Detailed federal regulatory applicability were provided in the PTC application, and specific federally-applicable requirements will be incorporated into the Tier I. Refer to the NSPS Applicability (40 CFR 60), NESHAP Applicability (40 CFR 61), and MACT/GACT Applicability (40 CFR 63) sections below for additional information regarding applicable requirements.

Post-project facility-wide emissions from this facility do not have a PTE greater than 100 tons per year for criteria pollutants or 10 tons per year for any one HAP or 25 tons per year for all HAP combined as demonstrated previously in the Emissions Inventories section of this analysis. Although not a major facility as defined in IDAPA 58.01.01.008.10, any source subject to 40 CFR 63, Subpart EEEEEEE is a Tier I source as defined in IDAPA 58.01.01.006.122.c. In accordance with IDAPA 58.01.01.313.01.b., the permittee must submit a complete application to DEQ for an initial Tier I operating permit within 12 months of becoming a Tier I source. Refer to the NESHAP Applicability (40 CFR 61) section for additional discussion of Subpart EEEEEEE applicability.

Permit Condition 2.24 incorporates the requirement to obtain a Tier I permit in accordance with IDAPA 58.01.01.313.01.b.

PSD Classification (40 CFR 52.21)

40 CFR 52.21 .... Prevention of Significant Deterioration of Air Quality

The project includes a lime manufacturing plant (LMP) that uses a Parallel Flow Regenerative Shaft Kiln (LK, LKC) to produce lime product from limestone by calcination, which is a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a). As a designated facility, both fugitive and non-fugitive emissions from the lime plant must be counted toward a determination of a major stationary source with a threshold of 100 T/yr. SGP is a gold mine with a nested lime plant operating within the stationary source. The primary activity of the stationary source is the mining and processing of gold ore. As explained in the United States Environmental Protection Agency's (EPA) March 6, 2003, guidance,[18] an example is "A coal mine with an onsite coal cleaning plant with a thermal dryer. The primary activity of the source, in this example, is the mining of coal, and coal mines are not a listed source category. The coal cleaning plant, however, does fall within a listed source category. You include fugitive emissions only from the coal cleaning plant to determine if the source is a major stationary source." Gold mines are not a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a). Therefore, emissions from the primary activity, the gold mining operation, are not included in the LMP major source determination as summarized in Table 10 below (values referenced are from 'PROC' tab in the emissions inventory spreadsheet, see Appendix A).

[18] "Clarification on fugitive emissions policy" letter to Janet McCabe, Assistant Commissioner, Office of Air Quality, Indiana Department of Environmental Management, March 6, 2003.

Using the definition of a LMP in the federal regulation Subpart AAAAA - National Emission Standards for Hazardous Air Pollutants for Lime Manufacturing Plants, the Subpart applies to each existing or new lime kiln(s) and their associated cooler(s), and processed stone handling (PSH) operations system(s). PSH operations systems includes all equipment associated with PSH operations beginning at the processed stone storage bin(s) or open storage pile(s) and ending where the processed stone is fed into the kiln. It includes man-made processed stone storage bins (but not open processed stone storage piles), conveying system transfer points, bulk loading or unloading systems, screening operations, surge bins, bucket elevators, and belt conveyors. These sources are included in the table below under the designated facility section. In addition, supporting equipment to the LMP has been included under the fugitive sources.

Table 10 LIME PLANT POTENTIAL TO EMIT

Source	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	VOC	SO_2
	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]
LMP (Designated Facility)							
LS12	0.12	0.05	0.01				
LS-L	0.02	0.02	0.02				
LS-U	0.002	0.002	0.002				
LK	3.40	3.40	3.40	11.79	6.29		0.03
LKC	0.63	0.63	0.63	6.72	11.6	0.72	1.42
LCR	1.06	0.89	0.32				
LMP / Fugitive Sources							
LS1	0.48	0.17	0.03				
LS2	0.86	0.38	0.06				
LS3	3.97	1.38	0.21				
LS4	0.86	0.38	0.06				
LS5	3.97	1.38	0.21				
LS6	0.48	0.17	0.03				
LSBM	6.42	5.39	1.92				
LS7	0.48	0.17	0.03				
LS8	0.48	0.17	0.03				
LS9	0.12	0.05	0.007				
LS10	0.12	0.05	0.007				
LS11	1.03	0.36	0.05				
Post-Project PTE	**24.5**	**15.0**	**7.0**	**18.5**	**17.9**	**0.7**	**1.5**

a) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating scenarios and annual limits.

To be conservative, if the primary activity of the stationary source was not considered and the LMP was treated as the primary activity of the mine with a threshold of 100 T/yr including both fugitive and non-fugitive emissions, the LMP affected sources are summarized in Table 11 below (values referenced from 'PROC' tab in the emissions inventory spreadsheet, see Appendix A).

The source of marble, the Middle Marble Geologic Unit (MMGU), for the LMP is overburden excavated from the West End pit. Because of its location, the overburden must be removed even if it were not used for onsite lime production. A percentage of the West End pit overburden, 0.63%, will provide the lime plant feed over the life of the mine. The potential throughput rate of limestone (marble) feed to the SGP LMP primary crusher is 1,130 tons/day (limited by Permit Condition 5.4) and the potential overburden mining rate is 180,000 tons/day (limited by Permit Condition 3.5).

LMP throughput percentage calculation: 1,130 tons/day / 180,000 tons/day = 0.0063 or 0.63%

This percentage was used to conservatively calculate the potential annual emissions from the marble overburden mining associated with the LMP operation.

Table 11 LIME PLANT POTENTIAL TO EMIT INCLUDING FUGITIVES FROM MARBLE OVERBURDEN MINING

Source	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	VOC	SO_2
	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]
LMP (Designated Facility)							
LS12	0.12	0.05	0.01				
LS-L	0.02	0.02	0.02				
LS-U	0.002	0.002	0.002				
LK	3.40	3.40	3.40	11.79	6.29		0.03
LKC	0.63	0.63	0.63	6.72	11.6	0.72	1.42
LCR	1.06	0.89	0.32				
LMP / Fugitive Sources							
LS1	0.48	0.17	0.03				
LS2	0.86	0.38	0.06				
LS3	3.97	1.38	0.21				
LS4	0.86	0.38	0.06				
LS5	3.97	1.38	0.21				
LS6	0.48	0.17	0.03				
LSBM	6.42	5.39	1.92				
LS7	0.48	0.17	0.03				
LS8	0.48	0.17	0.03				
LS9	0.12	0.05	0.007				
LS10	0.12	0.05	0.007				
LS11	1.03	0.36	0.05				
LMP Marble Overburden Mining / Fugitive Sources [(b)]							
Blasting activities	0.739	0.384	0.022	4.006	0.108		0.0002
Drilling activities	1.794	0.933	0.054				
Hauling	18.28	4.49	0.449				
Material load / unload (L/UL)	0.095	0.045	0.007				
Dozing	0.652	0.125	0.068				
Grading	0.232	0.070	0.007				
Water Truck Travel	0.688	0.169	0.017				
Access Roads	0.044	0.011	0.001				
Wind Erosion	0.036	0.018	0.003				
Surface Exploration	0.007	0.002	0.0004				
Underground Exploration	0.00001	0.000006	0.0000006				
Post-Project PTE	**47.07**	**21.29**	**7.65**	**22.52**	**18.00**	**0.72**	**1.45**

a) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating scenarios and annual limits.
b) Emissions are from Table 3 and multiplied by the percentage of overburden used as marble feed (<0.63%) to the SGP lime plant.

NSPS Applicability (40 CFR 60)

The permittee has affected facilities subject to New Source Performance Standards (NSPS). The POX Boiler (ACB) meets the definition of process heater rather than steam generating unit, and the use of a rotary lime kiln has not been proposed in the production of lime; therefore Subpart Dc and Subpart HH are not applicable. Initial regulatory applicability analyses and determinations are provided below; detailed analyses and explicit incorporation of applicable requirements is left to the required Tier I permit action as discussed in the Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70) section.

- Standards of Performance for New Stationary Sources (NSPS) 40 CFR 60, Subpart A – General Provisions. DEQ is delegated this Subpart.
- NSPS 40 CFR 60, Subpart LL – Standards of Performance for Metallic Mineral Processing Plants. DEQ is delegated this Subpart. Each crusher, conveyor belt transfer point, and truck unloading station is an affected facility.

- NSPS 40 CFR 60, Subpart OOO – Standards of Performance for Nonmetallic Mineral Processing Plants. DEQ is delegated this Subpart. Each crusher, grinding mill, screening operation, belt conveyor, and storage bin is an affected facility.
- NSPS 40 CFR 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. DEQ is delegated this Subpart. Each emergency generator engine and fire pump is an affected facility.

Emission sources regulated by Subpart LL, Subpart OOO, and Subpart IIII are identified in the incorporation of federal requirements condition (Permit Condition 2.22)

40 CFR 60, Subpart A .... General Provisions

§60.1 .... Applicability

(a) Except as provided in subparts B and C, the provisions of this part apply to the owner or operator of any stationary source which contains an affected facility, the construction or modification of which is commenced after the date of publication in this part of any standard (or, if earlier, the date of publication of any proposed standard) applicable to that facility.

(b) Any new or revised standard of performance promulgated pursuant to section 111(b) of the Act shall apply to the owner or operator of any stationary source which contains an affected facility, the construction or modification of which is commenced after the date of publication in this part of such new or revised standard (or, if earlier, the date of publication of any proposed standard) applicable to that facility.

Because the permittee will own or operate NSPS affected facilities, which have been proposed to commence construction after the date of publication of the relevant applicable NSPS standards (as listed above), general provisions in Subpart A are applicable.

40 CFR 60, Subpart A is incorporated by reference into Permit Condition 2.22, and specific applicable requirements will be incorporated into the Tier I operating permit.

40 CFR 60, Subpart Dc .... Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

§60.40c .... Applicability and delegation of authority.

(a) Except as provided in paragraphs (d), (e), (f), and (g) of this section, the affected facility to which this subpart applies is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/h)) or less, but greater than or equal to 2.9 MW (10 MMBtu/h).

§60.41c .... Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Clean Air Act and in subpart A of this part.

…

Heat input *means heat derived from combustion of fuel in a steam generating unit and does not include the heat derived from preheated combustion air, recirculated flue gases, or exhaust gases from other sources (such as stationary gas turbines, internal combustion engines, and kilns).*

Heat transfer medium *means any material that is used to transfer heat from one point to another point.*

…

Process heater *means a device that is primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst.*

…

Steam generating unit *means a device that combusts any fuel and produces steam or heats water or heats any heat transfer medium. This term includes any duct burner that combusts fuel and is part of a combined cycle system. This term does not include process heaters as defined in this subpart.*

Although the Pressure Oxidation Boiler (POX Boiler) is between 10 and 100 MMBtu/hr in design heat input capacity (17 MMBtu/hr) and is proposed for construction after June 9, 1989, it meets the definition of process heater rather than steam generating unit, and therefore is not applicable to this subpart. The POX Boiler (ACB) is a device used to directly heat ore material via steam injection into the autoclave, to promote chemical oxidation reactions in which the heated ore participates as a reactant. DEQ is delegated this Subpart.

40 CFR 60, Subpart HH .... Standards of Performance for Lime Manufacturing Plants

§60.340 .... Applicability and designation of affected facility.

(a) The provisions of this subpart are applicable to each rotary lime kiln used in the manufacture of lime.

(b) The provisions of this subpart are not applicable to facilities used in the manufacture of lime at kraft pulp mills.

(c) Any facility under paragraph (a) of this section that commences construction or modification after May 3, 1977, is subject to the requirements of this subpart.

§60.341 .... Definitions.

As used in this subpart, all terms not defined herein shall have the same meaning given them in the Act and in the General Provisions.

(a) Lime manufacturing plant *means any plant which uses a rotary lime kiln to produce lime product from limestone by calcination.*

(b) Lime product *means the product of the calcination process including, but not limited to, calcitic lime, dolomitic lime, and dead-burned dolomite.*

(c) Positive-pressure fabric filter *means a fabric filter with the fans on the upstream side of the filter bags.*

(d) Rotary lime kiln *means a unit with an inclined rotating drum that is used to produce a lime product from limestone by calcination.*

(e) Stone feed *means limestone feedstock and mill scale or other iron oxide additives that become part of the product.*

The use of a rotary lime kiln has not been proposed in the production of lime, and therefore the requirements of Subpart HH are not applicable. DEQ is delegated this Subpart.

40 CFR 60, Subpart LL .... Standards of Performance for Metallic Mineral Processing Plants

§60.380 .... Applicability and designation of affected facility.

(a) The provisions of this subpart are applicable to the following affected facilities in metallic mineral processing plants: Each crusher and screen in open-pit mines; each crusher, screen, bucket elevator, conveyor belt transfer point, thermal dryer, product packaging station, storage bin, enclosed storage area, truck loading station, truck unloading station, railcar loading station, and railcar unloading station at the mill or concentrator with the following exceptions. All facilities located in underground mines are exempted from the provisions of this subpart. At uranium ore processing plants, all facilities subsequent to and including the beneficiation of uranium ore are exempted from the provisions of this subpart.

(b) An affected facility under paragraph (a) of this section that commences construction or modification after August 24, 1982, is subject to the requirements of this part.

Because the permittee will own or operate a metallic mineral processing plant with a crusher at an open-pit mine; with crushers, conveyor belt transfer points, and truck unloading stations at the mill or concentrator; and because these are proposed to commence construction after August 24, 1982, requirements in Subpart LL are applicable.

40 CFR 60, Subpart LL is incorporated by reference into Permit Condition 2.22, and specific applicable requirements will be incorporated into the Tier I operating permit.

40 CFR 60, Subpart OOO .... Standards of Performance for Nonmetallic Mineral Processing Plants

§60.670 .... Applicability and designation of affected facility.

(a)(1) Except as provided in paragraphs (a)(2), (b), (c), and (d) of this section, the provisions of this subpart are applicable to the following affected facilities in fixed or portable nonmetallic mineral processing plants: each crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, enclosed truck or railcar loading station. Also, crushers and grinding mills at hot mix asphalt facilities that reduce the size of nonmetallic minerals embedded in recycled asphalt pavement and subsequent affected facilities up to, but not including, the first storage silo or bin are subject to the provisions of this subpart.

(2) The provisions of this subpart do not apply to the following operations: All facilities located in underground mines; plants without crushers or grinding mills above ground; and wet material processing operations (as defined in §60.671).

(b) An affected facility that is subject to the provisions of subparts F or I of this part or that follows in the plant process any facility subject to the provisions of subparts F or I of this part is not subject to the provisions of this subpart.

(c) Facilities at the following plants are not subject to the provisions of this subpart:

(1) Fixed sand and gravel plants and crushed stone plants with capacities, as defined in §60.671, of 23 megagrams per hour (25 tons per hour) or less;

(2) Portable sand and gravel plants and crushed stone plants with capacities, as defined in §60.671, of 136 megagrams per hour (150 tons per hour) or less; and

(3) Common clay plants and pumice plants with capacities, as defined in §60.671, of 9 megagrams per hour (10 tons per hour) or less.

(d)(1) When an existing facility is replaced by a piece of equipment of equal or smaller size, as defined in §60.671, having the same function as the existing facility, and there is no increase in the amount of emissions, the new facility is exempt from the provisions of §§60.672, 60.674, and 60.675 except as provided for in paragraph (d)(3) of this section.

(2) An owner or operator complying with paragraph (d)(1) of this section shall submit the information required in §60.676(a).

(3) An owner or operator replacing all existing facilities in a production line with new facilities does not qualify for the exemption described in paragraph (d)(1) of this section and must comply with the provisions of §§60.672, 60.674 and 60.675.

(e) An affected facility under paragraph (a) of this section that commences construction, modification, or reconstruction after August 31, 1983, is subject to the requirements of this part.

(f) Table 1 of this subpart specifies the provisions of subpart A of this part 60 that do not apply to owners and operators of affected facilities subject to this subpart or that apply with certain exceptions.

Because the project contains crushers, grinding mills, screening operations, belt conveyors, and storage bins in a fixed or portable nonmetallic mineral processing plant, which are proposed to commence construction after August 31, 1983, requirements in Subpart OOO are applicable. The portable crushing and screening plants (PCSP1, PCSP2) will be rated at below 150 tons per hour (T/hr), and are therefore not subject to the provisions of Subpart OOO.

40 CFR 60, Subpart OOO is incorporated by reference into Permit Condition 2.22, and specific applicable requirements will be incorporated into the Tier I operating permit.

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

§60.4200... Am I subject to this subpart?

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

(1) Manufacturers of stationary CI ICE with a displacement of less than 30 liters per cylinder where the model year is:

(i) 2007 or later, for engines that are not fire pump engines;

(ii) The model year listed in Table 3 to this subpart or later model year, for fire pump engines.

(2) Owners and operators of stationary CI ICE that commence construction after July 11, 2005, where the stationary CI ICE are:

(i) Manufactured after April 1, 2006, and are not fire pump engines, or

(ii) Manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006.

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

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

(b) The provisions of this subpart are not applicable to stationary CI ICE being tested at a stationary CI ICE test cell/stand.

(c) If you are an owner or operator of an area source subject to this subpart, you are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart applicable to area sources.

(d) Stationary CI ICE may be eligible for exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C (or the exemptions described in 40 CFR part 89, subpart J and 40 CFR part 94, subpart J, for engines that would need to be certified to standards in those parts), except that owners and operators, as well as manufacturers, may be eligible to request an exemption for national security.

(e) Owners and operators of facilities with CI ICE that are acting as temporary replacement units and that are located at a stationary source for less than 1 year and that have been properly certified as meeting the standards that would be applicable to such engine under the appropriate nonroad engine provisions, are not required to meet any other provisions under this subpart with regard to such engines.

Because the permittee will own or operate compression ignition (CI) internal combustion engines (ICE) which are proposed to commence construction after July 11, 2005 and which will be ordered after April 1, 2006 for the emergency generator engines, and which will be ordered after July 1, 2006 for the fire pump engine, requirements in Subpart IIII are applicable. The permittee has not requested or qualified for exemption pursuant to §60.4200(b), (d), or (e).

40 CFR 60, Subpart IIII is incorporated by reference into Permit Condition 2.22, and specific applicable requirements will be incorporated into the Tier I operating permit.

NESHAP Applicability (40 CFR 61)

The facility is not subject to any NESHAP requirements in 40 CFR 61.

MACT/GACT Applicability (40 CFR 63)

The permittee has proposed to operate as a minor source of hazardous air pollutant (HAP) emissions, and has affected facilities subject to the following National Emission Standards for Hazardous Air Pollutants (NESHAP). The lime manufacturing plant is proposed at an area source of HAP, and therefore is not applicable to Subpart AAAAA. The process boiler is at an area source of Applicability determinations and regulatory analyses are provided below.

- National Emission Standards for Hazardous Air Pollutants for Source Categories (NESHAP) 40 CFR 63, Subpart A – General Provisions. DEQ is delegated this Subpart for Tier I sources.
- NESHAP 40 CFR 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE). DEQ is delegated this Subpart. The emergency generator and fire pump engines (EDG1, EDG2, EDG3, and EDFP) are affected sources.
- NESHAP 40 CFR 63, Subpart CCCCCC – National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities. DEQ is delegated this Subpart for Tier I sources. The gasoline fuel storage tanks (TG1, TG2) are affected sources.
- NESHAP 40 CFR 63, Subpart EEEEEEE – National Emission Standards for Hazardous Air Pollutants: Gold Mine Ore Processing and Production Area Source Category. DEQ is delegated this Subpart for Tier I sources. The collection of ore pretreatment processes and the carbon process with mercury retort are affected sources. Ore pretreatment processes include the autoclave (AC). Carbon processes with mercury retort include the electrowinning cells and pregnant solution tank (EW), the mercury retort (MR), induction melting furnace (MF), and the carbon regeneration kiln (CKD).

Emission sources regulated by Subpart EEEEEEE, Subpart CCCCCC, and Subpart ZZZZ are identified in the incorporation of federal requirements condition (Permit Condition 2.22)

40 CFR 63, Subpart A .... General Provisions

§63.1 .... Applicability.

(a) General. *(1) Terms used throughout this part are defined in §63.2 or in the Clean Air Act (Act) as amended in 1990, except that individual subparts of this part may include specific definitions in addition to or that supersede definitions in §63.2.*

(2) This part contains national emission standards for hazardous air pollutants (NESHAP) established pursuant to section 112 of the Act as amended November 15, 1990. These standards regulate specific categories of stationary sources that emit (or have the potential to emit) one or more hazardous air pollutants listed in this part pursuant to section 112(b) of the Act. This section explains the applicability of such standards to sources affected by them. The standards in this part are independent of NESHAP contained in 40 CFR part 61. The NESHAP in part 61 promulgated by signature of the Administrator before November 15, 1990 (i.e., the date of enactment of the Clean Air Act Amendments of 1990) remain in effect until they are amended, if appropriate, and added to this part.

(3) No emission standard or other requirement established under this part shall be interpreted, construed, or applied to diminish or replace the requirements of a more stringent emission limitation or other applicable requirement established by the Administrator pursuant to other authority of the Act (section 111, part C or D or any other authority of this Act), or a standard issued under State authority. The Administrator may specify in a specific standard under this part that facilities subject to other provisions under the Act need only comply with the provisions of that standard.

(4)(i) Each relevant standard in this part 63 must identify explicitly whether each provision in this subpart A is or is not included in such relevant standard.

(ii) If a relevant part 63 standard incorporates the requirements of 40 CFR part 60, part 61 or other part 63 standards, the relevant part 63 standard must identify explicitly the applicability of each corresponding part 60, part 61, or other part 63 subpart A (General) provision.

(iii) The General Provisions in this subpart A do not apply to regulations developed pursuant to section 112(r) of the amended Act, unless otherwise specified in those regulations.

…

(b) Initial applicability determination for this part. *(1) The provisions of this part apply to the owner or operator of any stationary source that—*

(i) Emits or has the potential to emit any hazardous air pollutant listed in or pursuant to section 112(b) of the Act; and

(ii) Is subject to any standard, limitation, prohibition, or other federally enforceable requirement established pursuant to this part.

(2) [Reserved]

(3) An owner or operator of a stationary source who is in the relevant source category and who determines that the source is not subject to a relevant standard or other requirement established under this part must keep a record as specified in §63.10(b)(3).

Because the permittee will own or operate stationary sources that emit HAP which are subject to standards, limitations, prohibitions, or other federally-enforceable requirements established pursuant to NESHAP, provisions in Subpart A are applicable.

40 CFR 63, Subpart A is incorporated by reference into Permit Condition 2.22, and specific applicable requirements will be incorporated into the Tier I operating permit.

40 CFR 63, Subpart ZZZZ................................... National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

§63.6580... What is the purpose of subpart ZZZZ?

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

§63.6585... Am I subject to this subpart?

You are subject to this subpart if you own or operate a stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand.

(a) A stationary RICE is any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICE differ from mobile RICE in that a stationary RICE is not a non-road engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition.

(b) A major source of HAP emissions is a plant site that emits or has the potential to emit any single HAP at a rate of 10 tons (9.07 megagrams) or more per year or any combination of HAP at a rate of 25 tons (22.68 megagrams) or more per year, except that for oil and gas production facilities, a major source of HAP emissions is determined for each surface site.

(c) An area source of HAP emissions is a source that is not a major source.

(d) If you are an owner or operator of an area source subject to this subpart, your status as an entity subject to a standard or other requirements under this subpart does not subject you to the obligation to obtain a permit under 40 CFR part 70 or 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart as applicable.

(e) If you are an owner or operator of a stationary RICE used for national security purposes, you may be eligible to request an exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C.

(f) The emergency stationary RICE listed in paragraphs (f)(1) through (3) of this section are not subject to this subpart. The stationary RICE must meet the definition of an emergency stationary RICE in §63.6675, which includes operating according to the provisions specified in §63.6640(f).

(1) Existing residential emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in §63.6640(f)(4)(ii).

(2) Existing commercial emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in §63.6640(f)(4)(ii).

(3) Existing institutional emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in §63.6640(f)(4)(ii).

Because the permittee will own or operate stationary RICE at an area source of HAP which are subject to standards, limitations, prohibitions, or other federally-enforceable requirements established pursuant to NESHAP, requirements in Subpart ZZZZ are applicable.

40 CFR 63, Subpart ZZZZ is incorporated by reference into Permit Condition 2.22, and specific applicable requirements will be incorporated into the Tier I operating permit.

40 CFR 63, Subpart AAAAA................................ National Emission Standards for Hazardous Air Pollutants for Lime Manufacturing Plants

§63.7080.. What is the purpose of this subpart?

This subpart establishes national emission standards for hazardous air pollutants (NESHAP) for lime manufacturing plants. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations.

§63.7081.. Am I subject to this subpart?

(a) You are subject to this subpart if you own or operate a lime manufacturing plant (LMP) that is a major source, or that is located at, or is part of, a major source of hazardous air pollutant (HAP) emissions, unless the LMP is located at a kraft pulp mill, soda pulp mill, sulfite pulp mill, beet sugar manufacturing plant, or only processes sludge containing calcium carbonate from water softening processes.

(1) An LMP is an establishment engaged in the manufacture of lime product (calcium oxide, calcium oxide with magnesium oxide, or dead burned dolomite) by calcination of limestone, dolomite, shells or other calcareous substances.

(2) A major source of HAP is a plant site that emits or has the potential to emit any single HAP at a rate of 9.07 megagrams (10 tons) or more per year or any combination of HAP at a rate of 22.68 megagrams (25 tons) or more per year from all emission sources at the plant site.

(b) [Reserved]

§63.7143.. What definitions apply to this subpart?

Terms used in this subpart are defined in the Clean Air Act, in §63.2, and in this section as follows:

...

Lime manufacturing plant (LMP) *means any plant which uses a lime kiln to produce lime product from limestone or other calcareous material by calcination.*

Lime product *means the product of the lime kiln calcination process including, calcitic lime, dolomitic lime, and dead-burned dolomite.*

Limestone *means the material comprised primarily of calcium carbonate (referred to sometimes as calcitic or high calcium limestone), magnesium carbonate, and/or the double carbonate of both calcium and magnesium (referred to sometimes as dolomitic limestone or dolomite).*

...

The lime manufacturing plant is proposed at an area source of HAP, and therefore is not subject to this Subpart.

40 CFR 60, Subpart CCCCCC........................... National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities

§63.11110.. What is the purpose of this subpart?

This subpart establishes national emission limitations and management practices for hazardous air pollutants (HAP) emitted from the loading of gasoline storage tanks at gasoline dispensing facilities (GDF). This subpart also establishes requirements to demonstrate compliance with the emission limitations and management practices.

§63.11111.. Am I subject to the requirements in this subpart?

(a) The affected source to which this subpart applies is each GDF that is located at an area source. The affected source includes each gasoline cargo tank during the delivery of product to a GDF and also includes each storage tank.

(b) If your GDF has a monthly throughput of less than 10,000 gallons of gasoline, you must comply with the requirements in §63.11116.

(c) If your GDF has a monthly throughput of 10,000 gallons of gasoline or more, you must comply with the requirements in §63.11117.

(d) If your GDF has a monthly throughput of 100,000 gallons of gasoline or more, you must comply with the requirements in §63.11118.

(e) An affected source shall, upon request by the Administrator, demonstrate that their monthly throughput is less than the 10,000-gallon or the 100,000-gallon threshold level, as applicable. For new or reconstructed affected sources, as specified in §63.11112(b) and (c), recordkeeping to document monthly throughput must begin upon startup of the affected source. For existing sources, as specified in §63.11112(d), recordkeeping to document monthly throughput must begin on January 10, 2008. For existing sources that are subject to this subpart only because they load gasoline into fuel tanks other than those in motor vehicles, as defined in §63.11132, recordkeeping to document monthly throughput must begin on January 24, 2011. Records required under this paragraph shall be kept for a period of 5 years.

(f) If you are an owner or operator of affected sources, as defined in paragraph (a) of this section, you are not required to obtain a permit under 40 CFR part 70 or 40 CFR part 71 as a result of being subject to this subpart. However, you must still apply for and obtain a permit under 40 CFR part 70 or 40 CFR part 71 if you meet one or more of the applicability criteria found in 40 CFR 70.3(a) and (b) or 40 CFR 71.3(a) and (b).

(g) The loading of aviation gasoline into storage tanks at airports, and the subsequent transfer of aviation gasoline within the airport, is not subject to this subpart.

(h) Monthly throughput is the total volume of gasoline loaded into, or dispensed from, all the gasoline storage tanks located at a single affected GDF. If an area source has two or more GDF at separate locations within the area source, each GDF is treated as a separate affected source.

(i) If your affected source's throughput ever exceeds an applicable throughput threshold, the affected source will remain subject to the requirements for sources above the threshold, even if the affected source throughput later falls below the applicable throughput threshold.

(j) The dispensing of gasoline from a fixed gasoline storage tank at a GDF into a portable gasoline tank for the on-site delivery and subsequent dispensing of the gasoline into the fuel tank of a motor vehicle or other gasoline-fueled engine or equipment used within the area source is only subject to §63.11116 of this subpart.

(k) For any affected source subject to the provisions of this subpart and another Federal rule, you may elect to comply only with the more stringent provisions of the applicable subparts. You must consider all provisions of the rules, including monitoring, recordkeeping, and reporting. You must identify the affected source and provisions with which you will comply in your Notification of Compliance Status required under §63.11124. You also must demonstrate in your Notification of Compliance Status that each provision with which you will comply is at least as stringent as the otherwise applicable requirements in this subpart. You are responsible for making accurate determinations concerning the more stringent provisions, and noncompliance with this rule is not excused if it is later determined that your determination was in error, and, as a result, you are violating this subpart. Compliance with this rule is your responsibility and the Notification of Compliance Status does not alter or affect that responsibility.

§63.11132 .... What definitions apply to this subpart?

As used in this subpart, all terms not defined herein shall have the meaning given them in the Clean Air Act (CAA), or in subparts A and BBBBBB of this part. For purposes of this subpart, definitions in this section supersede definitions in other parts or subparts.

Dual-point vapor balance system *means a type of vapor balance system in which the storage tank is equipped with an entry port for a gasoline fill pipe and a separate exit port for a vapor connection.*

Gasoline *means any petroleum distillate or petroleum distillate/alcohol blend having a Reid vapor pressure of 27.6 kilopascals or greater, which is used as a fuel for internal combustion engines.*

Gasoline cargo tank *means a delivery tank truck or railcar which is loading or unloading gasoline, or which has loaded or unloaded gasoline on the immediately previous load.*

Gasoline dispensing facility (GDF) *means any stationary facility which dispenses gasoline into the fuel tank of a motor vehicle, motor vehicle engine, nonroad vehicle, or nonroad engine, including a nonroad vehicle or nonroad engine used solely for competition. These facilities include, but are not limited to, facilities that dispense gasoline into on- and off-road, street, or highway motor vehicles, lawn equipment, boats, test engines, landscaping equipment, generators, pumps, and other gasoline-fueled engines and equipment.*

Monthly throughput *means the total volume of gasoline that is loaded into, or dispensed from, all gasoline storage tanks at each GDF during a month. Monthly throughput is calculated by summing the volume of gasoline loaded into, or dispensed from, all gasoline storage tanks at each GDF during the current day, plus the total volume of gasoline loaded into, or dispensed from, all gasoline storage tanks at each GDF during the previous 364 days, and then dividing that sum by 12.*

Motor vehicle *means any self-propelled vehicle designed for transporting persons or property on a street or highway.*

Nonroad engine *means an internal combustion engine (including the fuel system) that is not used in a motor vehicle or a vehicle used solely for competition, or that is not subject to standards promulgated under section 7411 of this title or section 7521 of this title.*

Nonroad vehicle *means a vehicle that is powered by a nonroad engine, and that is not a motor vehicle or a vehicle used solely for competition.*

Submerged filling *means, for the purposes of this subpart, the filling of a gasoline storage tank through a submerged fill pipe whose discharge is no more than the applicable distance specified in §63.11117(b) from the bottom of the tank. Bottom filling of gasoline storage tanks is included in this definition.*

Vapor balance system *means a combination of pipes and hoses that create a closed system between the vapor spaces of an unloading gasoline cargo tank and a receiving storage tank such that vapors displaced from the storage tank are transferred to the gasoline cargo tank being unloaded.*

Vapor-tight *means equipment that allows no loss of vapors. Compliance with vapor-tight requirements can be determined by checking to ensure that the concentration at a potential leak source is not equal to or greater than 100 percent of the Lower Explosive Limit when measured with a combustible gas detector, calibrated with propane, at a distance of 1 inch from the source.*

Vapor-tight gasoline cargo tank *means a gasoline cargo tank which has demonstrated within the 12 preceding months that it meets the annual certification test requirements in §63.11092(f) of this part.*

Because the permittee will own or operate a gasoline dispensing facility (GDF) at an area source of HAP, requirements in Subpart CCCCCC are applicable. Because the permittee has committed to loading and dispensing of less than 100,000 gallons of gasoline per month (gal/mo), the requirements of 40 CFR 63.11117 will become applicable in accordance with 40 CFR 63.11111(b) and (c). Gasoline loading and dispensing is limited by Permit Condition 2.18 to avoid requirements applicable to GDF exceeding 100,000 gal/mo, and requires recordkeeping in accordance with 40 CFR 63.11111(e).

40 CFR 63, Subpart CCCCCC is incorporated by reference into Permit Condition 2.22, and specific applicable requirements will be incorporated into the Tier I operating permit.

40 CFR 63, Subpart EEEEEEE........................... National Emission Standards for Hazardous Air Pollutants: Gold Mine Ore Processing and Production Area Source Category

§40 CFR 63.11640.. Am I subject to this subpart?

(a) You are subject to this subpart if you own or operate a gold mine ore processing and production facility as defined in §63.11651, that is an area source.

(b) This subpart applies to each new or existing affected source. The affected sources are each collection of "ore pretreatment processes" at a gold mine ore processing and production facility, each collection of "carbon processes with mercury retorts" at a gold mine ore processing and production facility, each collection of "carbon processes without mercury retorts" at a gold mine ore processing and production facility, and each collection of "non-carbon concentrate processes" at a gold mine ore processing and production facility, as defined in §63.11651.

(1) An affected source is existing if you commenced construction or reconstruction of the affected source on or before April 28, 2010.

(2) An affected source is new if you commenced construction or reconstruction of the affected source after April 28, 2010.

(c) This subpart does not apply to research and development facilities, as defined in section 112(c)(7) of the Clean Air Act (CAA).

(d) If you own or operate a source subject to this subpart, you must have or you must obtain a permit under 40 CFR part 70 or 40 CFR part 71.

§40 CFR 63.11651.. What definitions apply to this subpart?

Terms used in this subpart are defined in the Clean Air Act, in §63.2, and in this section as follows:

Autoclave *means a pressure oxidation vessel that is used to treat gold ores (primarily sulfide refractory ore) and involves pumping a slurry of milled ore into the vessel which is highly pressurized with oxygen and heated to temperatures of approximately 350° to 430 °F.*

Calomel-based mercury control system *means a mercury emissions control system that uses scrubbers to remove mercury from the gas stream of a roaster or combination of roasters by complexing the mercury from the gas stream with mercuric chloride to form mercurous chloride (calomel). These scrubbers are also referred to as "mercury scrubbers."*

Carbon adsorber *means a control device consisting of a single fixed carbon bed, multiple carbon beds or columns, carbon filter packs or modules, and other variations that uses activated carbon to remove pollutants from a gas stream.*

Carbon kiln *means a kiln or furnace where carbon is regenerated by heating, usually in the presence of steam, after the gold has been stripped from the carbon.*

Carbon processes with mercury retorts *means the affected source that includes carbon kilns, preg tanks, electrowinning cells, mercury retorts, and melt furnaces at gold mine ore processing and production facilities that use activated carbon, or resins that can be used as a substitute for activated carbon, to recover (adsorb) gold from the pregnant cyanide solution.*

Carbon processes without mercury retorts *means the affected source that includes carbon kilns, preg tanks, electrowinning cells, and melt furnaces, but has no retorts, at gold mine ore processing and production facilities that use activated carbon, or resins that can be used as a substitute for activated carbon, to recover (adsorb) gold from the pregnant cyanide solution.*

Concentrate *means the sludge-like material that is loaded with gold along with various other metals (such as silver, copper, and mercury) and various other substances, that is produced by electrowinning, the Merrill-Crowe process, flotation and gravity separation processes. Concentrate is measured as the input to mercury retorts, or for facilities without mercury retorts, as the input to melt furnaces before any drying takes place. For facilities without mercury retorts or melt furnaces, concentrate is measured as the quantity shipped.*

Deviation *means any instance where an affected source subject to this subpart, or an owner or operator of such a source:*

(1) Fails to meet any requirement or obligation established by this subpart, including but not limited to any emissions limitation or work practice standard;

(2) Fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit; or

(3) Exceeds any operating limit established under this subpart.

Electrowinning *means a process that uses induced voltage on anode and cathode plates to remove metals from the continuous flow of solution, where the gold in solution is plated onto the cathode. Steel wool is typically used as the plating surface.*

Electrowinning Cells *means a tank in which the electrowinning takes place.*

Gold mine ore processing and production facility *means any industrial facility engaged in the processing of gold mine ore that uses any of the following processes: Roasting operations, autoclaves, carbon kilns, preg tanks, electrowinning, mercury retorts, or melt furnaces. Laboratories (see CAA section 112(c)(7)), individual prospectors, and very small pilot scale mining operations that processes or produces less than 100 pounds of concentrate per year are not a gold mine ore processing and production facility. A facility that produces primarily metals other than gold, such as copper, lead, zinc, or nickel (where these metals other than gold comprise 95 percent or more of the total metal production) that may also recover some gold as a byproduct is not a gold mine ore processing and production facility. Those facilities whereby 95 percent or more of total mass of metals produced are metals other than gold, whether final metal production is onsite or offsite, are not part of the gold mine ore processing and production source category.*

Melt furnace *means a furnace (typically a crucible furnace) that is used for smelting the gold-bearing material recovered from mercury retorting, or the gold-bearing material from electrowinning, the Merrill-Crowe process, or other processes for facilities without mercury retorts.*

Mercury retort *means a vessel that is operated under a partial vacuum at approximately 1,100° to 1,300 °F to remove mercury and moisture from the gold bearing sludge material that is recovered from electrowinning, the Merrill-Crowe process, or other processes. Mercury retorts are usually equipped with condensers that recover liquid mercury during the processing.*

Merrill-Crowe process *means a precipitation technique using zinc oxide for removing gold from a cyanide solution. Zinc dust is added to the solution, and gold is precipitated to produce a concentrate.*

Non-carbon concentrate processes *means the affected source that includes mercury retorts and melt furnaces at gold mine ore processing and production facilities that use the Merrill-Crowe process or other processes and do not use carbon (or resins that substitute for carbon) to recover (adsorb) gold from the pregnant cyanide solution.*

Ore dry grinding *means a process in which the gold ore is ground and heated (dried) prior to additional preheating or prior to entering the roaster.*

Ore preheating *means a process in which ground gold ore is preheated prior to entering the roaster.*

Ore pretreatment processes *means the affected source that includes roasting operations and autoclaves that are used to pre-treat gold mine ore at gold mine ore processing and production facilities prior to the cyanide leaching process.*

Pregnant solution tank (or preg tank) *means a storage tank for pregnant solution, which is the cyanide solution that contains gold-cyanide complexes that is generated from leaching gold ore with cyanide solution.*

Pregnant cyanide solution *means the cyanide solution that contains gold-cyanide complexes that are generated from leaching gold ore with a dilute cyanide solution.*

Quenching *means a process in which the hot calcined ore is cooled and quenched with water after it leaves the roaster.*

Roasting operation *means a process that uses an industrial furnace in which milled ore is combusted across a fluidized bed to oxidize and remove organic carbon and sulfide mineral grains in refractory gold ore. The emissions points of the roasting operation subject to this subpart include ore dry grinding, ore preheating, the roaster stack, and quenching.*

Because the permittee will own or operate a gold mine ore processing and production facility at an area source of HAP, requirements in Subpart EEEEEEE are applicable. The collection of ore pretreatment processes and the carbon process with mercury retort are affected sources. Ore pretreatment processes include the autoclave (AC). Carbon processes with mercury retort include the electrowinning cells and pregnant solution tank (EW), the mercury retort (MR), induction melting furnace (MF), and the carbon regeneration kiln (CKD).

Any source subject to 40 CFR 63, Subpart EEEEEEE is a Tier I source as defined in IDAPA 58.01.01.006.122.c. In accordance with IDAPA 58.01.01.313.01.b., the permittee must submit a complete application to DEQ for an initial Tier I operating permit within 12 months of becoming a Tier I source.

This subpart includes mercury emissions limits for the collection of new ore pretreatment processes and for the new carbon processes with mercury retort. This subpart also requires weight measurement devices for measuring ore throughput for the autoclave (AC) and mineral-bearing solution throughput for the electrowinning cells and pregnant solution tank (EW). Requires monitoring of mercury emissions, and monitoring of either inlet gas temperature for each process unit with a carbon filter (EW, MR, MF, CKD) or both water flow and pressure drop for each process unit with a wet scrubber not followed by a carbon filter (AC).

40 CFR 63, Subpart EEEEEEE is incorporated by reference into Permit Condition 2.22, and specific applicable requirements will be incorporated into the Tier I operating permit.

Permit Conditions Review

This section describes the permit conditions for this initial permit.

Permit Conditions 1.1–1.2 describe the purpose of this permitting action and the emission sources and the control equipment regulated by this permit. This reflects information presented in the application and relied upon in the development of emissions inventories, and in the evaluation of ambient air impacts in the modeling analyses. Refer to the Emissions Inventories and the Ambient Air Quality Impact Analyses sections for additional information concerning these analyses.

Because specific vendor and manufacturer information was unavailable at the time of permitting, documentation and testing requirements were included (Permit Condition 2.20) to verify consistency with the information specified in the application. Production values and limits were based on process flow diagrams and engineering design information provided.

Permit Conditions 2.1–2.8 incorporate fugitive dust emission limits and control requirements as required by IDAPA 58.01.01.650-651. Compliance is ensured by implementing reasonable control precautions and corrective actions when appropriate, excluding public access to operations, and complying with inspection, monitoring, recordkeeping, and notification requirements. Specific precautions are identified and required in the fugitive dust control plan (FDCP), and specific measures to control public access within the operations boundary are identified in and required by the Access Management Plan (AMP; Permit Conditions 2.6 and 2.7, respectively). A trigger level for haul roads was also established requiring employment of control measures (Permit Condition 2.5).

Reduction of PM emissions from each of the identified conveyors by 80% was supported by assuming location of these material transfers at below grade (OC9, OC10) or enclosure on all sides (OC11). Reduction of PM emissions from haul roads by a combined 93.3% was supported by assuming appropriate application of water and magnesium chloride dust suppression; DEQ is cognizant that to consistently achieve this level of control requires conscientious efforts, vigilant inspection and monitoring, and a comprehensive FDCP. Because continuous operation was proposed, suppression measures will need to account for and accommodate all weather conditions including diurnal and seasonal variability, and all traffic loads including mining and public traffic along publicly accessible roads. Conditions outside of what may normally be anticipated may require additional measures such as a reduction in vehicle speeds or selection of a more effective chemical dust suppressant. Although the FDCP specifies a minimum of efforts required, additional operational limits and monitoring are to be considered moving forward and evaluated for incorporation into the FDCP. Certification of employees for visible emissions inspection, training and orientation of relevant employees, and periodic evaluation of FDCP requirements are also required.

Access control measures are described in the Ambient Air Boundary section of the application (Section 5.6), and address primary access points, secondary access points, and surveillance.

Permit Conditions 2.9–2.12 incorporate visible emission limits and control requirements (Permit Condition 2.9) in accordance with IDAPA 58.01.01.625. Compliance is ensured by implementing corrective actions when appropriate and complying with inspection, monitoring, and recordkeeping requirements. Certification of employees for visible emissions inspection is also required.

Permit Condition 2.13 is listed as reserved to ensure the integrity of the permit numbering. The process weight rate permit condition has been removed because as discussed previously in the Process Weight section, compliance has been demonstrated with the process weight rule.

Permit Conditions 2.14–2.15 incorporate odorous emission limits in accordance with IDAPA 58.01.01.776.01. Compliance is ensured by complying with monitoring and recordkeeping requirements, including corrective action when appropriate.

Permit Conditions 2.16–2.17 incorporate sulfur content limits for distillate fuel oil, in accordance with IDAPA 58.01.01.725. Compliance is ensured by complying with monitoring and recordkeeping requirements.

Permit Conditions 2.18–2.19 limit facility-wide gasoline fuel throughput. Limiting gasoline throughput limits PTE, ensures avoidance of Subpart CCCCCC requirements applicable to GDF exceeding 100,000 gal/mo, and requires recordkeeping in accordance with 40 CFR 63.11111(e). Compliance is ensured by complying with monitoring and recordkeeping requirements.

Permit Conditions 2.20–2.21 require developing and complying with the requirements of an O&M manual to ensure compliance with control equipment maintenance and operation general provisions (Permit Condition 7.2). Documentation of as-built process equipment specifications and control equipment performance guarantees and establishing control equipment operating parameters and procedures were required, since these were relied upon in the development of emissions inventories, and in the evaluation of ambient air impacts in the modeling analyses. Compliance is ensured by complying with monitoring and recordkeeping requirements.

Permit Condition 2.22 incorporates applicable general compliance, notification, recordkeeping, reporting, general provisions, and other federal requirements by reference in accordance with IDAPA 58.01.01.107.03 and 590-591. Compliance is ensured by complying with applicable federal testing, monitoring, recordkeeping, and reporting requirements. In the event there is a conflict between the subparts and/or emission sources listed (Permit Condition 2.22), the federal requirements shall apply.

With regard to permit conditions referenced in accordance with federal requirements (i.e., NSPS and NESHAP requirements), should there be a conflict between the language of the permit condition and the language of the requirement, the language of the requirement shall govern. Refer to NSPS Applicability (40 CFR 60) and MACT/GACT Applicability (40 CFR 63) sections for additional information concerning applicable requirements.

Permit Conditions 2.23–2.24 require notification upon becoming a Tier I source and require the permittee to obtain a Tier I operation permit within 12 months of commencement of operation of any ore concentration and refining equipment (i.e., NESHAP Subpart EEEEEEE-affected sources) in accordance with IDAPA 58.01.01.313.01.b.

Permit Condition 2.25 specifies recommended test methods to be used when performance testing is required, unless otherwise specified in the permit, in accordance with IDAPA 58.01.01.157. The permittee is required to comply with notification and reporting requirements and is encouraged to submit performance test protocol to DEQ for approval prior to any performance testing in accordance with the performance testing general provisions (Permit Condition 7.7–7.9).

Permit Condition 2.26 provides DEQ agency contact information.

Permit Conditions 3.1–3.2 describe mining and ore processing equipment and controls. This reflects information presented in the application and relied upon in the development of emissions inventories, and in the evaluation of ambient air impacts in the modeling analyses.

Permit Conditions 3.3–3.9 establish limits on material throughput and production. These limits were relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses. Overall mine throughput is limited by hauling and excavating limits including T-RACT control measures (Permit Conditions 3.5 and 3.6). Compliance is ensured by complying with monitoring and recordkeeping requirements (Permit Conditions 3.14–3.20).

Permit Conditions 3.10 and 3.12 require measures to include in the FDCP to control fugitive emissions. Use of reasonable controls were relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses. Compliance is ensured by complying with fugitive dust monitoring and recordkeeping requirements (Permit Conditions 2.1–2.8).

Permit Conditions 3.11 and 3.13 establish a drilling rigs dust control system and a haul road capping plan. Use of these controls in the T-RACT analysis were relied upon in the evaluation of ambient air impacting in the modeling analyses. Compliance is ensured by complying with monitoring and recordkeeping requirements (Permit Conditions 3.11 and 3.13).

Permit Conditions 4.1–4.2 describe ore concentration and refining equipment and controls. This reflects information presented in the application and relied upon in the development of emissions inventories, and in the evaluation of ambient air impacts in the modeling analyses.

Permit Condition 4.3, and 4.33–4.34 establish emissions limits for ore concentration and refining equipment, consistent with estimates relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses for these sources. A sulfuric acid emission limit consistent with the modeled TAP emission rate from the autoclave was established in accordance with IDAPA 58.01.01.210.08. Compliance is ensured by complying with equipment operating and testing requirements (Permit Conditions 4.5–4.17, and 4.33–4.34).

Permit Conditions 4.4, 4.5–4.6, 4.7–4.12 and 4.18–4.25 limit operations of ore concentration and refining process equipment, consistent with the hours of operation, reagent usage, and material throughput assumptions relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses for these sources. Compliance is ensured by complying with monitoring and recordkeeping requirements (Permit Conditions 4.18–4.25). Cyanide is consumed, recycled, and destroyed in the process, and cyanide HAP emissions (and emission factors) dependent upon leachant concentration and basicity. Monitoring of these parameters was established to ensure that emissions do not exceed 10 T/yr of cyanide HAP to avoid classification as a HAP major source. Re-classification as a major source would affect NSPS and NESHAP applicability determinations, such as Subpart AAAAA as discussed in the NESHAP Applicability (40 CFR 61) section.

Permit Conditions 4.13–4.17 and 4.26–4.32 require control equipment for ore concentration and refining processes, consistent with controls relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses. Compliance is ensured by complying with monitoring and recordkeeping requirements (Permit Conditions 4.26–4.32).

Permit Condition 4.33 and 4.34 require testing of ore concentration and refining emission sources to demonstrate compliance with emissions limits (Permit Condition 4.3).

Permit Conditions 5.1–5.2 describe lime, aggregate, and concrete production equipment and controls. This reflects information presented in the application and relied upon in the development of emissions inventories, and in the evaluation of ambient air impacts in the modeling analyses.

Permit Condition 5.3 establishes emissions limits for lime, aggregate, and concrete production equipment, consistent with estimates relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses for these sources. Compliance is ensured by complying with equipment operating requirements (Permit Conditions 5.4–5.15).

Permit Conditions 5.4–5.9 and 5.17–5.22 limit operations of each lime, aggregate, and concrete production process equipment, consistent with material throughput assumptions relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses for these sources. Compliance is ensured by complying with monitoring and recordkeeping requirements (Permit Conditions 5.15–5.20).

Permit Conditions 5.10–5.11 require measures to include in the FDCP to control fugitive emissions. Use of water sprays, building enclosures, and reasonable controls were relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses. Compliance is ensured by complying with fugitive dust monitoring and recordkeeping requirements (Permit Conditions 2.1–2.8).

Permit Conditions 5.12–5.16 and 5.23–5.26 require control equipment for lime, aggregate, and concrete production processes, consistent with controls relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses. Compliance is ensured by complying with monitoring and recordkeeping requirements (Permit Conditions 5.23–5.26).

Permit Condition 6.1 describes the emergency power generation equipment. This reflects information presented in the application and relied upon in the development of emissions inventories, and in the evaluation of ambient air impacts in the modeling analyses.

Permit Conditions 6.2, 6.3, and 6.5 limit operations of each emergency power generation engine, consistent with the purpose and hours of operation assumptions relied upon in the development of emissions inventories, in the determination of federal regulatory applicability, and in the evaluation of ambient air impacts in the modeling analyses for these sources. Compliance is ensured by complying with monitoring, recordkeeping, and notification requirements (Permit Conditions 6.4, 6.6–6.7).

Permit Condition 7.1, the duty to comply general compliance provision, requires that the permittee comply with all of the permit terms and conditions pursuant to Idaho Code §39-101.

Permit Condition 7.2, the maintenance and operation general compliance provision, requires that the permittee maintain and operate all treatment and control facilities at the facility in accordance with IDAPA 58.01.01.211.

Permit Condition 7.3, the obligation to comply general compliance provision, specifies that no permit condition is intended to relieve or exempt the permittee from compliance with applicable state and federal requirements, in accordance with IDAPA 58.01.01.212.01.

Permit Condition 7.4, the inspection and entry provision, requires that the permittee allow DEQ inspection and entry pursuant to Idaho Code §39-108.

Permit Condition 7.5, the permit expiration construction and operation provision, specifies that the permit expires if construction has not begun within two years of permit issuance or if construction has been suspended for a year in accordance with IDAPA 58.01.01.211.02.

Permit Condition 7.6, the notification of construction and operation provision, requires that the permittee notify DEQ of the dates of construction and operation, in accordance with IDAPA 58.01.01.211.01 and 211.03.

Permit Condition 7.7, the performance testing notification of intent provision, requires that the permittee notify DEQ at least 15 days prior to any performance test to provide DEQ the option to have an observer present, in accordance with IDAPA 58.01.01.157.03.

Permit Condition 7.8, the performance test protocol provision, requires that any performance testing be conducted in accordance with the procedures of IDAPA 58.01.01.157 and encourages the permittee to submit a protocol to DEQ for approval prior to testing.

Permit Condition 7.9, the performance test report provision, requires that the permittee report any performance test results to DEQ within 60 days of completion, in accordance with IDAPA 58.01.01.157.04-05.

Permit Condition 7.10, the monitoring and recordkeeping provision, requires that the permittee maintain sufficient records to ensure compliance with permit conditions, in accordance with IDAPA 58.01.01.211.

Permit Condition 7.11, the excess emissions provision, requires that the permittee follow the procedures required for excess emissions events, in accordance with IDAPA 58.01.01.130-136.

Permit Condition 7.12, the certification provision, requires that a responsible official certify all documents submitted to DEQ, in accordance with IDAPA 58.01.01.123.

Permit Condition 7.13, the false statement provision, requires that no person make false statements, representations, or certifications, in accordance with IDAPA 58.01.01.125.

Permit Condition 7.14, the tampering provision, requires that no person render inaccurate any required monitoring device or method, in accordance with IDAPA 58.01.01.126.

Permit Condition 7.15, the transferability provision, specifies that this permit to construct is transferable, in accordance with the procedures of IDAPA 58.01.01.209.06.

Permit Condition 7.16, the severability provision, specifies that permit conditions are severable, in accordance with IDAPA 58.01.01.211.

PUBLIC REVIEW

Public Comment Opportunity

An opportunity for public comment period on the application was provided in accordance with IDAPA 58.01.01.209.01.c. During this time, there was a request for a public comment period on DEQ's proposed action. Refer to the Application Chronology for public comment opportunity dates.

Public Comment Period

Comment periods were made available to the public in accordance with IDAPA 58.01.01.209.01.c. An initial comment period and extension were provided to address the initial application and proposed action (i.e., permit and technical statement of basis), and a second comment period was provided to address updates to the proposed action resulting from a HAP/TAP application addendum[2] submitted by PRI that included new HAP and TAP emission estimates, additional information and discussion supporting HAP and TAP emission estimates, new and updated TAP increment compliance demonstrations which included particulate TAP emissions from fugitive sources, and a source-by-source inventory of HAP and TAP emissions. A third comment period was provided to address updates to the proposed action resulting from a lime plant source status determination[8] and a HAP/TAP application addendum[9] submitted by PRI that includes a T-RACT analysis and proposed control measures. During this time, comments were submitted in response to DEQ's proposed action. Refer to the Application Chronology for the dates of each public comment period.

A response to public comments document has been crafted by DEQ based on comments submitted during each public comment period. That document is part of the final permit package for this permitting action.

APPENDIX A – EMISSIONS INVENTORIES

Midas Gold - Stibnite Gold Project
IDEQ - Emission Inventory

Facility Wide Potential to Emit Emission Inventory

Table 8. POTENTIAL TO EMIT FOR NSR REGULATED POLLUTANTS

Emissions	PM	PM10	PM2.5	CO	Pb	NO2	VOC	SO2	CO2e
Unit	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
Process & Ancillary Point Sources									
LS1L	2.2E-3	7.4E-4	1.1E-4		--				--
MillS2L	2.2E-3	7.4E-4	1.1E-4		--				--
Sb1	0.09	0.09	0.09	0.98	--	1.69	0.10	0.21	1,658
Sb2	0.52	0.52	0.52		--				--
AC	22.23	22.23	22.23		--			2.86	47,316
ACB	2.0E-3	2.0E-3	2.0E-3	0.02	--	0.04	2.2E-3	4.4E-3	35.49
ACS1L	8.7E-3	3.0E-3	4.4E-4		--				--
ACS2L	8.7E-3	3.0E-3	4.4E-4		--				--
ACS3L	8.7E-3	3.0E-3	4.4E-4		--				--
ACS4L	4.3E-3	1.5E-3	2.2E-4		--				--
CKD	1.84	1.84	1.84	0.53	--	0.05	0.48		--
CKB	0.08	0.08	0.08	0.81	--	1.40	0.09	0.17	1,375
EW	0.31	0.31	0.31		--				--
MR	6.2E-3	6.2E-3	6.2E-3		--				--
MF	0.89	0.89	0.89		--				--
EDG1	0.02	0.02	0.02	0.39	--	0.71	0.14	7.2E-4	76.79
EDG2	0.02	0.02	0.02	0.39	--	0.71	0.14	7.2E-4	76.79
EDG3	0.02	0.02	0.02	0.39	--	0.71	0.14	7.2E-4	76.79
EDFP	4.4E-3	4.4E-3	4.4E-3	0.08	--	0.09	0.09	1.4E-4	15.36
PV	3.4E-3	3.4E-3	3.4E-3	0.04	--	0.06	3.8E-3	7.6E-3	60.95
HS	0.17	0.17	0.17	1.80	--	3.11	0.19	0.38	3,048
H1M	0.13	0.13	0.13	1.44	--	2.49	0.15	0.30	2,438
H2M	0.13	0.13	0.13	1.44	--	2.49	0.15	0.30	2,438
HM	0.13	0.13	0.13	1.44	--	2.49	0.15	0.30	2,438
HAC	8.4E-3	8.4E-3	8.4E-3	0.09	--	0.16	9.6E-3	0.02	152
HR	8.4E-3	8.4E-3	8.4E-3	0.09	--	0.16	9.6E-3	0.02	152
HA	8.4E-3	8.4E-3	8.4E-3	0.09	--	0.16	9.6E-3	0.02	152
HMO	0.02	0.02	0.02	0.18	--	0.31	0.02	0.04	305
HTS	0.07	0.07	0.07	0.72	--	1.24	0.08	0.15	1,219
HW	0.10	0.10	0.10	1.08	--	1.87	0.11	0.23	1,829
PSL	0.07	0.03	3.9E-3		--				--
CS1L	0.03	0.01	1.5E-3		2.2E-5				--
CS2L	0.03	0.01	1.5E-3		2.2E-5				--
TG1					--		0.96		--
TG2					--		0.96		--
TD3					--		7.3E-3		--
TD4					--		7.3E-3		--
TD5					--		7.3E-3		--
TD6					--		7.3E-3		--
TD7					--		7.3E-3		--
TD8					--		7.3E-3		--
TD9					--		7.3E-3		--
TD10					--		7.3E-3		--
LS6	0.48	0.17	0.03		--				--
LSBM	6.42	5.39	1.92		--				--
LS9	0.12	0.05	7.0E-3		--				--
LK	3.40	3.40	3.40	11.78	--	6.29		0.03	30,311
LKC	0.63	0.63	0.63	6.72	--	11.65	0.72	1.42	11,407
LCR	1.06	0.89	0.32		--				--
LSL	0.02	0.02	0.02		--				--

Midas Gold - Stibnite Gold Project
IDEQ - Emission Inventory

Facility Wide Potential to Emit Emission Inventory

Table 8. POTENTIAL TO EMIT FOR NSR REGULATED POLLUTANTS

Emissions	**PM**	**PM10**	**PM2.5**	**CO**	**Pb**	**NO2**	**VOC**	**SO2**	**CO2e**
Unit	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
Process & Ancillary Fugitive Sources									
OC1	0.64	0.21	0.06		5.1E-6				--
OC2	0.64	0.21	0.06		5.1E-6				--
OC3	0.64	0.21	0.06		5.1E-6				--
OC4	0.64	0.21	0.06		5.1E-6				--
OC5	0.64	0.21	0.06		5.1E-6				--
OC6	0.64	0.21	0.06		5.1E-6				--
OC7	5.48	2.46	0.46		4.4E-5				--
OC8	0.64	0.21	0.06		5.1E-6				--
OC9	3.02	1.11	0.17		2.4E-5				--
OC10	3.02	1.11	0.17		2.4E-5				--
OC11	3.02	1.11	0.17		2.4E-5				--
OC12	6.04	2.72	0.50		4.8E-5				--
OC13	0.71	0.23	0.07		5.6E-6				--
LS1U	0.01	6.1E-3	9.2E-4		--				--
MillS2U	0.01	6.1E-3	9.2E-4		--				--
ACS1U	0.04	0.02	3.5E-3		--				--
ACS2U	0.04	0.02	3.5E-3		--				--
ACS3U	0.04	0.02	3.5E-3		--				--
ACS42U	0.02	0.01	1.8E-3		--				--
PSU	0.07	0.03	3.9E-3		--				--
CS1U	0.14	0.08	0.01		--				--
CS2U	0.14	0.08	0.01		--				--
CAL	1.73	0.83	0.13		--				--
CAU	1.73	0.83	0.13		--				--
CM	0.55	0.17	0.02		1.1E-5				--
PCSP1	2.74	1.02	0.13		--				--
PCSP2	2.74	1.02	0.13		--				--
LS1	0.48	0.17	0.03		--				--
LS2	0.86	0.38	0.06		--				--
LS3	3.97	1.38	0.21		--				--
LS4	0.86	0.38	0.06		--				--
LS5	3.97	1.38	0.21		--				--
LS7	0.48	0.17	0.03		--				--
LS8	0.48	0.17	0.03		--				--
LS10	0.12	0.05	7.0E-3		--				--
LS11	1.03	0.36	0.05		--				--
LS12	0.12	0.05	7.0E-3		--				--
LSU	2.3E-3	2.3E-3	2.3E-3		--				--
Mining Fugitive Sources Model Scenario: W3									
YPP	0.0E+0	0.0E+0	0.0E+0	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
HFP	0.0E+0	0.0E+0	0.0E+0	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
WEP	345	162	14.53	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
BT	0.0E+0	0.0E+0	0.0E+0	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
TSF	0.0E+0	0.0E+0	0.0E+0	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
UGEXP	1.5E-3	7.3E-4	1.1E-4	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
YPPBL	0.0E+0	0.0E+0	0.0E+0	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
HFPBL	0.0E+0	0.0E+0	0.0E+0	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
WEPBL	117	61.02	3.52	636		17.08	0.0E+0	0.03	
BTBL	0.0E+0	0.0E+0	0.0E+0	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
STKP	0.0E+0	0.0E+0	0.0E+0	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
FDRSF	0.0E+0	0.0E+0	0.0E+0	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
HFDRSF	52.91	10.42	5.52	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
YPDRSF	0.0E+0	0.0E+0	0.0E+0	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
WEDRSF	0.0E+0	0.0E+0	0.0E+0	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
HR	3,047	751	75.12	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
ACCRD	6.95	1.72	0.17	0.0E+0		0.0E+0	0.0E+0	0.0E+0	
Totals	**3,656**	**1,042**	**135**	**666**	**2.6E-4**	**54.93**	**4.78**	**6.51**	**106,580**

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
	PROJECT NO: 335-20-3	PAGE: 1 OF: 19 SHEET: Calcs
AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emissions	DATE: December 18, 2020

Model Scenario W3

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	HAP/TAP	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk	chk	chk	chk	chk	chk

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
	PROJECT NO: 335-20-3	PAGE: 2 OF: 19 SHEET: Calcs
AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emissions	DATE: December 18, 2020

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	Non-HAP TAP	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions
2,000 lb/ton
8,760 hr/yr
24 hr/day

TABLE B1-W3. HAP/TAP Emissions and Exemptions

CAS	HAP/TAP	HAP	TAP														
						1	1	1	1	1	1	1	1	1	1	1	1
						MINING										LEACHING	
						Mining		*Model Scenario W3*								*CN Leach/PAX*	
						YPP,HFP,WEP,BT		YPPBL,HFPBL,WEP BL,BTBL		HR000		STKP, FDRSF, HFDRSF, YPDRSF, WEDRSF		TSF,ACCRD,UGEXP			
						Pits		Blasting		Haul Roads		Stockpiles and DRFS		Tails, Access Road, Exploration		CN Leach and PAX	
	NSPS or NESHAP HAP/TAP -->			***Y***		*7E*	*7E*	*7E*	*7E*	*7E*	*7E*	*7E*	*7E*	*7E*	*7E*	*7E*	*7E*
	Non-Carcinogenic Acute (A) or Carcinogenic (C) -->				A/C	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
106-99-0	1,3-Butadiene	Y	Y	Y	C	0	0	0	0	0	0	0	0	0	0		
91-57-6	2-Methylnaphthalene	Y	N	n/a		0	0	0	0	0	0	0	0	0	0		
56-49-5	3-Methylchloranthrene	Y	Y	Y	C	0	0	0	0	0	0	0	0	0	0		
57-97-6	7,12-Dimethylbenz(a)anthracene	Y	N	n/a		0	0	0	0	0	0	0	0	0	0		
83-32-9	Acenaphthene	Y	N	n/a		0	0	0	0	0	0	0	0	0	0		
208-96-8	Acenaphthylene	Y	N	n/a		0	0	0	0	0	0	0	0	0	0		
75-07-0	Acetaldehyde	Y	Y	Y	C	0	0	0	0	0	0	0	0	0	0		
107-02-8	Acrolein	Y	Y	Y	A	0	0	0	0	0	0	0	0	0	0		
120-12-7	Anthracene	Y	N	n/a		0	0	0	0	0	0	0	0	0	0		
7440-36-0	Antimony	Y	Y	Y	A	1.8E-3	7.9E-3	6.2E-4	2.7E-3	0.016	0.070	2.8E-4	1.2E-3	3.7E-5	1.6E-4		
7440-38-2	Arsenic	Y	Y	Y	C	0.052	0.230	0.018	0.078	0.464	2.033	8.1E-3	0.035	1.1E-3	4.6E-3		
71-43-2	Benzene	Y	Y	Y	C	0	0	0	0	0	0	0	0	0	0		
50-32-8	**Benzo(a)pyrene**	Y	Y	Y	C	0	0	0	0	0	0	0	0	0	0		
56-55-3	**Benz(a)anthracene**	Y	Y	Y	C	0	0	0	0	0	0	0	0	0	0		
205-99-2	**Benzo(b)fluoranthene**	Y	Y	Y	C	0	0	0	0	0	0	0	0	0	0		
207-08-9	**Benzo(k)fluoranthene**	Y	Y	Y	C	0	0	0	0	0	0	0	0	0	0		
218-01-9	**Chrysene**	Y	Y	Y	C	0	0	0	0	0	0	0	0	0	0		
53-70-3	**Dibenzo(a,h)anthracene**	Y	Y	Y	C	0	0	0	0	0	0	0	0	0	0		
193-39-5	**Indeno(1,2,3-cd)pyrene**	Y	Y	Y	C	0	0	0	0	0	0	0	0	0	0		
191-24-2	Benzo(g,h,i)perylene	Y	N	n/a		0	0	0	0	0	0	0	0	0	0		
7440-41-7	Beryllium	Y	Y	Y	C	2.5E-4	1.1E-3	8.6E-5	3.8E-4	2.2E-3	9.8E-3	3.9E-5	1.7E-4	5.1E-6	2.2E-5		
92-52-4	Biphenyl	Y	Y	Y	A	0	0	0	0	0	0	0	0	0	0		
7440-43-9	Cadmium	Y	Y	Y	C	3.9E-5	1.7E-4	1.3E-5	5.9E-5	3.5E-4	1.5E-3	6.0E-6	2.6E-5	7.9E-7	3.5E-6		
75-15-0	Carbon Disulfide	Y	Y	Y	A	0	0	0	0	0	0	0	0	0	0	0.014	0.063
7440-47-3	Chromium	Y	Y	Y	A	7.1E-4	3.1E-3	2.4E-4	1.1E-3	6.3E-3	0.027	1.1E-4	4.8E-4	1.4E-5	6.3E-5		
18540-29-9	Cr (VI)	Y	Y	Y	C	0	0	0	0	0	0	0	0	0	0		
7440-48-4	Cobalt	Y	Y	Y	A	3.1E-4	1.4E-3	1.1E-4	4.7E-4	2.8E-3	0.012	4.8E-5	2.1E-4	6.4E-6	2.8E-5		
592-01-8	Cyanide	Y	Y	Y	A	0	0	0	0	0	0	0	0	0	0	0.453	1.983
106-46-7	Dichlorobenzene	Y	Y	Y	A	0	0	0	0	0	0	0	0	0	0		
206-44-0	Fluoranthene	Y	N	n/a		0	0	0	0	0	0	0	0	0	0		
86-73-7	Fluorene	Y	N	n/a		0	0	0	0	0	0	0	0	0	0		
50-00-0	Formaldehyde	Y	Y	Y	C	0	0	0	0	0	0	0	0	0	0		
110-54-3	Hexane	Y	Y	Y	A	0	0	0	0	0	0	0	0	0	0		
7647-01-0	Hydrogen Chloride	Y	Y	Y	A	0	0	0	0	0	0	0	0	0	0		
7439-92-1	Lead	Y	N	n/a		6.3E-4	2.8E-3	2.1E-4	9.4E-4	5.6E-3	0.024	9.7E-5	4.2E-4	1.3E-5	5.6E-5		
7439-96-5	Manganese	Y	Y	Y	A	0.024	0.103	8.0E-3	0.035	0.208	0.911	3.6E-3	0.016	4.7E-4	2.1E-3		
7439-97-6	Mercury	Y	N	n/a		9.7E-5	4.3E-4	1.6E-5	7.0E-5	4.2E-4	1.8E-3	5.4E-5	2.4E-4	7.2E-4	3.2E-3		
91-20-3	Naphthalene	Y	Y	Y	A	0	0	0	0	0	0	0	0	0	0		
7440-02-0	Nickel	Y	Y	Y	C	1.6E-4	6.9E-4	5.4E-5	2.3E-4	1.4E-3	6.1E-3	2.4E-5	1.1E-4	3.2E-6	1.4E-5		
85-01-8	Phenanthrene	Y	N	n/a		0	0	0	0	0	0	0	0	0	0		
108-95-2	Phenol	Y	Y	Y	A	0	0	0	0	0	0	0	0	0	0		
7723-14-0	Phosphorus	Y	Y	Y	A	0.051	0.224	0.017	0.076	0.452	1.981	7.9E-3	0.034	1.0E-3	4.5E-3		
129-00-0	Pyrene	Y	N	n/a		0	0	0	0	0	0	0	0	0	0		
7782-49-2	Selenium	Y	Y	Y	A	3.1E-5	1.4E-4	1.1E-5	4.7E-5	2.8E-4	1.2E-3	4.8E-6	2.1E-5	6.4E-7	2.8E-6		
108-88-3	Toluene	Y	Y	Y	A	0	0	0	0	0	0	0	0	0	0		
1330-20-7	Xylene	Y	Y	Y	A	0	0	0	0	0	0	0	0	0	0		
7429-90-5	Aluminum	N	Y	N	A	5.585	24.463	1.902	8.332	49.397	216	0.858	3.756	0.113	0.494		
7440-39-3	Barium	N	Y	N	A	0.063	0.276	0.021	0.094	0.557	2.438	9.7E-3	0.042	1.3E-3	5.6E-3		
1317-65-3	Calcium Carbonate	N	Y	N	A	1.101	4.824	0.375	1.643	9.740	42.663	0.169	0.741	0.022	0.097		
1305-78-8	Calcium Oxide	N	Y	N	A	0	0	0	0	0	0	0	0	0	0		
7440-50-8	Copper	N	Y	N	A	3.9E-4	1.7E-3	1.3E-4	5.9E-4	3.5E-3	0.015	6.0E-5	2.6E-4	7.9E-6	3.5E-5		
110-82-7	Cyclohexane	N	Y	N	A	0	0	0	0	0	0	0	0	0	0		
7783-06-4	Hydrogen Sulfide	N	Y	N	A	0	0	0	0	0	0	0	0	0	0		
7439-89-6	Iron	N	Y	N	A	1.432	6.271	0.488	2.136	12.662	55.462	0.220	0.963	0.029	0.127		
7439-98-7	Molybdenum	N	Y	N	A	7.9E-5	3.4E-4	2.7E-5	1.2E-4	7.0E-4	3.0E-3	1.2E-5	5.3E-5	1.6E-6	7.0E-6		
109-66-0	Pentane	N	Y	N	A	0	0	0	0	0	0	0	0	0	0		
7440-22-4	Silver	N	Y	N	A	3.9E-5	1.7E-4	1.3E-5	5.9E-5	3.5E-4	1.5E-3	6.0E-6	2.6E-5	7.9E-7	3.5E-6		
7664-93-9	Sulfuric Acid	N	Y	N	A	0	0	0	0	0	0	0	0	0	0		
7440-28-0	Thallium	N	Y	N	A	7.9E-4	3.4E-3	2.7E-4	1.2E-3	7.0E-3	0.030	1.2E-4	5.3E-4	1.6E-5	7.0E-5		
7440-61-1	Uranium	N	Y	N	A	7.9E-4	3.4E-3	2.7E-4	1.2E-3	7.0E-3	0.030	1.2E-4	5.3E-4	1.6E-5	7.0E-5		
7440-62-2	Vanadium	N	Y	N	A	2.2E-3	9.6E-3	7.5E-4	3.3E-3	0.019	0.085	3.4E-4	1.5E-3	4.4E-5	1.9E-4		
25551-13-7	Trimethyl benzene	N	Y	N	A	0	0	0	0	0	0	0	0	0	0		
7440-33-7	Tungsten	N	Y	N	A	7.9E-4	3.4E-3	2.7E-4	1.2E-3	7.0E-3	0.030	1.2E-4	5.3E-4	1.6E-5	7.0E-5		
7440-66-6	Zinc	N	Y	N	A	2.8E-3	0.012	9.4E-4	4.1E-3	0.024	0.107	4.2E-4	1.9E-3	5.6E-5	2.4E-4		
HAP TOTAL						***0.131***	***0.574***	***0.045***	***0.196***	***1.160***	***5.079***	***0.020***	***0.088***	***3.4E-3***	***0.015***	***0.467***	***2.046***
MERCURY TOTAL (exempt)						***9.7E-5***	***4.3E-4***	***1.6E-5***	***7.0E-5***	***4.2E-4***	***1.8E-3***	***5.4E-5***	***2.4E-4***	***7.2E-4***	***3.2E-3***		
MERCURY TOTAL (non-exempt)						***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
TAP TOTAL (HAP-TAP addressed by NSPS/NESHAP)						***0.130***	***0.571***	***0.044***	***0.195***	***1.154***	***5.053***	***0.020***	***0.088***	***2.6E-3***	***0.012***	***0.467***	***2.046***
TAP TOTAL (For EL Evaluation)						***8.189***	***35.867***	***2.789***	***12.216***	***72.426***	***317***	***1.257***	***5.508***	***0.165***	***0.724***	***0***	***0***

TABLE B1-W3. HAP/TAP Emissions and Exemptions

						1	1	1	1	1	1	1	1	1	1	1	1
						PROCESSING AND PRODUCTION											
						Ore Processing				*Ore Concentration and Refining*				*Process Heating*			
						OC1-13		PS		AC		EW,MR,MF,CKD		ACB, CKB, PV, HS		LKC	
CAS	HAP/TAP	HAP	TAP			Crushers & Xfers		Prill Silos		Autoclave		EW, Preg Tank, Retort, Furnace, Carbon Kiln		POX Boiler, C. Kiln Comb., Prop. Vap., Sol'n Heater		Lime Kiln Combustion	
	NSPS or NESHAP HAP/TAP -->			*Y*		*7E/LL*	*7E/LL*	*7E*	*7E*	*7E*	*7E*	*7E*	*7E*	*7E*	*7E*	*5A*	*5A*
	Non-Carcinogenic Acute (A) or Carcinogenic (C) -->				A/C	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
106-99-0	1,3-Butadiene	Y	Y	Y	C												
91-57-6	2-Methylnaphthalene	Y	N	n/a										1.9E-7	7.6E-7	5.2E-7	1.9E-6
56-49-5	3-Methylchloranthrene	Y	Y	Y	C									1.3E-8	5.7E-8	3.3E-8	1.4E-7
57-97-6	7,12-Dimethylbenz(a)anthracene	Y	N	n/a										1.3E-7	5.1E-7	3.5E-7	1.3E-6
83-32-9	Acenaphthene	Y	N	n/a										1.4E-8	5.7E-8	3.9E-8	1.4E-7
208-96-8	Acenaphthylene	Y	N	n/a										1.4E-8	5.7E-8	3.9E-8	1.4E-7
75-07-0	Acetaldehyde	Y	Y	Y	C												
107-02-8	Acrolein	Y	Y	Y	A												
120-12-7	Anthracene	Y	N	n/a										1.9E-8	7.6E-8	5.2E-8	1.9E-7
7440-36-0	Antimony	Y	Y	Y	A	1.4E-4	5.9E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7440-38-2	Arsenic	Y	Y	Y	C	3.9E-3	0.017			2.3E-5	1.0E-4	3.8E-4	1.7E-3	1.5E-6	6.4E-6	3.7E-6	1.6E-5
71-43-2	Benzene	Y	Y	Y	C									1.5E-5	6.7E-5	3.9E-5	1.7E-4
50-32-8	**Benzo(a)pyrene**	Y	Y	Y	C									8.7E-9	3.8E-8	2.2E-8	9.6E-8
56-55-3	**Benz(a)anthracene**	Y	Y	Y	C									1.3E-8	5.7E-8	3.3E-8	1.4E-7
205-99-2	**Benzo(b)fluoranthene**	Y	Y	Y	C									1.3E-8	5.7E-8	3.3E-8	1.4E-7
207-08-9	**Benzo(k)fluoranthene**	Y	Y	Y	C									1.3E-8	5.7E-8	3.3E-8	1.4E-7
218-01-9	**Chrysene**	Y	Y	Y	C									1.3E-8	5.7E-8	3.3E-8	1.4E-7
53-70-3	**Dibenzo(a,h)anthracene**	Y	Y	Y	C									8.7E-9	3.8E-8	2.2E-8	9.6E-8
193-39-5	**Indeno(1,2,3-cd)pyrene**	Y	Y	Y	C									1.3E-8	5.7E-8	3.3E-8	1.4E-7
191-24-2	Benzo(g,h,i)perylene	Y	N	n/a										9.5E-9	3.8E-8	2.6E-8	9.6E-8
7440-41-7	Beryllium	Y	Y	Y	C	1.9E-5	8.2E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3	8.7E-8	3.8E-7	2.2E-7	9.6E-7
92-52-4	Biphenyl	Y	Y	Y	A												
7440-43-9	Cadmium	Y	Y	Y	C	2.9E-6	1.3E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3	8.0E-6	3.5E-5	2.0E-5	8.8E-5
75-15-0	Carbon Disulfide	Y	Y	Y	A												
7440-47-3	Chromium	Y	Y	Y	A	5.3E-5	2.3E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3	1.1E-5	4.5E-5	3.0E-5	1.1E-4
18540-29-9	Cr (VI)	Y	Y	Y	C												
7440-48-4	Cobalt	Y	Y	Y	A	2.4E-5	1.0E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3	6.6E-7	2.7E-6	1.8E-6	6.8E-6
592-01-8	Cyanide	Y	Y	Y	A					0	0	1.2E-3	5.3E-3				
106-46-7	Dichlorobenzene	Y	Y	Y	A									9.5E-6	3.8E-5	2.6E-5	9.6E-5
206-44-0	Fluoranthene	Y	N	n/a										2.4E-8	9.5E-8	6.5E-8	2.4E-7
86-73-7	Fluorene	Y	N	n/a										2.2E-8	8.9E-8	6.1E-8	2.3E-7
50-00-0	Formaldehyde	Y	Y	Y	C									5.5E-4	2.4E-3	1.4E-3	6.0E-3
110-54-3	Hexane	Y	Y	Y	A									0.014	0.057	0.039	0.145
7647-01-0	Hydrogen Chloride	Y	Y	Y	A												
7439-92-1	Lead	Y	N	n/a		4.7E-5	2.1E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7439-96-5	Manganese	Y	Y	Y	A	1.8E-3	7.7E-3			2.3E-5	1.0E-4	3.8E-4	1.7E-3	3.0E-6	1.2E-5	8.2E-6	3.1E-5
7439-97-6	Mercury	Y	N	n/a		5.6E-6	2.5E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3	2.1E-6	8.3E-6	5.6E-6	2.1E-5
91-20-3	Naphthalene	Y	Y	Y	A									4.8E-6	1.9E-5	1.3E-5	4.9E-5
7440-02-0	Nickel	Y	Y	Y	C	1.2E-5	5.2E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3	1.5E-5	6.7E-5	3.9E-5	1.7E-4
85-01-8	Phenanthrene	Y	N	n/a										1.3E-7	5.4E-7	3.7E-7	1.4E-6
108-95-2	Phenol	Y	Y	Y	A												
7723-14-0	Phosphorus	Y	Y	Y	A	3.8E-3	0.017			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
129-00-0	Pyrene	Y	N	n/a										4.0E-8	1.6E-7	1.1E-7	4.0E-7
7782-49-2	Selenium	Y	Y	Y	A	2.4E-6	1.0E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3	1.9E-7	7.6E-7	5.2E-7	1.9E-6
108-88-3	Toluene	Y	Y	Y	A									2.7E-5	1.1E-4	7.3E-5	2.7E-4
1330-20-7	Xylene	Y	Y	Y	A												
7429-90-5	Aluminum	N	Y	N	A	0.418	1.829			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7440-39-3	Barium	N	Y	N	A	4.7E-3	0.021			2.3E-5	1.0E-4	3.8E-4	1.7E-3	3.5E-5	1.4E-4	9.5E-5	3.5E-4
1317-65-3	Calcium Carbonate	N	Y	N	A	0.082	0.361			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
1305-78-8	Calcium Oxide	N	Y	N	A												
7440-50-8	Copper	N	Y	N	A	2.9E-5	1.3E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3	6.7E-6	2.7E-5	1.8E-5	6.8E-5
110-82-7	Cyclohexane	N	Y	N	A												
7783-06-4	Hydrogen Sulfide	N	Y	N	A					0.900	3.942	0	0				
7439-89-6	Iron	N	Y	N	A	0.107	0.469			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7439-98-7	Molybdenum	N	Y	N	A	5.9E-6	2.6E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3	8.7E-6	3.5E-5	2.4E-5	8.8E-5
109-66-0	Pentane	N	Y	N	A									0.021	0.083	0.056	0.209
7440-22-4	Silver	N	Y	N	A	2.9E-6	1.3E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7664-93-9	Sulfuric Acid	N	Y	N	A					2.030	8.891	0	0				
7440-28-0	Thallium	N	Y	N	A	5.9E-5	2.6E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7440-61-1	Uranium	N	Y	N	A	5.9E-5	2.6E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7440-62-2	Vanadium	N	Y	N	A	1.6E-4	7.2E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3	1.8E-5	7.3E-5	5.0E-5	1.8E-4
25551-13-7	Trimethyl benzene	N	Y	N	A												
7440-33-7	Tungsten	N	Y	N	A	5.9E-5	2.6E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7440-66-6	Zinc	N	Y	N	A	2.1E-4	9.0E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3	2.3E-4	9.2E-4	6.3E-4	2.3E-3
HAP TOTAL						***9.8E-3***	***0.043***	***0***	***0***	***2.8E-4***	***1.2E-3***	***5.8E-3***	***0.025***	***0.015***	***0.060***	***0.041***	***0.152***
MERCURY TOTAL (exempt)						***5.6E-6***	***2.5E-5***	***0***	***0***	***2.3E-5***	***1.0E-4***	***3.8E-4***	***1.7E-3***	***2.1E-6***	***8.3E-6***	***5.6E-6***	***2.1E-5***
MERCURY TOTAL (non-exempt)						***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
TAP TOTAL (HAP-TAP addressed by NSPS/NESHAP)						***9.8E-3***	***0.043***	***0***	***0***	***2.3E-4***	***1.0E-3***	***5.0E-3***	***0.022***	***0.015***	***0.060***	***0.041***	***0.152***
TAP TOTAL (For EL Evaluation)						***0.612***	***2.682***	***0***	***0***	***2.930***	***12.835***	***4.6E-3***	***0.020***	***0.021***	***0.084***	***0.057***	***0.212***

TABLE B1-W3. HAP/TAP Emissions and Exemptions

CAS	HAP/TAP	HAP	TAP			PROCESSING AND PRODUCTION - Continued													
						1	1	1	1	1	1	0	0	0	0	0	0	0	0
						Lime Production						*Aggregate Prod.*		*Concrete Production*					
						LS1-12,LSBM		LK		LS-L/U,LCR,LS1-L/U,MillS2-L/U,ACS1-4		PCSP1,PCSP2		CM		CS1L,CS1U,CS2L,CS2U		CA-L/U	
						Limestone Crushers, Screens, Mill, Xfers		Lime Kiln		Lime Silos and Lime Mill Crushing		Portable Crushers, Screens, Xfers		Central Mixer		Cement Silo #1 and #2 L/U		Aggregate Bin	
	NSPS or NESHAP HAP/TAP -->			***Y***		*5A*	*5A*	*5A*	*5A*	*5A*	*5A*	*OOO*	*OOO*					*OOO*	*OOO*
	Non-Carcinogenic Acute (A) or Carcinogenic (C) -->				**A/C**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
106-99-0	1,3-Butadiene	Y	Y	Y	C														
91-57-6	2-Methylnaphthalene	Y	N	n/a															
56-49-5	3-Methylchloranthrene	Y	Y	Y	C														
57-97-6	7,12-Dimethylbenz(a)anthracene	Y	N	n/a															
83-32-9	Acenaphthene	Y	N	n/a															
208-96-8	Acenaphthylene	Y	N	n/a															
75-07-0	Acetaldehyde	Y	Y	Y	C														
107-02-8	Acrolein	Y	Y	Y	A														
120-12-7	Anthracene	Y	N	n/a															
7440-36-0	Antimony	Y	Y	Y	A	1.4E-5	4.8E-5	2.3E-6	8.5E-6	2.4E-6	3.2E-6	3.1E-6	1.4E-5					3.5E-6	8.6E-6
7440-38-2	Arsenic	Y	Y	Y	C	1.0E-4	4.5E-4	1.8E-5	7.8E-5	6.8E-6	3.0E-5	2.9E-5	1.3E-4	2.0E-6	8.9E-6	1.2E-7	5.1E-7	1.8E-5	7.9E-5
71-43-2	Benzene	Y	Y	Y	C														
50-32-8	**Benzo(a)pyrene**	Y	Y	Y	C														
56-55-3	**Benz(a)anthracene**	Y	Y	Y	C														
205-99-2	**Benzo(b)fluoranthene**	Y	Y	Y	C														
207-08-9	**Benzo(k)fluoranthene**	Y	Y	Y	C														
218-01-9	**Chrysene**	Y	Y	Y	C														
53-70-3	**Dibenzo(a,h)anthracene**	Y	Y	Y	C														
193-39-5	**Indeno(1,2,3-cd)pyrene**	Y	Y	Y	C														
191-24-2	Benzo(g,h,i)perylene	Y	N	n/a															
7440-41-7	Beryllium	Y	Y	Y	C	3.5E-6	1.6E-5	6.2E-7	2.7E-6	2.3E-7	1.0E-6	1.0E-6	4.4E-6	0	0	1.3E-8	5.8E-8	6.3E-7	2.8E-6
92-52-4	Biphenyl	Y	Y	Y	A														
7440-43-9	Cadmium	Y	Y	Y	C	1.1E-6	4.8E-6	1.9E-7	8.5E-7	7.3E-8	3.2E-7	3.1E-7	1.4E-6	4.9E-9	2.1E-8	0	0	2.0E-7	8.6E-7
75-15-0	Carbon Disulfide	Y	Y	Y	A														
7440-47-3	Chromium	Y	Y	Y	A	8.6E-5	2.9E-4	1.4E-5	5.1E-5	1.4E-5	1.9E-5	1.9E-5	8.2E-5	8.7E-7	3.8E-6	7.9E-7	3.5E-6	2.1E-5	5.2E-5
18540-29-9	Cr (VI)	Y	Y	Y	C									1.9E-7	8.1E-7	1.6E-7	7.0E-7		
7440-48-4	Cobalt	Y	Y	Y	A	2.3E-5	7.8E-5	3.7E-6	1.4E-5	3.8E-6	5.1E-6	5.0E-6	2.2E-5					5.5E-6	1.4E-5
592-01-8	Cyanide	Y	Y	Y	A														
106-46-7	Dichlorobenzene	Y	Y	Y	A														
206-44-0	Fluoranthene	Y	N	n/a															
86-73-7	Fluorene	Y	N	n/a															
50-00-0	Formaldehyde	Y	Y	Y	C														
110-54-3	Hexane	Y	Y	Y	A														
7647-01-0	Hydrogen Chloride	Y	Y	Y	A	0	0	0.986	3.666										
7439-92-1	Lead	Y	N	n/a		1.7E-5	5.8E-5	2.7E-6	1.0E-5	2.8E-6	3.9E-6	3.8E-6	1.6E-5	2.5E-7	1.1E-6	3.0E-7	1.3E-6	4.1E-6	1.0E-5
7439-96-5	Manganese	Y	Y	Y	A	1.3E-3	4.6E-3	2.2E-4	8.1E-4	2.2E-4	3.0E-4	3.0E-4	1.3E-3	2.6E-5	1.1E-4	3.2E-6	1.4E-5	3.3E-4	8.2E-4
7439-97-6	Mercury	Y	N	n/a		1.1E-7	3.9E-7	2.8E-4	1.0E-3	1.9E-8	2.6E-8	2.5E-8	1.1E-7					2.8E-8	6.9E-8
91-20-3	Naphthalene	Y	Y	Y	A														
7440-02-0	Nickel	Y	Y	Y	C	2.2E-5	9.7E-5	3.9E-6	1.7E-5	1.5E-6	6.4E-6	6.3E-6	2.7E-5	1.7E-6	7.4E-6	1.1E-6	5.0E-6	3.9E-6	1.7E-5
85-01-8	Phenanthrene	Y	N	n/a															
108-95-2	Phenol	Y	Y	Y	A														
7723-14-0	Phosphorus	Y	Y	Y	A	7.4E-4	2.5E-3	1.2E-4	4.4E-4	1.2E-4	1.7E-4	1.6E-4	7.1E-4	8.2E-6	3.6E-5	0	0	1.8E-4	4.5E-4
129-00-0	Pyrene	Y	N	n/a															
7782-49-2	Selenium	Y	Y	Y	A														
108-88-3	Toluene	Y	Y	Y	A														
1330-20-7	Xylene	Y	Y	Y	A														
7429-90-5	Aluminum	N	Y	N	A	0.129	0.438	0.021	0.077	0.021	0.029	0.028	0.124					0.031	0.078
7440-39-3	Barium	N	Y	N	A	8.3E-4	2.8E-3	1.3E-4	4.9E-4	1.4E-4	1.9E-4	1.8E-4	7.9E-4					2.0E-4	5.0E-4
1317-65-3	Calcium Carbonate	N	Y	N	A	1.567	5.325	0.251	0.935			0.343	1.503						
1305-78-8	Calcium Oxide	N	Y	N	A					0.696	0.952								
7440-50-8	Copper	N	Y	N	A	2.9E-5	9.7E-5	4.6E-6	1.7E-5	4.7E-6	6.4E-6	6.3E-6	2.7E-5					6.9E-6	1.7E-5
110-82-7	Cyclohexane	N	Y	N	A														
7783-06-4	Hydrogen Sulfide	N	Y	N	A														
7439-89-6	Iron	N	Y	N	A	0.059	0.201	9.5E-3	0.035	9.7E-3	0.013	0.013	0.057					0.014	0.036
7439-98-7	Molybdenum	N	Y	N	A	2.9E-6	9.7E-6	4.6E-7	1.7E-6	4.7E-7	6.4E-7	6.3E-7	2.7E-6					6.9E-7	1.7E-6
109-66-0	Pentane	N	Y	N	A														
7440-22-4	Silver	N	Y	N	A	0	0	0	0	0	0	0	0					0	0
7664-93-9	Sulfuric Acid	N	Y	N	A														
7440-28-0	Thallium	N	Y	N	A	2.9E-5	9.7E-5	4.6E-6	1.7E-5	4.7E-6	6.4E-6	6.3E-6	2.7E-5					6.9E-6	1.7E-5
7440-61-1	Uranium	N	Y	N	A	2.9E-5	9.7E-5	4.6E-6	1.7E-5	4.7E-6	6.4E-6	6.3E-6	2.7E-5					6.9E-6	1.7E-5
7440-62-2	Vanadium	N	Y	N	A	8.8E-5	3.0E-4	1.4E-5	5.3E-5	1.5E-5	2.0E-5	1.9E-5	8.5E-5					2.1E-5	5.3E-5
25551-13-7	Trimethyl benzene	N	Y	N	A														
7440-33-7	Tungsten	N	Y	N	A	2.9E-5	9.7E-5	4.6E-6	1.7E-5	4.7E-6	6.4E-6	6.3E-6	2.7E-5					6.9E-6	1.7E-5
7440-66-6	Zinc	N	Y	N	A	1.0E-4	3.5E-4	1.6E-5	6.1E-5	1.7E-5	2.3E-5	2.3E-5	9.9E-5					2.5E-5	6.2E-5
HAP TOTAL						***2.4E-3***	***8.1E-3***	***0.986***	***3.669***	***3.8E-4***	***5.4E-4***	***5.3E-4***	***2.3E-3***	***3.9E-5***	***1.7E-4***	***5.7E-6***	***2.5E-5***	***5.6E-4***	***1.4E-3***
MERCURY TOTAL (exempt)						***1.1E-7***	***3.9E-7***	***2.8E-4***	***1.0E-3***	***1.9E-8***	***2.6E-8***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
MERCURY TOTAL (non-exempt)						***0***	***0***	***0***	***0***	***0***	***0***	***2.5E-8***	***1.1E-7***					***2.8E-8***	***6.9E-8***
TAP TOTAL (HAP-TAP addressed by NSPS/NESHAP)						***2.3E-3***	***8.1E-3***	***0.986***	***3.668***	***3.7E-4***	***5.4E-4***	***5.2E-4***	***2.3E-3***	***0***	***0***	***0***	***0***	***5.6E-4***	***1.4E-3***
TAP TOTAL (For EL Evaluation)						***1.756***	***5.968***	***0.282***	***1.047***	***0.727***	***0.994***	***0.385***	***1.684***	***3.9E-5***	***1.7E-4***	***5.4E-6***	***2.4E-5***	***0.046***	***0.114***

TABLE B1-W3. HAP/TAP Emissions and Exemptions

						0	0	1	1	1	1			1	1	0	0				
						PROCESSING AND PRODUCTION - Continued						MINING and LEACHING - Totals									
						HVAC		*Emer. Power/Fire*		*Fuel Storage*		*HAP Total*		*Mercury Total*		*Mercury Total*		*TAP Total*		*TAP Total*	
						H1M,H2M,HM, HAC,HR,HA,H MO,HTS,HW		EDG1,EDG2,ED G3,EDFP		TG1,TG2				*Exempt*		*Non-Exempt*		*HAP-TAP addressed by NSPS/NESHAP*		*For EL Evaluation*	
CAS	HAP/TAP	HAP	TAP			Heaters		Emergency Generators and Fire Pump		Gasoline Fuel Tanks											
	NSPS or NESHAP HAP/TAP -->			***Y***				*4Z*	*4Z*	*6C*	*6C*										
	Non-Carcinogenic Acute (A) or Carcinogenic (C) -->				***A/C***	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
106-99-0	1,3-Butadiene	Y	Y	Y	C			8.4E-7	3.7E-6			0	0					0	0	0	0
91-57-6	2-Methylnaphthalene	Y	N	n/a		4.3E-7	1.9E-6					0	0					0	0	0	0
56-49-5	3-Methylchloranthrene	Y	Y	Y	C	3.2E-8	1.4E-7					0	0					0	0	0	0
57-97-6	7,12-Dimethylbenz(a)anthracene	Y	N	n/a		2.9E-7	1.3E-6					0	0					0	0	0	0
83-32-9	Acenaphthene	Y	N	n/a		3.2E-8	1.4E-7	5.6E-6	6.7E-6			0	0					0	0	0	0
208-96-8	Acenaphthylene	Y	N	n/a		3.2E-8	1.4E-7	1.1E-5	1.3E-5			0	0					0	0	0	0
75-07-0	Acetaldehyde	Y	Y	Y	C			2.5E-5	1.1E-4			0	0					0	0	0	0
107-02-8	Acrolein	Y	Y	Y	A			1.6E-5	2.0E-5			0	0					0	0	0	0
120-12-7	Anthracene	Y	N	n/a		4.3E-8	1.9E-7	1.6E-6	1.9E-6			0	0					0	0	0	0
7440-36-0	Antimony	Y	Y	Y	A							0.019	0.082					0.019	0.082	0	0
7440-38-2	Arsenic	Y	Y	Y	C	3.6E-6	1.6E-5					0.544	2.381					0.544	2.381	0	0
71-43-2	Benzene	Y	Y	Y	C	3.8E-5	1.6E-4	2.7E-4	1.2E-3	7.0E-3	0.031	0	0					0	0	0	0
50-32-8	**Benzo(a)pyrene**	Y	Y	Y	C	2.1E-8	9.4E-8	8.7E-8	3.8E-7			0	0					0	0	0	0
56-55-3	**Benz(a)anthracene**	Y	Y	Y	C	3.2E-8	1.4E-7	2.4E-7	1.0E-6			0	0					0	0	0	0
205-99-2	**Benzo(b)fluoranthene**	Y	Y	Y	C	3.2E-8	1.4E-7	3.6E-7	1.6E-6			0	0					0	0	0	0
207-08-9	**Benzo(k)fluoranthene**	Y	Y	Y	C	3.2E-8	1.4E-7	7.3E-8	3.2E-7			0	0					0	0	0	0
218-01-9	**Chrysene**	Y	Y	Y	C	3.2E-8	1.4E-7	5.0E-7	2.2E-6			0	0					0	0	0	0
53-70-3	**Dibenzo(a,h)anthracene**	Y	Y	Y	C	2.1E-8	9.4E-8	1.2E-7	5.4E-7			0	0					0	0	0	0
193-39-5	**Indeno(1,2,3-cd)pyrene**	Y	Y	Y	C	3.2E-8	1.4E-7	1.4E-7	6.2E-7			0	0					0	0	0	0
191-24-2	Benzo(g,h,i)perylene	Y	N	n/a		2.1E-8	9.4E-8	6.9E-7	8.3E-7			0	0					0	0	0	0
7440-41-7	Beryllium	Y	Y	Y	C	2.1E-7	9.4E-7					2.6E-3	0.011					2.6E-3	0.011	0	0
92-52-4	Biphenyl	Y	Y	Y	A					4.4E-5	1.9E-4	0	0					0	0	0	0
7440-43-9	Cadmium	Y	Y	Y	C	2.0E-5	8.6E-5					4.1E-4	1.8E-3					4.1E-4	1.8E-3	0	0
75-15-0	Carbon Disulfide	Y	Y	Y	A							0.014	0.063					0.014	0.063	0	0
7440-47-3	Chromium	Y	Y	Y	A	2.5E-5	1.1E-4					7.3E-3	0.032					7.3E-3	0.032	0	0
18540-29-9	Cr (VI)	Y	Y	Y	C							0	0					0	0	0	0
7440-48-4	Cobalt	Y	Y	Y	A	1.5E-6	6.6E-6					3.3E-3	0.014					3.3E-3	0.014	0	0
592-01-8	Cyanide	Y	Y	Y	A							0.453	1.983					0.453	1.983	0	0
106-46-7	Dichlorobenzene	Y	Y	Y	A	2.1E-5	9.4E-5					0	0					0	0	0	0
206-44-0	Fluoranthene	Y	N	n/a		5.4E-8	2.4E-7	5.3E-6	6.4E-6			0	0					0	0	0	0
86-73-7	Fluorene	Y	N	n/a		5.0E-8	2.2E-7	1.7E-5	2.1E-5			0	0					0	0	0	0
50-00-0	Formaldehyde	Y	Y	Y	C	1.3E-3	5.9E-3	5.1E-5	2.2E-4			0	0					0	0	0	0
110-54-3	Hexane	Y	Y	Y	A	0.032	0.141			0.031	0.137	0	0					0	0	0	0
7647-01-0	Hydrogen Chloride	Y	Y	Y	A							0	0					0	0	0	0
7439-92-1	Lead	Y	N	n/a								6.5E-3	0.029					0	0	0	0
7439-96-5	Manganese	Y	Y	Y	A	6.8E-6	3.0E-5					0.244	1.067					0.244	1.067	0	0
7439-97-6	Mercury	Y	N	n/a		4.7E-6	2.0E-5					1.3E-3	5.7E-3	1.3E-3	5.7E-3	0	0	0	0	0	0
91-20-3	Naphthalene	Y	Y	Y	A	1.1E-5	4.8E-5	1.6E-4	1.9E-4	1.9E-3	8.5E-3	0	0					0	0	0	0
7440-02-0	Nickel	Y	Y	Y	C	3.8E-5	1.6E-4					1.6E-3	7.1E-3					1.6E-3	7.1E-3	0	0
85-01-8	Phenanthrene	Y	N	n/a		3.0E-7	1.3E-6	5.0E-5	6.0E-5			0	0					0	0	0	0
108-95-2	Phenol	Y	Y	Y	A					2.4E-4	1.1E-3	0	0					0	0	0	0
7723-14-0	Phosphorus	Y	Y	Y	A							0.530	2.320					0.530	2.320	0	0
129-00-0	Pyrene	Y	N	n/a		8.9E-8	3.9E-7	4.7E-6	5.7E-6			0	0					0	0	0	0
7782-49-2	Selenium	Y	Y	Y	A	4.3E-7	1.9E-6					3.3E-4	1.4E-3					3.3E-4	1.4E-3	0	0
108-88-3	Toluene	Y	Y	Y	A	6.1E-5	2.7E-4	3.6E-4	4.3E-4	0.032	0.138	0	0					0	0	0	0
1330-20-7	Xylene	Y	Y	Y	A			2.5E-4	3.0E-4	0.031	0.137	0	0					0	0	0	0
7429-90-5	Aluminum	N	Y	N	A							0	0					0	0	57.855	253
7440-39-3	Barium	N	Y	N	A	7.9E-5	3.4E-4					0	0					0	0	0.652	2.855
1317-65-3	Calcium Carbonate	N	Y	N	A							0	0					0	0	11.408	49.967
1305-78-8	Calcium Oxide	N	Y	N	A							0	0					0	0	0	0
7440-50-8	Copper	N	Y	N	A	1.5E-5	6.7E-5					0	0					0	0	4.1E-3	0.018
110-82-7	Cyclohexane	N	Y	N	A					1.0E-3	4.6E-3	0	0					0	0	0	0
7783-06-4	Hydrogen Sulfide	N	Y	N	A							0	0					0	0	0	0
7439-89-6	Iron	N	Y	N	A							0	0					0	0	14.831	64.958
7439-98-7	Molybdenum	N	Y	N	A	2.0E-5	8.6E-5					0	0					0	0	8.1E-4	3.6E-3
109-66-0	Pentane	N	Y	N	A	0.047	0.204					0	0					0	0	0	0
7440-22-4	Silver	N	Y	N	A							0	0					0	0	4.1E-4	1.8E-3
7664-93-9	Sulfuric Acid	N	Y	N	A							0	0					0	0	0	0
7440-28-0	Thallium	N	Y	N	A							0	0					0	0	8.1E-3	0.036
7440-61-1	Uranium	N	Y	N	A							0	0					0	0	8.1E-3	0.036
7440-62-2	Vanadium	N	Y	N	A	4.1E-5	1.8E-4					0	0					0	0	0.023	0.100
25551-13-7	Trimethyl benzene	N	Y	N	A					0.011	0.048	0	0					0	0	0	0
7440-33-7	Tungsten	N	Y	N	A							0	0					0	0	8.1E-3	0.036
7440-66-6	Zinc	N	Y	N	A	5.2E-4	2.3E-3					0	0					0	0	0.029	0.125
HAP TOTAL						***0.034***	***0.148***	***1.2E-3***	***2.6E-3***	***0.103***	***0.453***	***1.826***	***7.998***								
MERCURY TOTAL (exempt)						***0***	***0***							***1.3E-3***	***5.7E-3***						
MERCURY TOTAL (non-exempt)						***4.7E-6***	***2.0E-5***	***0***	***0***	***0***	***0***					***0***	***0***				
TAP TOTAL (HAP-TAP addressed by NSPS/NESHAP)						***0***	***0***	***1.1E-3***	***2.5E-3***	***0.103***	***0.453***							***1.818***	***7.964***		
TAP TOTAL (For EL Evaluation)						***0.081***	***0.355***	***0***	***0***	***0.012***	***0.052***									***84.827***	***372***

TABLE B1-W3. HAP/TAP Emissions and Exemptions

1 1 0 0

CAS	HAP/TAP	HAP	TAP	NSPS or NESHAP HAP/TAP --> Y	Non-Carcinogenic Acute (A) or Carcinogenic (C) --> A/C	PROCESSING AND PRODUCTION - Totals: *HAP Total* lb/hr	*HAP Total* ton/yr	*Mercury Total Exempt* lb/hr	*Mercury Total Exempt* ton/yr	*Mercury Total Non-Exempt* lb/hr	*Mercury Total Non-Exempt* ton/yr	*TAP Total HAP-TAP addressed by NSPS/NESHAP* lb/hr	*TAP Total HAP-TAP addressed by NSPS/NESHAP* ton/yr	*TAP Total For EL Evaluation* lb/hr	*TAP Total For EL Evaluation* ton/yr	ALL *HAP* ton/yr	ALL *Hg Non-Exempt* ton/yr	ALL *TAP For EL Evaluation* lb/hr	TAP EL *TAP Emission Screening Level (EL)* Non-car lb/hr	TAP EL *TAP Emission Screening Level (EL)* Carcin lb/hr
106-99-0	1,3-Butadiene	Y	Y	Y	C	8.4E-7	3.7E-6					8.4E-7	3.7E-6	0	0	3.7E-6		0	--	2.4E-5
91-57-6	2-Methylnaphthalene	Y	N	n/a		1.1E-6	4.6E-6					0	0	0	0	4.6E-6		0	--	--
56-49-5	3-Methylchloranthrene	Y	Y	Y	C	7.8E-8	3.4E-7					4.6E-8	2.0E-7	3.2E-8	1.4E-7	3.4E-7		3.2E-8	--	2.5E-6
57-97-6	7,12-Dimethylbenz(a)anthracene	Y	N	n/a		7.6E-7	3.0E-6					0	0	0	0	3.0E-6		0	--	--
83-32-9	Acenaphthene	Y	N	n/a		5.7E-6	7.1E-6					0	0	0	0	7.1E-6		0	--	--
208-96-8	Acenaphthylene	Y	N	n/a		1.1E-5	1.4E-5					0	0	0	0	1.4E-5		0	--	--
75-07-0	Acetaldehyde	Y	Y	Y	C	2.5E-5	1.1E-4					2.5E-5	1.1E-4	0	0	1.1E-4		0	--	3.0E-3
107-02-8	Acrolein	Y	Y	Y	A	1.6E-5	2.0E-5					1.6E-5	2.0E-5	0	0	2.0E-5		0	0.017	--
120-12-7	Anthracene	Y	N	n/a		1.7E-6	2.4E-6					0	0	0	0	2.4E-6		0	--	--
7440-36-0	Antimony	Y	Y	Y	A	5.7E-4	2.5E-3					5.7E-4	2.5E-3	0	0	0.085		0	0.033	--
7440-38-2	Arsenic	Y	Y	Y	C	4.5E-3	0.020					4.5E-3	0.020	5.7E-6	2.5E-5	2.400		5.7E-6	--	1.5E-6
71-43-2	Benzene	Y	Y	Y	C	7.4E-3	0.032					7.4E-3	0.032	3.8E-5	1.6E-4	0.032		3.8E-5	--	8.0E-4
50-32-8	**Benzo(a)pyrene**	Y	Y	Y	C	1.4E-7	6.1E-7					1.2E-7	5.1E-7	2.1E-8	9.4E-8	6.1E-7				
56-55-3	**Benz(a)anthracene**	Y	Y	Y	C	3.1E-7	1.4E-6					2.8E-7	1.2E-6	3.2E-8	1.4E-7	1.4E-6				
205-99-2	**Benzo(b)fluoranthene**	Y	Y	Y	C	4.4E-7	1.9E-6					4.1E-7	1.8E-6	3.2E-8	1.4E-7	1.9E-6				
207-08-9	**Benzo(k)fluoranthene**	Y	Y	Y	C	1.5E-7	6.6E-7					1.2E-7	5.2E-7	3.2E-8	1.4E-7	6.6E-7		2.0E-7	--	2.0E-6
218-01-9	**Chrysene**	Y	Y	Y	C	5.8E-7	2.5E-6					5.5E-7	2.4E-6	3.2E-8	1.4E-7	2.5E-6				
53-70-3	**Dibenzo(a,h)anthracene**	Y	Y	Y	C	1.8E-7	7.7E-7					1.5E-7	6.8E-7	2.1E-8	9.4E-8	7.7E-7				
193-39-5	**Indeno(1,2,3-cd)pyrene**	Y	Y	Y	C	2.2E-7	9.6E-7					1.9E-7	8.2E-7	3.2E-8	1.4E-7	9.6E-7				
191-24-2	Benzo(g,h,i)perylene	Y	N	n/a		7.5E-7	1.1E-6					0	0	0	0	1.1E-6		0	--	--
7440-41-7	Beryllium	Y	Y	Y	C	4.3E-4	1.9E-3					4.3E-4	1.9E-3	2.3E-7	1.0E-6	0.013		2.3E-7	--	2.8E-5
92-52-4	Biphenyl	Y	Y	Y	A	4.4E-5	1.9E-4					4.4E-5	1.9E-4	0	0	1.9E-4		0	0.100	--
7440-43-9	Cadmium	Y	Y	Y	C	4.6E-4	2.0E-3					4.4E-4	1.9E-3	2.0E-5	8.6E-5	3.8E-3		2.0E-5	--	3.7E-6
75-15-0	Carbon Disulfide	Y	Y	Y	A	0	0					0	0	0	0	0.063		0	2.000	--
7440-47-3	Chromium	Y	Y	Y	A	6.8E-4	2.8E-3					6.5E-4	2.7E-3	2.7E-5	1.2E-4	0.035		2.7E-5	0.033	--
18540-29-9	Cr (VI)	Y	Y	Y	C	3.4E-7	1.5E-6					0	0	3.4E-7	1.5E-6	1.5E-6		3.4E-7	--	5.6E-7
7440-48-4	Cobalt	Y	Y	Y	A	4.7E-4	2.0E-3					4.7E-4	2.0E-3	1.5E-6	6.6E-6	0.016		1.5E-6	3.3E-3	--
592-01-8	Cyanide	Y	Y	Y	A	1.2E-3	5.3E-3					1.2E-3	5.3E-3	0	0	1.988		0	0.333	--
106-46-7	Dichlorobenzene	Y	Y	Y	A	5.7E-5	2.3E-4					3.5E-5	1.3E-4	2.1E-5	9.4E-5	2.3E-4		2.1E-5	30.000	--
206-44-0	Fluoranthene	Y	N	n/a		5.5E-6	7.0E-6					0	0	0	0	7.0E-6		0	--	--
86-73-7	Fluorene	Y	N	n/a		1.7E-5	2.1E-5					0	0	0	0	2.1E-5		0	--	--
50-00-0	Formaldehyde	Y	Y	Y	C	3.3E-3	0.015					2.0E-3	8.6E-3	1.3E-3	5.9E-3	0.015		1.3E-3	--	5.1E-4
110-54-3	Hexane	Y	Y	Y	A	0.117	0.480					0.084	0.339	0.032	0.141	0.480		0.032	12.000	--
7647-01-0	Hydrogen Chloride	Y	Y	Y	A	0.986	3.666					0.986	3.666	0	0	3.666		0	0.050	--
7439-92-1	Lead	Y	N	n/a		4.8E-4	2.1E-3					0	0	0	0	0.031		0	--	--
7439-96-5	Manganese	Y	Y	Y	A	4.6E-3	0.017					4.6E-3	0.017	3.6E-5	1.6E-4	1.085		3.6E-5	0.067	--
7439-97-6	Mercury	Y	N	n/a		7.1E-4	2.9E-3	7.0E-4	2.9E-3	4.7E-6	2.1E-5	0	0	0	0	8.6E-3	2.1E-5	0	--	--
91-20-3	Naphthalene	Y	Y	Y	A	2.1E-3	8.8E-3					2.1E-3	8.8E-3	1.1E-5	4.8E-5	8.8E-3		1.1E-5	3.330	--
7440-02-0	Nickel	Y	Y	Y	C	5.5E-4	2.4E-3					5.1E-4	2.2E-3	4.0E-5	1.8E-4	9.5E-3		4.0E-5	--	2.7E-5
85-01-8	Phenanthrene	Y	N	n/a		5.1E-5	6.3E-5					0	0	0	0	6.3E-5		0	--	--
108-95-2	Phenol	Y	Y	Y	A	2.4E-4	1.1E-3					2.4E-4	1.1E-3	0	0	1.1E-3		0	1.270	--
7723-14-0	Phosphorus	Y	Y	Y	A	5.6E-3	0.023					5.6E-3	0.023	8.2E-6	3.6E-5	2.343		8.2E-6	7.0E-3	--
129-00-0	Pyrene	Y	N	n/a		5.0E-6	6.6E-6					0	0	0	0	6.6E-6		0	--	--
7782-49-2	Selenium	Y	Y	Y	A	4.1E-4	1.8E-3					4.1E-4	1.8E-3	4.3E-7	1.9E-6	3.2E-3		4.3E-7	0.013	--
108-88-3	Toluene	Y	Y	Y	A	0.032	0.139					0.032	0.139	6.1E-5	2.7E-4	0.139		6.1E-5	25.000	--
1330-20-7	Xylene	Y	Y	Y	A	0.032	0.138					0.032	0.138	0	0	0.138		0	29.000	--
7429-90-5	Aluminum	N	Y	N	A	0	0					0	0	0.648	2.577	0		58.504	0.667	--
7440-39-3	Barium	N	Y	N	A	0	0					0	0	6.8E-3	0.028	0		0.659	0.033	--
1317-65-3	Calcium Carbonate	N	Y	N	A	0	0					0	0	2.244	8.125	0		13.652	0.667	--
1305-78-8	Calcium Oxide	N	Y	N	A	0	0					0	0	0.696	0.952	0		0.696	0.133	--
7440-50-8	Copper	N	Y	N	A	0	0					0	0	5.3E-4	2.2E-3	0		4.6E-3	0.067	--
110-82-7	Cyclohexane	N	Y	N	A	0	0					0	0	1.0E-3	4.6E-3	0		1.0E-3	70.000	--
7783-06-4	Hydrogen Sulfide	N	Y	N	A	0	0					0	0	0.900	3.942	0		0.900	0.933	--
7439-89-6	Iron	N	Y	N	A	0	0					0	0	0.213	0.812	0		15.043	0.067	--
7439-98-7	Molybdenum	N	Y	N	A	0	0					0	0	4.7E-4	2.0E-3	0		1.3E-3	0.333	--
109-66-0	Pentane	N	Y	N	A	0	0					0	0	0.123	0.495	0		0.123	118	--
7440-22-4	Silver	N	Y	N	A	0	0					0	0	4.1E-4	1.8E-3	0		8.2E-4	7.0E-3	--
7664-93-9	Sulfuric Acid	N	Y	N	A	0	0					0	0	2.030	8.891	0		2.030	0.067	--
7440-28-0	Thallium	N	Y	N	A	0	0					0	0	5.2E-4	2.2E-3	0		8.7E-3	7.0E-3	--
7440-61-1	Uranium	N	Y	N	A	0	0					0	0	5.2E-4	2.2E-3	0		8.7E-3	0.013	--
7440-62-2	Vanadium	N	Y	N	A	0	0					0	0	8.4E-4	3.5E-3	0		0.024	3.0E-3	--
25551-13-7	Trimethyl benzene	N	Y	N	A	0	0					0	0	0.011	0.048	0		0.011	8.200	--
7440-33-7	Tungsten	N	Y	N	A	0	0					0	0	5.2E-4	2.2E-3	0		8.7E-3	0.333	--
7440-66-6	Zinc	N	Y	N	A	0	0					0	0	2.2E-3	8.8E-3	0		0.031	0.667	--
HAP TOTAL						***1.200***	***4.566***									***12.564***				
MERCURY TOTAL (exempt)								***7.0E-4***	***2.9E-3***											
MERCURY TOTAL (non-exempt)										***4.7E-6***	***2.1E-5***						***2.1E-5***			
TAP TOTAL (HAP-TAP addressed by NSPS/NESHAP)												***1.165***	***4.413***							
TAP TOTAL (For EL Evaluation)														***6.913***	***26.048***			***91.740***		

TABLE B2-Y1. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
			(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr
Ore Processing	OC1	Loader Transfer of Ore to	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC2	Grizzly to Apron Feeder	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC3	Apron Feeder to Dribble Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC4	Apron Feeder to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC5	Dribble Conveyor to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.089	1.0E-3	0.018	0	0.023	0	1.3E-5	3.5E-5
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC9	Stockpile Transfers to Reclaim Conveyors	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	7E/LL	7E/LL	7E/LL	7E/LL	0.098	1.1E-3	0.019	0	0.025	0	1.4E-5	3.9E-5
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.011	1.3E-4	2.3E-3	0	2.9E-3	0	1.6E-6	4.5E-6
Ore Concentration and Refining	AC	Autoclave	7E	7E	7E	7E	2.3E-5	2.3E-5	2.3E-5	0	2.3E-5	2.030	2.3E-5	2.3E-5
	EW	Electrowinning Cells and Pregnant Solution Tank	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MR	Mercury Retort	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MF	Induction Melting Furnace	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	CKD	Carbon Regeneration Kiln (Drum)	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
Process Heating	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	3.1E-6	0	0	0	0	0	1.6E-6
	CKB	Carbon Regeneration Kiln (Burners)	7E	7E	7E	7E	0	9.7E-6	0	0	0	0	0	5.1E-6
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	4.3E-7	0	0	0	0	0	2.3E-7
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7E	7E	7E	7E	0	2.2E-5	0	0	0	0	0	1.1E-5
	LKC	PFR Shaft Lime Kiln Combustion	5A	5A	5A	5A	0	9.5E-5	0	0	0	0	0	5.0E-5
Lime Production	LS1	Limestone transfer to Primary Crusher Hopper	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS2	Primary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS3	Primary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS4	Secondary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS5	Secondary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS6	Limestone transfer to Ball Mill Feed Bin	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS8	Ball Mill Feed transfer to Ball	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LSBM	Limestone Ball Mill	5A	5A	5A	5A	0.043	2.8E-4	0.522	0	0.020	0	9.5E-6	2.9E-5
	LS9	Limestone transfer to Kiln Feed Bin	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS11	Fines Screening and Associated Transfers In and Out	5A	5A	5A	5A	6.3E-3	4.0E-5	0.076	0	2.9E-3	0	1.4E-6	4.3E-6
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	5A	5A	5A	5A	0.021	1.3E-4	0.251	0	9.5E-3	0	4.6E-6	1.4E-5
	LCR	Lime Mill Crushing and associated transfers In and Out	5A	5A	5A	5A	6.4E-3	4.1E-5	0	0.211	2.9E-3	0	1.4E-6	4.4E-6
	LSL	Pebble Lime Silo Loading via Bucket Elevator	5A	5A	5A	5A	1.4E-4	9.0E-7	0	4.6E-3	6.4E-5	0	3.1E-8	9.6E-8
	LSU	Pebble Lime Silo discharge to Lime Slaker	5A	5A	5A	5A	1.4E-5	9.0E-8	0	4.6E-4	6.4E-6	0	3.1E-9	9.6E-9
	LS1L	Mill Lime Silo #1 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	MillS2L	Mill Lime Silo #2 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	ACS1L	AC Lime Silo #1 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7

TABLE B2-Y1. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic	Cadmium	Formaldehyde	Nickel	Aluminum	Barium	Calcium Carbonate	Calcium Oxide	Iron	Sulfuric Acid	Thallium	Vanadium
			7440-38-2	7440-43-9	50-00-0	7440-02-0	7429-90-5	7440-39-3	1317-65-3	1305-78-8	7439-89-6	7664-93-9	7440-28-0	7440-62-2
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS2L	AC Lime Silo #2 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS3L	AC Lime Silo #3 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS4L	AC Lime Silo #4 Loading	5A	5A	5A	5A	4.7E-4	3.0E-6	0	0.015	2.1E-4	0	1.0E-7	3.2E-7
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
Aggregate Prod.	PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
	PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
Concrete Production	CM	Central Mixer Loading	2.0E-6	4.9E-9	0	1.7E-6	0	0	0	0	0	0	0	0
	CS1L	Cement/Shotcrete Silo #1 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS1U	Cement/Shotcrete Silo #1 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2L	Cement/Shotcrete Silo #2 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2U	Cement/Shotcrete Silo #2 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CAL	Aggregate Bin Loading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
	CAU	Aggregate Bin Unloading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
HVAC	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	9.8E-8	5.4E-7	3.7E-5	1.0E-6	0	2.2E-6	0	0	0	0	0	1.1E-6
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	3.9E-7	2.2E-6	1.5E-4	4.1E-6	0	8.6E-6	0	0	0	0	0	4.5E-6
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	5.9E-7	3.2E-6	2.2E-4	6.2E-6	0	1.3E-5	0	0	0	0	0	6.8E-6
Mining - Modeling Scenario: Y1	YPP	Yellow Pine Pit	7E	7E	7E	7E	5.585	0.063	1.101	0	1.432	0	7.9E-4	2.2E-3
	YPPBL	Yellow Pine Pit Blasting	7E	7E	7E	7E	1.902	0.021	0.375	0	0.488	0	2.7E-4	7.5E-4
	STKP	PC Stockpile	7E	7E	7E	7E	1.063	0.012	0.210	0	0.272	0	1.5E-4	4.2E-4
	HR000	Haul Roads	7E	7E	7E	7E	15.394	0.173	3.035	0	3.946	0	2.2E-3	6.1E-3
	ACCRD	Access Roads	7E	7E	7E	7E	0.113	1.3E-3	0.022	0	0.029	0	1.6E-5	4.4E-5
	UGEXP	Scout Portal	7E	7E	7E	7E	2.5E-5	2.8E-7	4.9E-6	0	6.4E-6	0	3.5E-9	9.8E-9
		Total	**5.7E-6**	**2.0E-5**	**1.3E-3**	**4.0E-5**	**24.705**	**0.278**	**6.987**	**0.696**	**6.380**	**2.030**	**3.9E-3**	**0.010**

TABLE B2-Y2. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
			(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr
Ore Processing	OC1	Loader Transfer of Ore to	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC2	Grizzly to Apron Feeder	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC3	Apron Feeder to Dribble Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC4	Apron Feeder to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC5	Dribble Conveyor to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.089	1.0E-3	0.018	0	0.023	0	1.3E-5	3.5E-5
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC9	Stockpile Transfers to Reclaim Conveyors	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	7E/LL	7E/LL	7E/LL	7E/LL	0.098	1.1E-3	0.019	0	0.025	0	1.4E-5	3.9E-5
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.011	1.3E-4	2.3E-3	0	2.9E-3	0	1.6E-6	4.5E-6
Ore Concentration and Refining	AC	Autoclave	7E	7E	7E	7E	2.3E-5	2.3E-5	2.3E-5	0	2.3E-5	2.030	2.3E-5	2.3E-5
	EW	Electrowinning Cells and Pregnant Solution Tank	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MR	Mercury Retort	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MF	Induction Melting Furnace	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	CKD	Carbon Regeneration Kiln (Drum)	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
Process Heating	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	3.1E-6	0	0	0	0	0	1.6E-6
	CKB	Carbon Regeneration Kiln (Burners)	7E	7E	7E	7E	0	9.7E-6	0	0	0	0	0	5.1E-6
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	4.3E-7	0	0	0	0	0	2.3E-7
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7E	7E	7E	7E	0	2.2E-5	0	0	0	0	0	1.1E-5
	LKC	PFR Shaft Lime Kiln Combustion	5A	5A	5A	5A	0	9.5E-5	0	0	0	0	0	5.0E-5
Lime Production	LS1	Limestone transfer to Primary Crusher Hopper	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS2	Primary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS3	Primary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS4	Secondary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS5	Secondary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS6	Limestone transfer to Ball Mill Feed Bin	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS8	Ball Mill Feed transfer to Ball	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LSBM	Limestone Ball Mill	5A	5A	5A	5A	0.043	2.8E-4	0.522	0	0.020	0	9.5E-6	2.9E-5
	LS9	Limestone transfer to Kiln Feed Bin	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS11	Fines Screening and Associated Transfers In and Out	5A	5A	5A	5A	6.3E-3	4.0E-5	0.076	0	2.9E-3	0	1.4E-6	4.3E-6
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	5A	5A	5A	5A	0.021	1.3E-4	0.251	0	9.5E-3	0	4.6E-6	1.4E-5
	LCR	Lime Mill Crushing and associated transfers In and Out	5A	5A	5A	5A	6.4E-3	4.1E-5	0	0.211	2.9E-3	0	1.4E-6	4.4E-6
	LSL	Pebble Lime Silo Loading via Bucket Elevator	5A	5A	5A	5A	1.4E-4	9.0E-7	0	4.6E-3	6.4E-5	0	3.1E-8	9.6E-8
	LSU	Pebble Lime Silo discharge to Lime Slaker	5A	5A	5A	5A	1.4E-5	9.0E-8	0	4.6E-4	6.4E-6	0	3.1E-9	9.6E-9
	LS1L	Mill Lime Silo #1 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	MillS2L	Mill Lime Silo #2 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	ACS1L	AC Lime Silo #1 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7

TABLE B2-Y2. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS2L	AC Lime Silo #2 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS3L	AC Lime Silo #3 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS4L	AC Lime Silo #4 Loading	5A	5A	5A	5A	4.7E-4	3.0E-6	0	0.015	2.1E-4	0	1.0E-7	3.2E-7
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
Aggregate Prod.	PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
	PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
Concrete Production	CM	Central Mixer Loading	2.0E-6	4.9E-9	0	1.7E-6	0	0	0	0	0	0	0	0
	CS1L	Cement/Shotcrete Silo #1 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS1U	Cement/Shotcrete Silo #1 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2L	Cement/Shotcrete Silo #2 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2U	Cement/Shotcrete Silo #2 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CAL	Aggregate Bin Loading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
	CAU	Aggregate Bin Unloading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
HVAC	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	9.8E-8	5.4E-7	3.7E-5	1.0E-6	0	2.2E-6	0	0	0	0	0	1.1E-6
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	3.9E-7	2.2E-6	1.5E-4	4.1E-6	0	8.6E-6	0	0	0	0	0	4.5E-6
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	5.9E-7	3.2E-6	2.2E-4	6.2E-6	0	1.3E-5	0	0	0	0	0	6.8E-6
Mining - Modeling Scenario: Y2	YPP	Yellow Pine Pit	7E	7E	7E	7E	5.585	0.063	1.101	0	1.432	0	7.9E-4	2.2E-3
	YPPBL	Yellow Pine Pit Blasting	7E	7E	7E	7E	1.902	0.021	0.375	0	0.488	0	2.7E-4	7.5E-4
	FDRSF	Fiddle DRSF	7E	7E	7E	7E	0.858	9.7E-3	0.169	0	0.220	0	1.2E-4	3.4E-4
	HR000	Haul Roads	7E	7E	7E	7E	22.711	0.256	4.478	0	5.822	0	3.2E-3	9.0E-3
	ACCRD	Access Roads	7E	7E	7E	7E	0.113	1.3E-3	0.022	0	0.029	0	1.6E-5	4.4E-5
	UGEXP	Scout Portal	7E	7E	7E	7E	2.5E-5	2.8E-7	4.9E-6	0	6.4E-6	0	3.5E-9	9.8E-9
		Total	**5.7E-6**	**2.0E-5**	**1.3E-3**	**4.0E-5**	**31.817**	**0.358**	**8.390**	**0.696**	**8.203**	**2.030**	**4.9E-3**	**0.013**

TABLE B2-Y3. TAPs that Exceed the EL by Model Source ID

	Source	Source	Arsenic	Cadmium	Formaldehyde	Nickel	Aluminum	Barium	Calcium Carbonate	Calcium Oxide	Iron	Sulfuric Acid	Thallium	Vanadium
	ID	Description	7440-38-2	7440-43-9	50-00-0	7440-02-0	7429-90-5	7440-39-3	1317-65-3	1305-78-8	7439-89-6	7664-93-9	7440-28-0	7440-62-2
			(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr
Ore Processing	OC1	Loader Transfer of Ore to	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC2	Grizzly to Apron Feeder	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC3	Apron Feeder to Dribble Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC4	Apron Feeder to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC5	Dribble Conveyor to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.089	1.0E-3	0.018	0	0.023	0	1.3E-5	3.5E-5
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC9	Stockpile Transfers to Reclaim Conveyors	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	7E/LL	7E/LL	7E/LL	7E/LL	0.098	1.1E-3	0.019	0	0.025	0	1.4E-5	3.9E-5
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.011	1.3E-4	2.3E-3	0	2.9E-3	0	1.6E-6	4.5E-6
Ore Concentration and Refining	AC	Autoclave	7E	7E	7E	7E	2.3E-5	2.3E-5	2.3E-5	0	2.3E-5	2.030	2.3E-5	2.3E-5
	EW	Electrowinning Cells and Pregnant Solution Tank	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MR	Mercury Retort	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MF	Induction Melting Furnace	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	CKD	Carbon Regeneration Kiln (Drum)	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
Process Heating	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	3.1E-6	0	0	0	0	0	1.6E-6
	CKB	Carbon Regeneration Kiln (Burners)	7E	7E	7E	7E	0	9.7E-6	0	0	0	0	0	5.1E-6
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	4.3E-7	0	0	0	0	0	2.3E-7
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7E	7E	7E	7E	0	2.2E-5	0	0	0	0	0	1.1E-5
	LKC	PFR Shaft Lime Kiln Combustion	5A	5A	5A	5A	0	9.5E-5	0	0	0	0	0	5.0E-5
Lime Production	LS1	Limestone transfer to Primary Crusher Hopper	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS2	Primary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS3	Primary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS4	Secondary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS5	Secondary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS6	Limestone transfer to Ball Mill Feed Bin	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS8	Ball Mill Feed transfer to Ball	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LSBM	Limestone Ball Mill	5A	5A	5A	5A	0.043	2.8E-4	0.522	0	0.020	0	9.5E-6	2.9E-5
	LS9	Limestone transfer to Kiln Feed Bin	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS11	Fines Screening and Associated Transfers In and Out	5A	5A	5A	5A	6.3E-3	4.0E-5	0.076	0	2.9E-3	0	1.4E-6	4.3E-6
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	5A	5A	5A	5A	0.021	1.3E-4	0.251	0	9.5E-3	0	4.6E-6	1.4E-5
	LCR	Lime Mill Crushing and associated transfers In and Out	5A	5A	5A	5A	6.4E-3	4.1E-5	0	0.211	2.9E-3	0	1.4E-6	4.4E-6
	LSL	Pebble Lime Silo Loading via Bucket Elevator	5A	5A	5A	5A	1.4E-4	9.0E-7	0	4.6E-3	6.4E-5	0	3.1E-8	9.6E-8
	LSU	Pebble Lime Silo discharge to Lime Slaker	5A	5A	5A	5A	1.4E-5	9.0E-8	0	4.6E-4	6.4E-6	0	3.1E-9	9.6E-9
	LS1L	Mill Lime Silo #1 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	MillS2L	Mill Lime Silo #2 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	ACS1L	AC Lime Silo #1 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7

TABLE B2-Y3. TAPs that Exceed the EL by Model Source ID

	Source	Source	Arsenic	Cadmium	Formaldehyde	Nickel	Aluminum	Barium	Calcium Carbonate	Calcium Oxide	Iron	Sulfuric Acid	Thallium	Vanadium
	ID	Description	7440-38-2	7440-43-9	50-00-0	7440-02-0	7429-90-5	7440-39-3	1317-65-3	1305-78-8	7439-89-6	7664-93-9	7440-28-0	7440-62-2
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS2L	AC Lime Silo #2 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS3L	AC Lime Silo #3 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS4L	AC Lime Silo #4 Loading	5A	5A	5A	5A	4.7E-4	3.0E-6	0	0.015	2.1E-4	0	1.0E-7	3.2E-7
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
Aggregate Prod.	PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
	PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
Concrete Production	CM	Central Mixer Loading	2.0E-6	4.9E-9	0	1.7E-6	0	0	0	0	0	0	0	0
	CS1L	Cement/Shotcrete Silo #1 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS1U	Cement/Shotcrete Silo #1 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2L	Cement/Shotcrete Silo #2 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2U	Cement/Shotcrete Silo #2 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CAL	Aggregate Bin Loading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
	CAU	Aggregate Bin Unloading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
HVAC	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	9.8E-8	5.4E-7	3.7E-5	1.0E-6	0	2.2E-6	0	0	0	0	0	1.1E-6
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	3.9E-7	2.2E-6	1.5E-4	4.1E-6	0	8.6E-6	0	0	0	0	0	4.5E-6
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	5.9E-7	3.2E-6	2.2E-4	6.2E-6	0	1.3E-5	0	0	0	0	0	6.8E-6
Mining - Modeling Scenario: Y3	YPP	Yellow Pine Pit	7E	7E	7E	7E	5.585	0.063	1.101	0	1.432	0	7.9E-4	2.2E-3
	YPPBL	Yellow Pine Pit Blasting	7E	7E	7E	7E	1.902	0.021	0.375	0	0.488	0	2.7E-4	7.5E-4
	HFDRSF	Hangar Flats DRSF	7E	7E	7E	7E	0.858	9.7E-3	0.169	0	0.220	0	1.2E-4	3.4E-4
	HR000	Haul Roads	7E	7E	7E	7E	36.835	0.415	7.263	0	9.442	0	5.2E-3	0.015
	ACCRD	Access Roads	7E	7E	7E	7E	0.113	1.3E-3	0.022	0	0.029	0	1.6E-5	4.4E-5
	UGEXP	Scout Portal	7E	7E	7E	7E	2.5E-5	2.8E-7	4.9E-6	0	6.4E-6	0	3.5E-9	9.8E-9
		Total	**5.7E-6**	**2.0E-5**	**1.3E-3**	**4.0E-5**	**45.941**	**0.517**	**11.175**	**0.696**	**11.823**	**2.030**	**6.9E-3**	**0.019**

TABLE B2-H1. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
			(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr
Ore Processing	OC1	Loader Transfer of Ore to	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC2	Grizzly to Apron Feeder	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC3	Apron Feeder to Dribble Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC4	Apron Feeder to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC5	Dribble Conveyor to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.089	1.0E-3	0.018	0	0.023	0	1.3E-5	3.5E-5
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC9	Stockpile Transfers to Reclaim Conveyors	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	7E/LL	7E/LL	7E/LL	7E/LL	0.098	1.1E-3	0.019	0	0.025	0	1.4E-5	3.9E-5
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.011	1.3E-4	2.3E-3	0	2.9E-3	0	1.6E-6	4.5E-6
Ore Concentration and Refining	AC	Autoclave	7E	7E	7E	7E	2.3E-5	2.3E-5	2.3E-5	0	2.3E-5	2.030	2.3E-5	2.3E-5
	EW	Electrowinning Cells and Pregnant Solution Tank	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MR	Mercury Retort	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MF	Induction Melting Furnace	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	CKD	Carbon Regeneration Kiln (Drum)	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
Process Heating	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	3.1E-6	0	0	0	0	0	1.6E-6
	CKB	Carbon Regeneration Kiln (Burners)	7E	7E	7E	7E	0	9.7E-6	0	0	0	0	0	5.1E-6
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	4.3E-7	0	0	0	0	0	2.3E-7
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7E	7E	7E	7E	0	2.2E-5	0	0	0	0	0	1.1E-5
	LKC	PFR Shaft Lime Kiln Combustion	5A	5A	5A	5A	0	9.5E-5	0	0	0	0	0	5.0E-5
Lime Production	LS1	Limestone transfer to Primary Crusher Hopper	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS2	Primary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS3	Primary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS4	Secondary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS5	Secondary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS6	Limestone transfer to Ball Mill Feed Bin	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS8	Ball Mill Feed transfer to Ball	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LSBM	Limestone Ball Mill	5A	5A	5A	5A	0.043	2.8E-4	0.522	0	0.020	0	9.5E-6	2.9E-5
	LS9	Limestone transfer to Kiln Feed Bin	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS11	Fines Screening and Associated Transfers In and Out	5A	5A	5A	5A	6.3E-3	4.0E-5	0.076	0	2.9E-3	0	1.4E-6	4.3E-6
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	5A	5A	5A	5A	0.021	1.3E-4	0.251	0	9.5E-3	0	4.6E-6	1.4E-5
	LCR	Lime Mill Crushing and associated transfers In and Out	5A	5A	5A	5A	6.4E-3	4.1E-5	0	0.211	2.9E-3	0	1.4E-6	4.4E-6
	LSL	Pebble Lime Silo Loading via Bucket Elevator	5A	5A	5A	5A	1.4E-4	9.0E-7	0	4.6E-3	6.4E-5	0	3.1E-8	9.6E-8
	LSU	Pebble Lime Silo discharge to Lime Slaker	5A	5A	5A	5A	1.4E-5	9.0E-8	0	4.6E-4	6.4E-6	0	3.1E-9	9.6E-9
	LS1L	Mill Lime Silo #1 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	MillS2L	Mill Lime Silo #2 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	ACS1L	AC Lime Silo #1 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7

TABLE B2-H1. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS2L	AC Lime Silo #2 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS3L	AC Lime Silo #3 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS4L	AC Lime Silo #4 Loading	5A	5A	5A	5A	4.7E-4	3.0E-6	0	0.015	2.1E-4	0	1.0E-7	3.2E-7
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
Aggregate Prod.	PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
	PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
Concrete Production	CM	Central Mixer Loading	2.0E-6	4.9E-9	0	1.7E-6	0	0	0	0	0	0	0	0
	CS1L	Cement/Shotcrete Silo #1 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS1U	Cement/Shotcrete Silo #1 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2L	Cement/Shotcrete Silo #2 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2U	Cement/Shotcrete Silo #2 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CAL	Aggregate Bin Loading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
	CAU	Aggregate Bin Unloading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
HVAC	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	9.8E-8	5.4E-7	3.7E-5	1.0E-6	0	2.2E-6	0	0	0	0	0	1.1E-6
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	3.9E-7	2.2E-6	1.5E-4	4.1E-6	0	8.6E-6	0	0	0	0	0	4.5E-6
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	5.9E-7	3.2E-6	2.2E-4	6.2E-6	0	1.3E-5	0	0	0	0	0	6.8E-6
Mining - Modeling Scenario: H1	HFP	Hangar Flats Pit	7E	7E	7E	7E	5.585	0.063	1.101	0	1.432	0	7.9E-4	2.2E-3
	HFPBL	Hangar Flats Pit Blasting	7E	7E	7E	7E	1.902	0.021	0.375	0	0.488	0	2.7E-4	7.5E-4
	STKP	PC Stockpile	7E	7E	7E	7E	1.063	0.012	0.210	0	0.272	0	1.5E-4	4.2E-4
	HR000	Haul Roads	7E	7E	7E	7E	24.940	0.281	4.918	0	6.393	0	3.5E-3	9.8E-3
	ACCRD	Access Roads	7E	7E	7E	7E	0.113	1.3E-3	0.022	0	0.029	0	1.6E-5	4.4E-5
	UGEXP	Scout Portal	7E	7E	7E	7E	2.5E-5	2.8E-7	4.9E-6	0	6.4E-6	0	3.5E-9	9.8E-9
		Total	**5.7E-6**	**2.0E-5**	**1.3E-3**	**4.0E-5**	**34.252**	**0.385**	**8.870**	**0.696**	**8.827**	**2.030**	**5.2E-3**	**0.014**

TABLE B2-H2. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
			(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr
Ore Processing	OC1	Loader Transfer of Ore to	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC2	Grizzly to Apron Feeder	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC3	Apron Feeder to Dribble Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC4	Apron Feeder to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC5	Dribble Conveyor to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.089	1.0E-3	0.018	0	0.023	0	1.3E-5	3.5E-5
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC9	Stockpile Transfers to Reclaim Conveyors	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	7E/LL	7E/LL	7E/LL	7E/LL	0.098	1.1E-3	0.019	0	0.025	0	1.4E-5	3.9E-5
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.011	1.3E-4	2.3E-3	0	2.9E-3	0	1.6E-6	4.5E-6
Ore Concentration and Refining	AC	Autoclave	7E	7E	7E	7E	2.3E-5	2.3E-5	2.3E-5	0	2.3E-5	2.030	2.3E-5	2.3E-5
	EW	Electrowinning Cells and Pregnant Solution Tank	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MR	Mercury Retort	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MF	Induction Melting Furnace	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	CKD	Carbon Regeneration Kiln (Drum)	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
Process Heating	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	3.1E-6	0	0	0	0	0	1.6E-6
	CKB	Carbon Regeneration Kiln (Burners)	7E	7E	7E	7E	0	9.7E-6	0	0	0	0	0	5.1E-6
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	4.3E-7	0	0	0	0	0	2.3E-7
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7E	7E	7E	7E	0	2.2E-5	0	0	0	0	0	1.1E-5
	LKC	PFR Shaft Lime Kiln Combustion	5A	5A	5A	5A	0	9.5E-5	0	0	0	0	0	5.0E-5
Lime Production	LS1	Limestone transfer to Primary Crusher Hopper	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS2	Primary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS3	Primary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS4	Secondary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS5	Secondary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS6	Limestone transfer to Ball Mill Feed Bin	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS8	Ball Mill Feed transfer to Ball	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LSBM	Limestone Ball Mill	5A	5A	5A	5A	0.043	2.8E-4	0.522	0	0.020	0	9.5E-6	2.9E-5
	LS9	Limestone transfer to Kiln Feed Bin	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS11	Fines Screening and Associated Transfers In and Out	5A	5A	5A	5A	6.3E-3	4.0E-5	0.076	0	2.9E-3	0	1.4E-6	4.3E-6
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	5A	5A	5A	5A	0.021	1.3E-4	0.251	0	9.5E-3	0	4.6E-6	1.4E-5
	LCR	Lime Mill Crushing and associated transfers In and Out	5A	5A	5A	5A	6.4E-3	4.1E-5	0	0.211	2.9E-3	0	1.4E-6	4.4E-6
	LSL	Pebble Lime Silo Loading via Bucket Elevator	5A	5A	5A	5A	1.4E-4	9.0E-7	0	4.6E-3	6.4E-5	0	3.1E-8	9.6E-8
	LSU	Pebble Lime Silo discharge to Lime Slaker	5A	5A	5A	5A	1.4E-5	9.0E-8	0	4.6E-4	6.4E-6	0	3.1E-9	9.6E-9
	LS1L	Mill Lime Silo #1 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	MillS2L	Mill Lime Silo #2 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	ACS1L	AC Lime Silo #1 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7

TABLE B2-H2. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS2L	AC Lime Silo #2 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS3L	AC Lime Silo #3 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS4L	AC Lime Silo #4 Loading	5A	5A	5A	5A	4.7E-4	3.0E-6	0	0.015	2.1E-4	0	1.0E-7	3.2E-7
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
Aggregate Prod.	PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
	PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
Concrete Production	CM	Central Mixer Loading	2.0E-6	4.9E-9	0	1.7E-6	0	0	0	0	0	0	0	0
	CS1L	Cement/Shotcrete Silo #1 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS1U	Cement/Shotcrete Silo #1 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2L	Cement/Shotcrete Silo #2 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2U	Cement/Shotcrete Silo #2 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CAL	Aggregate Bin Loading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
	CAU	Aggregate Bin Unloading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
HVAC	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	9.8E-8	5.4E-7	3.7E-5	1.0E-6	0	2.2E-6	0	0	0	0	0	1.1E-6
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	3.9E-7	2.2E-6	1.5E-4	4.1E-6	0	8.6E-6	0	0	0	0	0	4.5E-6
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	5.9E-7	3.2E-6	2.2E-4	6.2E-6	0	1.3E-5	0	0	0	0	0	6.8E-6
Mining - Modeling Scenario: H2	HFP	Hangar Flats Pit	7E	7E	7E	7E	5.585	0.063	1.101	0	1.432	0	7.9E-4	2.2E-3
	HFPBL	Hangar Flats Pit Blasting	7E	7E	7E	7E	1.902	0.021	0.375	0	0.488	0	2.7E-4	7.5E-4
	FDRSF	Fiddle DRSF	7E	7E	7E	7E	0.858	9.7E-3	0.169	0	0.220	0	1.2E-4	3.4E-4
	HR000	Haul Roads	7E	7E	7E	7E	37.334	0.421	7.362	0	9.570	0	5.3E-3	0.015
	ACCRD	Access Roads	7E	7E	7E	7E	0.113	1.3E-3	0.022	0	0.029	0	1.6E-5	4.4E-5
	UGEXP	Scout Portal	7E	7E	7E	7E	2.5E-5	2.8E-7	4.9E-6	0	6.4E-6	0	3.5E-9	9.8E-9
		Total	**5.7E-6**	**2.0E-5**	**1.3E-3**	**4.0E-5**	**46.440**	**0.523**	**11.273**	**0.696**	**11.951**	**2.030**	**7.0E-3**	**0.019**

TABLE B2-H3. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
			(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr
Ore Processing	OC1	Loader Transfer of Ore to	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC2	Grizzly to Apron Feeder	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC3	Apron Feeder to Dribble Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC4	Apron Feeder to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC5	Dribble Conveyor to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.089	1.0E-3	0.018	0	0.023	0	1.3E-5	3.5E-5
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC9	Stockpile Transfers to Reclaim Conveyors	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	7E/LL	7E/LL	7E/LL	7E/LL	0.098	1.1E-3	0.019	0	0.025	0	1.4E-5	3.9E-5
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.011	1.3E-4	2.3E-3	0	2.9E-3	0	1.6E-6	4.5E-6
Ore Concentration and Refining	AC	Autoclave	7E	7E	7E	7E	2.3E-5	2.3E-5	2.3E-5	0	2.3E-5	2.030	2.3E-5	2.3E-5
	EW	Electrowinning Cells and Pregnant Solution Tank	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MR	Mercury Retort	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MF	Induction Melting Furnace	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	CKD	Carbon Regeneration Kiln (Drum)	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
Process Heating	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	3.1E-6	0	0	0	0	0	1.6E-6
	CKB	Carbon Regeneration Kiln (Burners)	7E	7E	7E	7E	0	9.7E-6	0	0	0	0	0	5.1E-6
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	4.3E-7	0	0	0	0	0	2.3E-7
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7E	7E	7E	7E	0	2.2E-5	0	0	0	0	0	1.1E-5
	LKC	PFR Shaft Lime Kiln Combustion	5A	5A	5A	5A	0	9.5E-5	0	0	0	0	0	5.0E-5
Lime Production	LS1	Limestone transfer to Primary Crusher Hopper	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS2	Primary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS3	Primary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS4	Secondary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS5	Secondary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS6	Limestone transfer to Ball Mill Feed Bin	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS8	Ball Mill Feed transfer to Ball	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LSBM	Limestone Ball Mill	5A	5A	5A	5A	0.043	2.8E-4	0.522	0	0.020	0	9.5E-6	2.9E-5
	LS9	Limestone transfer to Kiln Feed Bin	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS11	Fines Screening and Associated Transfers In and Out	5A	5A	5A	5A	6.3E-3	4.0E-5	0.076	0	2.9E-3	0	1.4E-6	4.3E-6
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	5A	5A	5A	5A	0.021	1.3E-4	0.251	0	9.5E-3	0	4.6E-6	1.4E-5
	LCR	Lime Mill Crushing and associated transfers In and Out	5A	5A	5A	5A	6.4E-3	4.1E-5	0	0.211	2.9E-3	0	1.4E-6	4.4E-6
	LSL	Pebble Lime Silo Loading via Bucket Elevator	5A	5A	5A	5A	1.4E-4	9.0E-7	0	4.6E-3	6.4E-5	0	3.1E-8	9.6E-8
	LSU	Pebble Lime Silo discharge to Lime Slaker	5A	5A	5A	5A	1.4E-5	9.0E-8	0	4.6E-4	6.4E-6	0	3.1E-9	9.6E-9
	LS1L	Mill Lime Silo #1 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	MillS2L	Mill Lime Silo #2 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	ACS1L	AC Lime Silo #1 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7

TABLE B2-H3. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS2L	AC Lime Silo #2 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS3L	AC Lime Silo #3 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS4L	AC Lime Silo #4 Loading	5A	5A	5A	5A	4.7E-4	3.0E-6	0	0.015	2.1E-4	0	1.0E-7	3.2E-7
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
Aggregate Prod.	PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
	PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
Concrete Production	CM	Central Mixer Loading	2.0E-6	4.9E-9	0	1.7E-6	0	0	0	0	0	0	0	0
	CS1L	Cement/Shotcrete Silo #1 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS1U	Cement/Shotcrete Silo #1 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2L	Cement/Shotcrete Silo #2 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2U	Cement/Shotcrete Silo #2 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CAL	Aggregate Bin Loading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
	CAU	Aggregate Bin Unloading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
HVAC	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	9.8E-8	5.4E-7	3.7E-5	1.0E-6	0	2.2E-6	0	0	0	0	0	1.1E-6
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	3.9E-7	2.2E-6	1.5E-4	4.1E-6	0	8.6E-6	0	0	0	0	0	4.5E-6
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	5.9E-7	3.2E-6	2.2E-4	6.2E-6	0	1.3E-5	0	0	0	0	0	6.8E-6
Mining - Modeling Scenario: H3	HFP	Hangar Flats Pit	7E	7E	7E	7E	5.585	0.063	1.101	0	1.432	0	7.9E-4	2.2E-3
	HFPBL	Hangar Flats Pit Blasting	7E	7E	7E	7E	1.902	0.021	0.375	0	0.488	0	2.7E-4	7.5E-4
	HFDRSF	Hangar Flats DRSF	7E	7E	7E	7E	0.858	9.7E-3	0.169	0	0.220	0	1.2E-4	3.4E-4
	HR000	Haul Roads	7E	7E	7E	7E	22.854	0.258	4.506	0	5.858	0	3.2E-3	9.0E-3
	ACCRD	Access Roads	7E	7E	7E	7E	0.113	1.3E-3	0.022	0	0.029	0	1.6E-5	4.4E-5
	UGEXP	Scout Portal	7E	7E	7E	7E	2.5E-5	2.8E-7	4.9E-6	0	6.4E-6	0	3.5E-9	9.8E-9
		Total	**5.7E-6**	**2.0E-5**	**1.3E-3**	**4.0E-5**	**31.960**	**0.360**	**8.418**	**0.696**	**8.239**	**2.030**	**4.9E-3**	**0.013**

TABLE B2-H4. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
			(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr
Ore Processing	OC1	Loader Transfer of Ore to	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC2	Grizzly to Apron Feeder	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC3	Apron Feeder to Dribble Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC4	Apron Feeder to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC5	Dribble Conveyor to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.089	1.0E-3	0.018	0	0.023	0	1.3E-5	3.5E-5
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC9	Stockpile Transfers to Reclaim Conveyors	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	7E/LL	7E/LL	7E/LL	7E/LL	0.098	1.1E-3	0.019	0	0.025	0	1.4E-5	3.9E-5
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.011	1.3E-4	2.3E-3	0	2.9E-3	0	1.6E-6	4.5E-6
Ore Concentration and Refining	AC	Autoclave	7E	7E	7E	7E	2.3E-5	2.3E-5	2.3E-5	0	2.3E-5	2.030	2.3E-5	2.3E-5
	EW	Electrowinning Cells and Pregnant Solution Tank	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MR	Mercury Retort	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MF	Induction Melting Furnace	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	CKD	Carbon Regeneration Kiln (Drum)	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
Process Heating	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	3.1E-6	0	0	0	0	0	1.6E-6
	CKB	Carbon Regeneration Kiln (Burners)	7E	7E	7E	7E	0	9.7E-6	0	0	0	0	0	5.1E-6
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	4.3E-7	0	0	0	0	0	2.3E-7
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7E	7E	7E	7E	0	2.2E-5	0	0	0	0	0	1.1E-5
	LKC	PFR Shaft Lime Kiln Combustion	5A	5A	5A	5A	0	9.5E-5	0	0	0	0	0	5.0E-5
Lime Production	LS1	Limestone transfer to Primary Crusher Hopper	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS2	Primary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS3	Primary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS4	Secondary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS5	Secondary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS6	Limestone transfer to Ball Mill Feed Bin	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS8	Ball Mill Feed transfer to Ball	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LSBM	Limestone Ball Mill	5A	5A	5A	5A	0.043	2.8E-4	0.522	0	0.020	0	9.5E-6	2.9E-5
	LS9	Limestone transfer to Kiln Feed Bin	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS11	Fines Screening and Associated Transfers In and Out	5A	5A	5A	5A	6.3E-3	4.0E-5	0.076	0	2.9E-3	0	1.4E-6	4.3E-6
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	5A	5A	5A	5A	0.021	1.3E-4	0.251	0	9.5E-3	0	4.6E-6	1.4E-5
	LCR	Lime Mill Crushing and associated transfers In and Out	5A	5A	5A	5A	6.4E-3	4.1E-5	0	0.211	2.9E-3	0	1.4E-6	4.4E-6
	LSL	Pebble Lime Silo Loading via Bucket Elevator	5A	5A	5A	5A	1.4E-4	9.0E-7	0	4.6E-3	6.4E-5	0	3.1E-8	9.6E-8
	LSU	Pebble Lime Silo discharge to Lime Slaker	5A	5A	5A	5A	1.4E-5	9.0E-8	0	4.6E-4	6.4E-6	0	3.1E-9	9.6E-9
	LS1L	Mill Lime Silo #1 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	MillS2L	Mill Lime Silo #2 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	ACS1L	AC Lime Silo #1 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7

TABLE B2-H4. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS2L	AC Lime Silo #2 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS3L	AC Lime Silo #3 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS4L	AC Lime Silo #4 Loading	5A	5A	5A	5A	4.7E-4	3.0E-6	0	0.015	2.1E-4	0	1.0E-7	3.2E-7
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
Aggregate Prod.	PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
	PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
Concrete Production	CM	Central Mixer Loading	2.0E-6	4.9E-9	0	1.7E-6	0	0	0	0	0	0	0	0
	CS1L	Cement/Shotcrete Silo #1 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS1U	Cement/Shotcrete Silo #1 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2L	Cement/Shotcrete Silo #2 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2U	Cement/Shotcrete Silo #2 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CAL	Aggregate Bin Loading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
	CAU	Aggregate Bin Unloading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
HVAC	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	9.8E-8	5.4E-7	3.7E-5	1.0E-6	0	2.2E-6	0	0	0	0	0	1.1E-6
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	3.9E-7	2.2E-6	1.5E-4	4.1E-6	0	8.6E-6	0	0	0	0	0	4.5E-6
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	5.9E-7	3.2E-6	2.2E-4	6.2E-6	0	1.3E-5	0	0	0	0	0	6.8E-6
Mining - Modeling Scenario: H4	HFP	Hangar Flats Pit	7E	7E	7E	7E	5.585	0.063	1.101	0	1.432	0	7.9E-4	2.2E-3
	HFPBL	Hangar Flats Pit Blasting	7E	7E	7E	7E	1.902	0.021	0.375	0	0.488	0	2.7E-4	7.5E-4
	YPDRSF	Yellow Pine DRSF	7E	7E	7E	7E	0.858	9.7E-3	0.169	0	0.220	0	1.2E-4	3.4E-4
	HR000	Haul Roads	7E	7E	7E	7E	29.277	0.330	5.773	0	7.505	0	4.1E-3	0.012
	ACCRD	Access Roads	7E	7E	7E	7E	0.113	1.3E-3	0.022	0	0.029	0	1.6E-5	4.4E-5
	UGEXP	Scout Portal	7E	7E	7E	7E	2.5E-5	2.8E-7	4.9E-6	0	6.4E-6	0	3.5E-9	9.8E-9
		Total	**5.7E-6**	**2.0E-5**	**1.3E-3**	**4.0E-5**	**38.383**	**0.432**	**9.685**	**0.696**	**9.886**	**2.030**	**5.8E-3**	**0.016**

TABLE B2-W1. TAPs that Exceed the EL by Model Source ID

	Source	Source	Arsenic	Cadmium	Formaldehyde	Nickel	Aluminum	Barium	Calcium Carbonate	Calcium Oxide	Iron	Sulfuric Acid	Thallium	Vanadium
	ID	Description	7440-38-2	7440-43-9	50-00-0	7440-02-0	7429-90-5	7440-39-3	1317-65-3	1305-78-8	7439-89-6	7664-93-9	7440-28-0	7440-62-2
			(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr
Ore Processing	OC1	Loader Transfer of Ore to	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC2	Grizzly to Apron Feeder	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC3	Apron Feeder to Dribble Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC4	Apron Feeder to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC5	Dribble Conveyor to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.089	1.0E-3	0.018	0	0.023	0	1.3E-5	3.5E-5
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC9	Stockpile Transfers to Reclaim Conveyors	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	7E/LL	7E/LL	7E/LL	7E/LL	0.098	1.1E-3	0.019	0	0.025	0	1.4E-5	3.9E-5
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.011	1.3E-4	2.3E-3	0	2.9E-3	0	1.6E-6	4.5E-6
Ore Concentration and Refining	AC	Autoclave	7E	7E	7E	7E	2.3E-5	2.3E-5	2.3E-5	0	2.3E-5	2.030	2.3E-5	2.3E-5
	EW	Electrowinning Cells and Pregnant Solution Tank	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MR	Mercury Retort	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MF	Induction Melting Furnace	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	CKD	Carbon Regeneration Kiln (Drum)	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
Process Heating	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	3.1E-6	0	0	0	0	0	1.6E-6
	CKB	Carbon Regeneration Kiln (Burners)	7E	7E	7E	7E	0	9.7E-6	0	0	0	0	0	5.1E-6
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	4.3E-7	0	0	0	0	0	2.3E-7
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7E	7E	7E	7E	0	2.2E-5	0	0	0	0	0	1.1E-5
	LKC	PFR Shaft Lime Kiln Combustion	5A	5A	5A	5A	0	9.5E-5	0	0	0	0	0	5.0E-5
Lime Production	LS1	Limestone transfer to Primary Crusher Hopper	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS2	Primary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS3	Primary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS4	Secondary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS5	Secondary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS6	Limestone transfer to Ball Mill Feed Bin	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS8	Ball Mill Feed transfer to Ball	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LSBM	Limestone Ball Mill	5A	5A	5A	5A	0.043	2.8E-4	0.522	0	0.020	0	9.5E-6	2.9E-5
	LS9	Limestone transfer to Kiln Feed Bin	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS11	Fines Screening and Associated Transfers In and Out	5A	5A	5A	5A	6.3E-3	4.0E-5	0.076	0	2.9E-3	0	1.4E-6	4.3E-6
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	5A	5A	5A	5A	0.021	1.3E-4	0.251	0	9.5E-3	0	4.6E-6	1.4E-5
	LCR	Lime Mill Crushing and associated transfers In and Out	5A	5A	5A	5A	6.4E-3	4.1E-5	0	0.211	2.9E-3	0	1.4E-6	4.4E-6
	LSL	Pebble Lime Silo Loading via Bucket Elevator	5A	5A	5A	5A	1.4E-4	9.0E-7	0	4.6E-3	6.4E-5	0	3.1E-8	9.6E-8
	LSU	Pebble Lime Silo discharge to Lime Slaker	5A	5A	5A	5A	1.4E-5	9.0E-8	0	4.6E-4	6.4E-6	0	3.1E-9	9.6E-9
	LS1L	Mill Lime Silo #1 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	MillS2L	Mill Lime Silo #2 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	ACS1L	AC Lime Silo #1 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7

TABLE B2-W1. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS2L	AC Lime Silo #2 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS3L	AC Lime Silo #3 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS4L	AC Lime Silo #4 Loading	5A	5A	5A	5A	4.7E-4	3.0E-6	0	0.015	2.1E-4	0	1.0E-7	3.2E-7
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
Aggregate Prod.	PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
	PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
Concrete Production	CM	Central Mixer Loading	2.0E-6	4.9E-9	0	1.7E-6	0	0	0	0	0	0	0	0
	CS1L	Cement/Shotcrete Silo #1 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS1U	Cement/Shotcrete Silo #1 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2L	Cement/Shotcrete Silo #2 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2U	Cement/Shotcrete Silo #2 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CAL	Aggregate Bin Loading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
	CAU	Aggregate Bin Unloading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
HVAC	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	9.8E-8	5.4E-7	3.7E-5	1.0E-6	0	2.2E-6	0	0	0	0	0	1.1E-6
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	3.9E-7	2.2E-6	1.5E-4	4.1E-6	0	8.6E-6	0	0	0	0	0	4.5E-6
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	5.9E-7	3.2E-6	2.2E-4	6.2E-6	0	1.3E-5	0	0	0	0	0	6.8E-6
Mining - Modeling Scenario: W1	WEP	West End Pit	7E	7E	7E	7E	5.585	0.063	1.101	0	1.432	0	7.9E-4	2.2E-3
	WEPBL	West End Pit Blasting	7E	7E	7E	7E	1.902	0.021	0.375	0	0.488	0	2.7E-4	7.5E-4
	STKP	PC Stockpile	7E	7E	7E	7E	1.063	0.012	0.210	0	0.272	0	1.5E-4	4.2E-4
	HR000	Haul Roads	7E	7E	7E	7E	21.435	0.242	4.227	0	5.495	0	3.0E-3	8.5E-3
	ACCRD	Access Roads	7E	7E	7E	7E	0.113	1.3E-3	0.022	0	0.029	0	1.6E-5	4.4E-5
	UGEXP	Scout Portal	7E	7E	7E	7E	2.5E-5	2.8E-7	4.9E-6	0	6.4E-6	0	3.5E-9	9.8E-9
		Total	**5.7E-6**	**2.0E-5**	**1.3E-3**	**4.0E-5**	**30.746**	**0.346**	**8.179**	**0.696**	**7.928**	**2.030**	**4.8E-3**	**0.013**

TABLE B2-W2. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic	Cadmium	Formaldehyde	Nickel	Aluminum	Barium	Calcium Carbonate	Calcium Oxide	Iron	Sulfuric Acid	Thallium	Vanadium
			7440-38-2	7440-43-9	50-00-0	7440-02-0	7429-90-5	7440-39-3	1317-65-3	1305-78-8	7439-89-6	7664-93-9	7440-28-0	7440-62-2
			(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr
Ore Processing	OC1	Loader Transfer of Ore to	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC2	Grizzly to Apron Feeder	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC3	Apron Feeder to Dribble Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC4	Apron Feeder to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC5	Dribble Conveyor to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.089	1.0E-3	0.018	0	0.023	0	1.3E-5	3.5E-5
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC9	Stockpile Transfers to Reclaim Conveyors	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	7E/LL	7E/LL	7E/LL	7E/LL	0.098	1.1E-3	0.019	0	0.025	0	1.4E-5	3.9E-5
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.011	1.3E-4	2.3E-3	0	2.9E-3	0	1.6E-6	4.5E-6
Ore Concentration and Refining	AC	Autoclave	7E	7E	7E	7E	2.3E-5	2.3E-5	2.3E-5	0	2.3E-5	2.030	2.3E-5	2.3E-5
	EW	Electrowinning Cells and Pregnant Solution Tank	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MR	Mercury Retort	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MF	Induction Melting Furnace	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	CKD	Carbon Regeneration Kiln (Drum)	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
Process Heating	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	3.1E-6	0	0	0	0	0	1.6E-6
	CKB	Carbon Regeneration Kiln (Burners)	7E	7E	7E	7E	0	9.7E-6	0	0	0	0	0	5.1E-6
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	4.3E-7	0	0	0	0	0	2.3E-7
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7E	7E	7E	7E	0	2.2E-5	0	0	0	0	0	1.1E-5
	LKC	PFR Shaft Lime Kiln Combustion	5A	5A	5A	5A	0	9.5E-5	0	0	0	0	0	5.0E-5
Lime Production	LS1	Limestone transfer to Primary Crusher Hopper	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS2	Primary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS3	Primary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS4	Secondary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS5	Secondary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS6	Limestone transfer to Ball Mill Feed Bin	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS8	Ball Mill Feed transfer to Ball	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LSBM	Limestone Ball Mill	5A	5A	5A	5A	0.043	2.8E-4	0.522	0	0.020	0	9.5E-6	2.9E-5
	LS9	Limestone transfer to Kiln Feed Bin	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS11	Fines Screening and Associated Transfers In and Out	5A	5A	5A	5A	6.3E-3	4.0E-5	0.076	0	2.9E-3	0	1.4E-6	4.3E-6
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	5A	5A	5A	5A	0.021	1.3E-4	0.251	0	9.5E-3	0	4.6E-6	1.4E-5
	LCR	Lime Mill Crushing and associated transfers In and Out	5A	5A	5A	5A	6.4E-3	4.1E-5	0	0.211	2.9E-3	0	1.4E-6	4.4E-6
	LSL	Pebble Lime Silo Loading via Bucket Elevator	5A	5A	5A	5A	1.4E-4	9.0E-7	0	4.6E-3	6.4E-5	0	3.1E-8	9.6E-8
	LSU	Pebble Lime Silo discharge to Lime Slaker	5A	5A	5A	5A	1.4E-5	9.0E-8	0	4.6E-4	6.4E-6	0	3.1E-9	9.6E-9
	LS1L	Mill Lime Silo #1 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	MillS2L	Mill Lime Silo #2 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	ACS1L	AC Lime Silo #1 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7

TABLE B2-W2. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS2L	AC Lime Silo #2 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS3L	AC Lime Silo #3 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS4L	AC Lime Silo #4 Loading	5A	5A	5A	5A	4.7E-4	3.0E-6	0	0.015	2.1E-4	0	1.0E-7	3.2E-7
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
Aggregate Prod.	PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
	PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
Concrete Production	CM	Central Mixer Loading	2.0E-6	4.9E-9	0	1.7E-6	0	0	0	0	0	0	0	0
	CS1L	Cement/Shotcrete Silo #1 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS1U	Cement/Shotcrete Silo #1 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2L	Cement/Shotcrete Silo #2 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2U	Cement/Shotcrete Silo #2 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CAL	Aggregate Bin Loading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
	CAU	Aggregate Bin Unloading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
HVAC	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	9.8E-8	5.4E-7	3.7E-5	1.0E-6	0	2.2E-6	0	0	0	0	0	1.1E-6
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	3.9E-7	2.2E-6	1.5E-4	4.1E-6	0	8.6E-6	0	0	0	0	0	4.5E-6
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	5.9E-7	3.2E-6	2.2E-4	6.2E-6	0	1.3E-5	0	0	0	0	0	6.8E-6
Mining - Modeling Scenario: W2	WEP	West End Pit	7E	7E	7E	7E	5.585	0.063	1.101	0	1.432	0	7.9E-4	2.2E-3
	WEPBL	West End Pit Blasting	7E	7E	7E	7E	1.902	0.021	0.375	0	0.488	0	2.7E-4	7.5E-4
	FDRSF	Fiddle DRSF	7E	7E	7E	7E	0.858	9.7E-3	0.169	0	0.220	0	1.2E-4	3.4E-4
	HR000	Haul Roads	7E	7E	7E	7E	34.484	0.389	6.800	0	8.840	0	4.9E-3	0.014
	ACCRD	Access Roads	7E	7E	7E	7E	0.113	1.3E-3	0.022	0	0.029	0	1.6E-5	4.4E-5
	UGEXP	Scout Portal	7E	7E	7E	7E	2.5E-5	2.8E-7	4.9E-6	0	6.4E-6	0	3.5E-9	9.8E-9
		Total	**5.7E-6**	**2.0E-5**	**1.3E-3**	**4.0E-5**	**43.590**	**0.491**	**10.711**	**0.696**	**11.221**	**2.030**	**6.6E-3**	**0.018**

TABLE B2-W3. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
			(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr
Ore Processing	OC1	Loader Transfer of Ore to	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC2	Grizzly to Apron Feeder	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC3	Apron Feeder to Dribble Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC4	Apron Feeder to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC5	Dribble Conveyor to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.089	1.0E-3	0.018	0	0.023	0	1.3E-5	3.5E-5
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC9	Stockpile Transfers to Reclaim Conveyors	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	7E/LL	7E/LL	7E/LL	7E/LL	0.098	1.1E-3	0.019	0	0.025	0	1.4E-5	3.9E-5
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.011	1.3E-4	2.3E-3	0	2.9E-3	0	1.6E-6	4.5E-6
Ore Concentration and Refining	AC	Autoclave	7E	7E	7E	7E	2.3E-5	2.3E-5	2.3E-5	0	2.3E-5	2.030	2.3E-5	2.3E-5
	EW	Electrowinning Cells and Pregnant Solution Tank	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MR	Mercury Retort	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MF	Induction Melting Furnace	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	CKD	Carbon Regeneration Kiln (Drum)	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
Process Heating	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	3.1E-6	0	0	0	0	0	1.6E-6
	CKB	Carbon Regeneration Kiln (Burners)	7E	7E	7E	7E	0	9.7E-6	0	0	0	0	0	5.1E-6
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	4.3E-7	0	0	0	0	0	2.3E-7
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7E	7E	7E	7E	0	2.2E-5	0	0	0	0	0	1.1E-5
	LKC	PFR Shaft Lime Kiln Combustion	5A	5A	5A	5A	0	9.5E-5	0	0	0	0	0	5.0E-5
Lime Production	LS1	Limestone transfer to Primary Crusher Hopper	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS2	Primary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS3	Primary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS4	Secondary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS5	Secondary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS6	Limestone transfer to Ball Mill Feed Bin	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS8	Ball Mill Feed transfer to Ball	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LSBM	Limestone Ball Mill	5A	5A	5A	5A	0.043	2.8E-4	0.522	0	0.020	0	9.5E-6	2.9E-5
	LS9	Limestone transfer to Kiln Feed Bin	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS11	Fines Screening and Associated Transfers In and Out	5A	5A	5A	5A	6.3E-3	4.0E-5	0.076	0	2.9E-3	0	1.4E-6	4.3E-6
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	5A	5A	5A	5A	0.021	1.3E-4	0.251	0	9.5E-3	0	4.6E-6	1.4E-5
	LCR	Lime Mill Crushing and associated transfers In and Out	5A	5A	5A	5A	6.4E-3	4.1E-5	0	0.211	2.9E-3	0	1.4E-6	4.4E-6
	LSL	Pebble Lime Silo Loading via Bucket Elevator	5A	5A	5A	5A	1.4E-4	9.0E-7	0	4.6E-3	6.4E-5	0	3.1E-8	9.6E-8
	LSU	Pebble Lime Silo discharge to Lime Slaker	5A	5A	5A	5A	1.4E-5	9.0E-8	0	4.6E-4	6.4E-6	0	3.1E-9	9.6E-9
	LS1L	Mill Lime Silo #1 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	MillS2L	Mill Lime Silo #2 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	ACS1L	AC Lime Silo #1 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7

TABLE B2-W3. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS2L	AC Lime Silo #2 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS3L	AC Lime Silo #3 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS4L	AC Lime Silo #4 Loading	5A	5A	5A	5A	4.7E-4	3.0E-6	0	0.015	2.1E-4	0	1.0E-7	3.2E-7
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
Aggregate Prod.	PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
	PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
Concrete Production	CM	Central Mixer Loading	2.0E-6	4.9E-9	0	1.7E-6	0	0	0	0	0	0	0	0
	CS1L	Cement/Shotcrete Silo #1 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS1U	Cement/Shotcrete Silo #1 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2L	Cement/Shotcrete Silo #2 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2U	Cement/Shotcrete Silo #2 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CAL	Aggregate Bin Loading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
	CAU	Aggregate Bin Unloading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
HVAC	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	9.8E-8	5.4E-7	3.7E-5	1.0E-6	0	2.2E-6	0	0	0	0	0	1.1E-6
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	3.9E-7	2.2E-6	1.5E-4	4.1E-6	0	8.6E-6	0	0	0	0	0	4.5E-6
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	5.9E-7	3.2E-6	2.2E-4	6.2E-6	0	1.3E-5	0	0	0	0	0	6.8E-6
Mining - Modeling Scenario: W3	WEP	West End Pit	7E	7E	7E	7E	5.585	0.063	1.101	0	1.432	0	7.9E-4	2.2E-3
	WEPBL	West End Pit Blasting	7E	7E	7E	7E	1.902	0.021	0.375	0	0.488	0	2.7E-4	7.5E-4
	HFDRSF	Hangar Flats DRSF	7E	7E	7E	7E	0.858	9.7E-3	0.169	0	0.220	0	1.2E-4	3.4E-4
	HR000	Haul Roads	7E	7E	7E	7E	49.397	0.557	9.740	0	12.662	0	7.0E-3	0.019
	ACCRD	Access Roads	7E	7E	7E	7E	0.113	1.3E-3	0.022	0	0.029	0	1.6E-5	4.4E-5
	UGEXP	Scout Portal	7E	7E	7E	7E	2.5E-5	2.8E-7	4.9E-6	0	6.4E-6	0	3.5E-9	9.8E-9
		Total	**5.7E-6**	**2.0E-5**	**1.3E-3**	**4.0E-5**	**58.504**	**0.659**	**13.652**	**0.696**	**15.043**	**2.030**	**8.7E-3**	**0.024**

TABLE B2-W4. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic	Cadmium	Formaldehyde	Nickel	Aluminum	Barium	Calcium Carbonate	Calcium Oxide	Iron	Sulfuric Acid	Thallium	Vanadium
			7440-38-2	7440-43-9	50-00-0	7440-02-0	7429-90-5	7440-39-3	1317-65-3	1305-78-8	7439-89-6	7664-93-9	7440-28-0	7440-62-2
			(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr
Ore Processing	OC1	Loader Transfer of Ore to	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC2	Grizzly to Apron Feeder	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC3	Apron Feeder to Dribble Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC4	Apron Feeder to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC5	Dribble Conveyor to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.089	1.0E-3	0.018	0	0.023	0	1.3E-5	3.5E-5
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC9	Stockpile Transfers to Reclaim Conveyors	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	7E/LL	7E/LL	7E/LL	7E/LL	0.098	1.1E-3	0.019	0	0.025	0	1.4E-5	3.9E-5
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.011	1.3E-4	2.3E-3	0	2.9E-3	0	1.6E-6	4.5E-6
Ore Concentration and Refining	AC	Autoclave	7E	7E	7E	7E	2.3E-5	2.3E-5	2.3E-5	0	2.3E-5	2.030	2.3E-5	2.3E-5
	EW	Electrowinning Cells and Pregnant Solution Tank	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MR	Mercury Retort	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MF	Induction Melting Furnace	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	CKD	Carbon Regeneration Kiln (Drum)	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
Process Heating	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	3.1E-6	0	0	0	0	0	1.6E-6
	CKB	Carbon Regeneration Kiln (Burners)	7E	7E	7E	7E	0	9.7E-6	0	0	0	0	0	5.1E-6
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	4.3E-7	0	0	0	0	0	2.3E-7
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7E	7E	7E	7E	0	2.2E-5	0	0	0	0	0	1.1E-5
	LKC	PFR Shaft Lime Kiln Combustion	5A	5A	5A	5A	0	9.5E-5	0	0	0	0	0	5.0E-5
Lime Production	LS1	Limestone transfer to Primary Crusher Hopper	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS2	Primary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS3	Primary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS4	Secondary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS5	Secondary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS6	Limestone transfer to Ball Mill Feed Bin	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS8	Ball Mill Feed transfer to Ball	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LSBM	Limestone Ball Mill	5A	5A	5A	5A	0.043	2.8E-4	0.522	0	0.020	0	9.5E-6	2.9E-5
	LS9	Limestone transfer to Kiln Feed Bin	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS11	Fines Screening and Associated Transfers In and Out	5A	5A	5A	5A	6.3E-3	4.0E-5	0.076	0	2.9E-3	0	1.4E-6	4.3E-6
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	5A	5A	5A	5A	0.021	1.3E-4	0.251	0	9.5E-3	0	4.6E-6	1.4E-5
	LCR	Lime Mill Crushing and associated transfers In and Out	5A	5A	5A	5A	6.4E-3	4.1E-5	0	0.211	2.9E-3	0	1.4E-6	4.4E-6
	LSL	Pebble Lime Silo Loading via Bucket Elevator	5A	5A	5A	5A	1.4E-4	9.0E-7	0	4.6E-3	6.4E-5	0	3.1E-8	9.6E-8
	LSU	Pebble Lime Silo discharge to Lime Slaker	5A	5A	5A	5A	1.4E-5	9.0E-8	0	4.6E-4	6.4E-6	0	3.1E-9	9.6E-9
	LS1L	Mill Lime Silo #1 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	MillS2L	Mill Lime Silo #2 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	ACS1L	AC Lime Silo #1 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7

TABLE B2-W4. TAPs that Exceed the EL by Model Source ID

	Source	Source	Arsenic	Cadmium	Formaldehyde	Nickel	Aluminum	Barium	Calcium Carbonate	Calcium Oxide	Iron	Sulfuric Acid	Thallium	Vanadium
	ID	Description	7440-38-2	7440-43-9	50-00-0	7440-02-0	7429-90-5	7440-39-3	1317-65-3	1305-78-8	7439-89-6	7664-93-9	7440-28-0	7440-62-2
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS2L	AC Lime Silo #2 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS3L	AC Lime Silo #3 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS4L	AC Lime Silo #4 Loading	5A	5A	5A	5A	4.7E-4	3.0E-6	0	0.015	2.1E-4	0	1.0E-7	3.2E-7
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
Aggregate Prod.	PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
	PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
Concrete Production	CM	Central Mixer Loading	2.0E-6	4.9E-9	0	1.7E-6	0	0	0	0	0	0	0	0
	CS1L	Cement/Shotcrete Silo #1 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS1U	Cement/Shotcrete Silo #1 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2L	Cement/Shotcrete Silo #2 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2U	Cement/Shotcrete Silo #2 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CAL	Aggregate Bin Loading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
	CAU	Aggregate Bin Unloading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
HVAC	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	9.8E-8	5.4E-7	3.7E-5	1.0E-6	0	2.2E-6	0	0	0	0	0	1.1E-6
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	3.9E-7	2.2E-6	1.5E-4	4.1E-6	0	8.6E-6	0	0	0	0	0	4.5E-6
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	5.9E-7	3.2E-6	2.2E-4	6.2E-6	0	1.3E-5	0	0	0	0	0	6.8E-6
Mining - Modeling Scenario: W4	WEP	West End Pit	7E	7E	7E	7E	5.585	0.063	1.101	0	1.432	0	7.9E-4	2.2E-3
	WEPBL	West End Pit Blasting	7E	7E	7E	7E	1.902	0.021	0.375	0	0.488	0	2.7E-4	7.5E-4
	YPDRSF	Yellow Pine DRSF	7E	7E	7E	7E	0.858	9.7E-3	0.169	0	0.220	0	1.2E-4	3.4E-4
	HR000	Haul Roads	7E	7E	7E	7E	22.281	0.251	4.393	0	5.711	0	3.1E-3	8.8E-3
	ACCRD	Access Roads	7E	7E	7E	7E	0.113	1.3E-3	0.022	0	0.029	0	1.6E-5	4.4E-5
	UGEXP	Scout Portal	7E	7E	7E	7E	2.5E-5	2.8E-7	4.9E-6	0	6.4E-6	0	3.5E-9	9.8E-9
		Total	**5.7E-6**	**2.0E-5**	**1.3E-3**	**4.0E-5**	**31.387**	**0.353**	**8.305**	**0.696**	**8.092**	**2.030**	**4.8E-3**	**0.013**

TABLE B2-W5. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
			(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr
Ore Processing	OC1	Loader Transfer of Ore to	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC2	Grizzly to Apron Feeder	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC3	Apron Feeder to Dribble Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC4	Apron Feeder to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC5	Dribble Conveyor to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.089	1.0E-3	0.018	0	0.023	0	1.3E-5	3.5E-5
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC9	Stockpile Transfers to Reclaim Conveyors	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	7E/LL	7E/LL	7E/LL	7E/LL	0.098	1.1E-3	0.019	0	0.025	0	1.4E-5	3.9E-5
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.011	1.3E-4	2.3E-3	0	2.9E-3	0	1.6E-6	4.5E-6
Ore Concentration and Refining	AC	Autoclave	7E	7E	7E	7E	2.3E-5	2.3E-5	2.3E-5	0	2.3E-5	2.030	2.3E-5	2.3E-5
	EW	Electrowinning Cells and Pregnant Solution Tank	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MR	Mercury Retort	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MF	Induction Melting Furnace	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	CKD	Carbon Regeneration Kiln (Drum)	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
Process Heating	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	3.1E-6	0	0	0	0	0	1.6E-6
	CKB	Carbon Regeneration Kiln (Burners)	7E	7E	7E	7E	0	9.7E-6	0	0	0	0	0	5.1E-6
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	4.3E-7	0	0	0	0	0	2.3E-7
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7E	7E	7E	7E	0	2.2E-5	0	0	0	0	0	1.1E-5
	LKC	PFR Shaft Lime Kiln Combustion	5A	5A	5A	5A	0	9.5E-5	0	0	0	0	0	5.0E-5
Lime Production	LS1	Limestone transfer to Primary Crusher Hopper	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS2	Primary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS3	Primary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS4	Secondary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS5	Secondary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS6	Limestone transfer to Ball Mill Feed Bin	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS8	Ball Mill Feed transfer to Ball	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LSBM	Limestone Ball Mill	5A	5A	5A	5A	0.043	2.8E-4	0.522	0	0.020	0	9.5E-6	2.9E-5
	LS9	Limestone transfer to Kiln Feed Bin	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS11	Fines Screening and Associated Transfers In and Out	5A	5A	5A	5A	6.3E-3	4.0E-5	0.076	0	2.9E-3	0	1.4E-6	4.3E-6
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	5A	5A	5A	5A	0.021	1.3E-4	0.251	0	9.5E-3	0	4.6E-6	1.4E-5
	LCR	Lime Mill Crushing and associated transfers In and Out	5A	5A	5A	5A	6.4E-3	4.1E-5	0	0.211	2.9E-3	0	1.4E-6	4.4E-6
	LSL	Pebble Lime Silo Loading via Bucket Elevator	5A	5A	5A	5A	1.4E-4	9.0E-7	0	4.6E-3	6.4E-5	0	3.1E-8	9.6E-8
	LSU	Pebble Lime Silo discharge to Lime Slaker	5A	5A	5A	5A	1.4E-5	9.0E-8	0	4.6E-4	6.4E-6	0	3.1E-9	9.6E-9
	LS1L	Mill Lime Silo #1 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	MillS2L	Mill Lime Silo #2 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	ACS1L	AC Lime Silo #1 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7

TABLE B2-W5. TAPs that Exceed the EL by Model Source ID

	Source	Source	Arsenic	Cadmium	Formaldehyde	Nickel	Aluminum	Barium	Calcium Carbonate	Calcium Oxide	Iron	Sulfuric Acid	Thallium	Vanadium
	ID	Description	7440-38-2	7440-43-9	50-00-0	7440-02-0	7429-90-5	7440-39-3	1317-65-3	1305-78-8	7439-89-6	7664-93-9	7440-28-0	7440-62-2
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS2L	AC Lime Silo #2 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS3L	AC Lime Silo #3 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS4L	AC Lime Silo #4 Loading	5A	5A	5A	5A	4.7E-4	3.0E-6	0	0.015	2.1E-4	0	1.0E-7	3.2E-7
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
Aggregate Prod.	PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
	PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
Concrete Production	CM	Central Mixer Loading	2.0E-6	4.9E-9	0	1.7E-6	0	0	0	0	0	0	0	0
	CS1L	Cement/Shotcrete Silo #1 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS1U	Cement/Shotcrete Silo #1 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2L	Cement/Shotcrete Silo #2 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2U	Cement/Shotcrete Silo #2 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CAL	Aggregate Bin Loading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
	CAU	Aggregate Bin Unloading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
HVAC	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	9.8E-8	5.4E-7	3.7E-5	1.0E-6	0	2.2E-6	0	0	0	0	0	1.1E-6
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	3.9E-7	2.2E-6	1.5E-4	4.1E-6	0	8.6E-6	0	0	0	0	0	4.5E-6
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	5.9E-7	3.2E-6	2.2E-4	6.2E-6	0	1.3E-5	0	0	0	0	0	6.8E-6
Mining - Modeling Scenario: W5	WEP	West End Pit	7E	7E	7E	7E	5.585	0.063	1.101	0	1.432	0	7.9E-4	2.2E-3
	WEPBL	West End Pit Blasting	7E	7E	7E	7E	1.902	0.021	0.375	0	0.488	0	2.7E-4	7.5E-4
	WEDRSF	West End DRSF	7E	7E	7E	7E	0.858	9.7E-3	0.169	0	0.220	0	1.2E-4	3.4E-4
	HR000	Haul Roads	7E	7E	7E	7E	24.595	0.277	4.850	0	6.305	0	3.5E-3	9.7E-3
	ACCRD	Access Roads	7E	7E	7E	7E	0.113	1.3E-3	0.022	0	0.029	0	1.6E-5	4.4E-5
	UGEXP	Scout Portal	7E	7E	7E	7E	2.5E-5	2.8E-7	4.9E-6	0	6.4E-6	0	3.5E-9	9.8E-9
		Total	**5.7E-6**	**2.0E-5**	**1.3E-3**	**4.0E-5**	**33.702**	**0.379**	**8.761**	**0.696**	**8.686**	**2.030**	**5.2E-3**	**0.014**

TABLE B2-B1. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
			(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr
Ore Processing	OC1	Loader Transfer of Ore to	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC2	Grizzly to Apron Feeder	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC3	Apron Feeder to Dribble Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC4	Apron Feeder to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC5	Dribble Conveyor to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.089	1.0E-3	0.018	0	0.023	0	1.3E-5	3.5E-5
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC9	Stockpile Transfers to Reclaim Conveyors	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	7E/LL	7E/LL	7E/LL	7E/LL	0.098	1.1E-3	0.019	0	0.025	0	1.4E-5	3.9E-5
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.011	1.3E-4	2.3E-3	0	2.9E-3	0	1.6E-6	4.5E-6
Ore Concentration and Refining	AC	Autoclave	7E	7E	7E	7E	2.3E-5	2.3E-5	2.3E-5	0	2.3E-5	2.030	2.3E-5	2.3E-5
	EW	Electrowinning Cells and Pregnant Solution Tank	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MR	Mercury Retort	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MF	Induction Melting Furnace	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	CKD	Carbon Regeneration Kiln (Drum)	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
Process Heating	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	3.1E-6	0	0	0	0	0	1.6E-6
	CKB	Carbon Regeneration Kiln (Burners)	7E	7E	7E	7E	0	9.7E-6	0	0	0	0	0	5.1E-6
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	4.3E-7	0	0	0	0	0	2.3E-7
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7E	7E	7E	7E	0	2.2E-5	0	0	0	0	0	1.1E-5
	LKC	PFR Shaft Lime Kiln Combustion	5A	5A	5A	5A	0	9.5E-5	0	0	0	0	0	5.0E-5
Lime Production	LS1	Limestone transfer to Primary Crusher Hopper	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS2	Primary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS3	Primary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS4	Secondary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS5	Secondary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS6	Limestone transfer to Ball Mill Feed Bin	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS8	Ball Mill Feed transfer to Ball	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LSBM	Limestone Ball Mill	5A	5A	5A	5A	0.043	2.8E-4	0.522	0	0.020	0	9.5E-6	2.9E-5
	LS9	Limestone transfer to Kiln Feed Bin	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS11	Fines Screening and Associated Transfers In and Out	5A	5A	5A	5A	6.3E-3	4.0E-5	0.076	0	2.9E-3	0	1.4E-6	4.3E-6
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	5A	5A	5A	5A	0.021	1.3E-4	0.251	0	9.5E-3	0	4.6E-6	1.4E-5
	LCR	Lime Mill Crushing and associated transfers In and Out	5A	5A	5A	5A	6.4E-3	4.1E-5	0	0.211	2.9E-3	0	1.4E-6	4.4E-6
	LSL	Pebble Lime Silo Loading via Bucket Elevator	5A	5A	5A	5A	1.4E-4	9.0E-7	0	4.6E-3	6.4E-5	0	3.1E-8	9.6E-8
	LSU	Pebble Lime Silo discharge to Lime Slaker	5A	5A	5A	5A	1.4E-5	9.0E-8	0	4.6E-4	6.4E-6	0	3.1E-9	9.6E-9
	LS1L	Mill Lime Silo #1 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	MillS2L	Mill Lime Silo #2 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	ACS1L	AC Lime Silo #1 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7

TABLE B2-B1. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS2L	AC Lime Silo #2 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS3L	AC Lime Silo #3 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS4L	AC Lime Silo #4 Loading	5A	5A	5A	5A	4.7E-4	3.0E-6	0	0.015	2.1E-4	0	1.0E-7	3.2E-7
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
Aggregate Prod.	PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
	PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
Concrete Production	CM	Central Mixer Loading	2.0E-6	4.9E-9	0	1.7E-6	0	0	0	0	0	0	0	0
	CS1L	Cement/Shotcrete Silo #1 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS1U	Cement/Shotcrete Silo #1 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2L	Cement/Shotcrete Silo #2 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2U	Cement/Shotcrete Silo #2 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CAL	Aggregate Bin Loading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
	CAU	Aggregate Bin Unloading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
HVAC	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	9.8E-8	5.4E-7	3.7E-5	1.0E-6	0	2.2E-6	0	0	0	0	0	1.1E-6
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	3.9E-7	2.2E-6	1.5E-4	4.1E-6	0	8.6E-6	0	0	0	0	0	4.5E-6
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	5.9E-7	3.2E-6	2.2E-4	6.2E-6	0	1.3E-5	0	0	0	0	0	6.8E-6
Mining - Modeling Scenario: B1	BT	Bradley Tailings	7E	7E	7E	7E	5.567	0.063	1.098	0	1.427	0	7.8E-4	2.2E-3
	BTBL	Bradley Tailings Blasting	7E	7E	7E	7E	1.902	0.021	0.375	0	0.488	0	2.7E-4	7.5E-4
	STKP	PC Stockpile	7E	7E	7E	7E	1.063	0.012	0.210	0	0.272	0	1.5E-4	4.2E-4
	HR000	Haul Roads	7E	7E	7E	7E	28.394	0.320	5.599	0	7.278	0	4.0E-3	0.011
	ACCRD	Access Roads	7E	7E	7E	7E	0.113	1.3E-3	0.022	0	0.029	0	1.6E-5	4.4E-5
	UGEXP	Scout Portal	7E	7E	7E	7E	2.5E-5	2.8E-7	4.9E-6	0	6.4E-6	0	3.5E-9	9.8E-9
		Total	**5.7E-6**	**2.0E-5**	**1.3E-3**	**4.0E-5**	**37.687**	**0.424**	**9.547**	**0.696**	**9.707**	**2.030**	**5.7E-3**	**0.015**

TABLE B2-B2. TAPs that Exceed the EL by Model Source ID

	Source ID	Source Description	Arsenic 7440-38-2	Cadmium 7440-43-9	Formaldehyde 50-00-0	Nickel 7440-02-0	Aluminum 7429-90-5	Barium 7440-39-3	Calcium Carbonate 1317-65-3	Calcium Oxide 1305-78-8	Iron 7439-89-6	Sulfuric Acid 7664-93-9	Thallium 7440-28-0	Vanadium 7440-62-2
			(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(annual) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr	(24-hr) lb/hr
Ore Processing	OC1	Loader Transfer of Ore to	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC2	Grizzly to Apron Feeder	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC3	Apron Feeder to Dribble Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC4	Apron Feeder to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC5	Dribble Conveyor to Vibrating Grizzly	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.089	1.0E-3	0.018	0	0.023	0	1.3E-5	3.5E-5
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	7E/LL	7E/LL	7E/LL	7E/LL	0.010	1.2E-4	2.0E-3	0	2.7E-3	0	1.5E-6	4.1E-6
	OC9	Stockpile Transfers to Reclaim Conveyors	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	7E/LL	7E/LL	7E/LL	7E/LL	0.049	5.5E-4	9.7E-3	0	0.013	0	6.9E-6	1.9E-5
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	7E/LL	7E/LL	7E/LL	7E/LL	0.098	1.1E-3	0.019	0	0.025	0	1.4E-5	3.9E-5
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	7E/LL	7E/LL	7E/LL	7E/LL	0.011	1.3E-4	2.3E-3	0	2.9E-3	0	1.6E-6	4.5E-6
Ore Concentration and Refining	AC	Autoclave	7E	7E	7E	7E	2.3E-5	2.3E-5	2.3E-5	0	2.3E-5	2.030	2.3E-5	2.3E-5
	EW	Electrowinning Cells and Pregnant Solution Tank	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MR	Mercury Retort	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	MF	Induction Melting Furnace	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
	CKD	Carbon Regeneration Kiln (Drum)	7E	7E	7E	7E	9.6E-5	9.6E-5	9.6E-5	0	9.6E-5	0	9.6E-5	9.6E-5
Process Heating	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	3.1E-6	0	0	0	0	0	1.6E-6
	CKB	Carbon Regeneration Kiln (Burners)	7E	7E	7E	7E	0	9.7E-6	0	0	0	0	0	5.1E-6
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7E	7E	7E	7E	0	4.3E-7	0	0	0	0	0	2.3E-7
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7E	7E	7E	7E	0	2.2E-5	0	0	0	0	0	1.1E-5
	LKC	PFR Shaft Lime Kiln Combustion	5A	5A	5A	5A	0	9.5E-5	0	0	0	0	0	5.0E-5
Lime Production	LS1	Limestone transfer to Primary Crusher Hopper	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS2	Primary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS3	Primary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS4	Secondary Crushing and Associated Transfers In and Out	5A	5A	5A	5A	5.7E-3	3.7E-5	0.070	0	2.6E-3	0	1.3E-6	3.9E-6
	LS5	Secondary Screening and Associated Transfers In and Out	5A	5A	5A	5A	0.027	1.7E-4	0.323	0	0.012	0	5.9E-6	1.8E-5
	LS6	Limestone transfer to Ball Mill Feed Bin	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LS8	Ball Mill Feed transfer to Ball	5A	5A	5A	5A	3.2E-3	2.0E-5	0.039	0	1.5E-3	0	7.1E-7	2.2E-6
	LSBM	Limestone Ball Mill	5A	5A	5A	5A	0.043	2.8E-4	0.522	0	0.020	0	9.5E-6	2.9E-5
	LS9	Limestone transfer to Kiln Feed Bin	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LS11	Fines Screening and Associated Transfers In and Out	5A	5A	5A	5A	6.3E-3	4.0E-5	0.076	0	2.9E-3	0	1.4E-6	4.3E-6
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	5A	5A	5A	5A	7.5E-4	4.8E-6	9.2E-3	0	3.5E-4	0	1.7E-7	5.2E-7
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	5A	5A	5A	5A	0.021	1.3E-4	0.251	0	9.5E-3	0	4.6E-6	1.4E-5
	LCR	Lime Mill Crushing and associated transfers In and Out	5A	5A	5A	5A	6.4E-3	4.1E-5	0	0.211	2.9E-3	0	1.4E-6	4.4E-6
	LSL	Pebble Lime Silo Loading via Bucket Elevator	5A	5A	5A	5A	1.4E-4	9.0E-7	0	4.6E-3	6.4E-5	0	3.1E-8	9.6E-8
	LSU	Pebble Lime Silo discharge to Lime Slaker	5A	5A	5A	5A	1.4E-5	9.0E-8	0	4.6E-4	6.4E-6	0	3.1E-9	9.6E-9
	LS1L	Mill Lime Silo #1 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	MillS2L	Mill Lime Silo #2 Loading	5A	5A	5A	5A	2.3E-4	1.5E-6	0	7.6E-3	1.1E-4	0	5.2E-8	1.6E-7
	MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	5A	5A	5A	5A	1.1E-3	7.3E-6	0	0.037	5.2E-4	0	2.5E-7	7.8E-7
	ACS1L	AC Lime Silo #1 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7

TABLE B2-B2. TAPs that Exceed the EL by Model Source ID

	Source	Source	Arsenic	Cadmium	Formaldehyde	Nickel	Aluminum	Barium	Calcium Carbonate	Calcium Oxide	Iron	Sulfuric Acid	Thallium	Vanadium
	ID	Description	7440-38-2	7440-43-9	50-00-0	7440-02-0	7429-90-5	7440-39-3	1317-65-3	1305-78-8	7439-89-6	7664-93-9	7440-28-0	7440-62-2
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS2L	AC Lime Silo #2 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS3L	AC Lime Silo #3 Loading	5A	5A	5A	5A	9.3E-4	6.0E-6	0	0.031	4.3E-4	0	2.1E-7	6.4E-7
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
	ACS4L	AC Lime Silo #4 Loading	5A	5A	5A	5A	4.7E-4	3.0E-6	0	0.015	2.1E-4	0	1.0E-7	3.2E-7
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5A	5A	5A	5A	2.2E-3	1.4E-5	0	0.071	9.9E-4	0	4.8E-7	1.5E-6
Aggregate Prod.	PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
	PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	OOO	OOO	OOO	OOO	0.014	9.1E-5	0.172	0	6.5E-3	0	3.1E-6	9.7E-6
Concrete Production	CM	Central Mixer Loading	2.0E-6	4.9E-9	0	1.7E-6	0	0	0	0	0	0	0	0
	CS1L	Cement/Shotcrete Silo #1 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS1U	Cement/Shotcrete Silo #1 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2L	Cement/Shotcrete Silo #2 Loading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CS2U	Cement/Shotcrete Silo #2 Unloading	2.9E-8	0	0	2.9E-7	0	0	0	0	0	0	0	0
	CAL	Aggregate Bin Loading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
	CAU	Aggregate Bin Unloading	OOO	OOO	OOO	OOO	0.016	1.0E-4	0	0	7.1E-3	0	3.5E-6	1.1E-5
HVAC	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	7.8E-7	4.3E-6	2.9E-4	8.2E-6	0	1.7E-5	0	0	0	0	0	9.0E-6
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	4.9E-8	2.7E-7	1.8E-5	5.1E-7	0	1.1E-6	0	0	0	0	0	5.6E-7
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	9.8E-8	5.4E-7	3.7E-5	1.0E-6	0	2.2E-6	0	0	0	0	0	1.1E-6
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	3.9E-7	2.2E-6	1.5E-4	4.1E-6	0	8.6E-6	0	0	0	0	0	4.5E-6
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	5.9E-7	3.2E-6	2.2E-4	6.2E-6	0	1.3E-5	0	0	0	0	0	6.8E-6
Mining - Modeling Scenario: B2	BT	Bradley Tailings	7E	7E	7E	7E	5.567	0.063	1.098	0	1.427	0	7.8E-4	2.2E-3
	BTBL	Bradley Tailings Blasting	7E	7E	7E	7E	1.902	0.021	0.375	0	0.488	0	2.7E-4	7.5E-4
	HFDRSF	Hangar Flats DRSF	7E	7E	7E	7E	0.858	9.7E-3	0.169	0	0.220	0	1.2E-4	3.4E-4
	HR000	Haul Roads	7E	7E	7E	7E	6.713	0.076	1.324	0	1.721	0	9.5E-4	2.6E-3
	ACCRD	Access Roads	7E	7E	7E	7E	0.113	1.3E-3	0.022	0	0.029	0	1.6E-5	4.4E-5
	UGEXP	Scout Portal	7E	7E	7E	7E	2.5E-5	2.8E-7	4.9E-6	0	6.4E-6	0	3.5E-9	9.8E-9
		Total	**5.7E-6**	**2.0E-5**	**1.3E-3**	**4.0E-5**	**15.801**	**0.178**	**5.232**	**0.696**	**4.097**	**2.030**	**2.7E-3**	**6.8E-3**

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis/E. Memon
	PROJECT NO: 335-1-4	PAGE: 1 OF: 4 SHEET: Summary
AIR EMISSION CALCULATIONS	SUBJECT: Emissions Summary	DATE: June 22, 2020

Facility-Wide Criteria Pollutant PTE

Activity	PM	PM10		PM2.5		CO		NOX		SO2		VOC
	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	ton/yr
Process & Ancillary	87.3	21.7	56.3	13.4	36.4	33.5	30.5	55.4	37.9	1.9	6.5	4.8
Mining Fugitive	3,569	225	986	22.5	98.9	1,742	636	46.8	17.1	9.4E-02	3.4E-02	0.0E+00
Total	3,656	246	1,042	35.9	135	1,776	666	102	54.9	2.0	6.5	4.8

Mining fugitive emissions are for model scenario: W3

Permitting Applicability

	PM	PM10	PM2.5	CO	NOX	SO2
	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
Total Process & Ancillary	87.3	56.3	36.4	30.5	37.9	6.5
Significant Threshold [(1)]	25	15	10	100	40	40
	Above	Above	Above	Minor	Minor	Minor
Regulatory Concern Threshold (10% of Significant) [(2)]						
	2.5	1.5	1	10	4	4
	Permit	Permit	Permit	Permit	Permit	Permit
Major Source Determination		100	100	100	100	100
		Minor	Minor	Minor	Minor	Minor

(1) *IDAPA 58.01.01.006.108.a.*

(2) *IDAPA 58.01.01.221.01*

Modeling Applicability

	PM10	PM2.5		CO	NOX		SO2		Pb
	lb/hr	lb/hr	ton/yr	lb/hr	lb/hr	ton/yr	lb/hr	ton/yr	lb/month
Process & Ancillary	21.7	13.4	36.4	33.5	55.4	37.9	1.9	6.5	4.4E-02
Mining Fugitive	225	22.5	98.9	1,742	46.8	17.1	9.4E-02	3.4E-02	0.0E+00
Total	246	35.9	135	1,776	102	54.9	2.0	6.5	4.4E-02
Level I Thresholds [(1)]	0.22	0.054	0.35	15	0.20	1.20	0.21	1.2	14
Modeling Triggered?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	No

(1) *IDEQ, Guideline for Performing Air Quality Impact Analyses Table 2, September-2013*

Permit to Construct Processing Fee Determination [(1)]

Regulated Pollutant	ton/yr
PM10	56.3
CO	30.5
NOX	37.9
SO2	6.5
VOC	4.8
Total [(2)]	136

(1) *Process & Ancillary Sources Only*

(2) *In accordance with 58.01.01.225, the Permit to Construct Processing Fee will be $7,500.*
This is for a non major new source with an increase of emissions of 100 tpy or more.

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

Autoclave Non-HAP TAP Emissions

CAS No.	Pollutant	Throughpu ton/hr	Operation hr/yr	Emission Factor		Emissions lb/hr	Emissions ton/yr
7664-93-9	Sulfuric Acid	290	8,760	0.007	lb/ton[1]	2.03	8.9
7783-06-4	Hydrogen Sulfide		8,760	0.9	lb/hr[2]	0.9	3.9

(1) *H2SO4 is based on Acidic Autoclave test data (APT 2010)*

(2) *H2S is based on Acidic Autoclave test data (APT 2013)*

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: S. Pryor/E. Memon
	PROJECT NO: 335-1-4	PAGE: 8 OF: 10 SHEET: ProcHAP
AIR EMISSION CALCULATIONS	SUBJECT: Process HAP Emissions	DATE: June 22, 2020

MATERIAL PROCESSING HAP/TAP EMISSIONS

Ore Processing PM Emissions 5.9 lb/hr
25.8 ton/yr

Ore Dust HAP Concentrations[1] and Emissions

		Concentration	Emissions	
CAS No.	Pollutant	ppm	lb/hr	ton/yr
7440-38-2	Arsenic	667	0.003923	0.0172
7440-41-7	Beryllium	3.2	0.000019	0.0001
7440-43-9	Cadmium	0.5	0.000003	0.00001
7440-48-4	Cobalt	4	0.000024	0.0001
7440-47-3	Chromium	9	0.000053	0.0002
7439-97-6	Mercury	0.96	0.000006	0.00002
7439-96-5	Manganese	299	0.001759	0.0077
7440-02-0	Nickel	2	0.000012	0.0001
7439-92-1	Lead	8	0.000047	0.0002
7440-36-0	Antimony	23	0.000135	0.0006
7723-14-0	Phosphorus	650	0.003823	0.0167
Dust HAP Total			0.009803	0.0429

[1] *(Midas Gold 2017c)*

Ore Dust Non-HAP TAP Concentrations[1] and Emissions

		Concentration	Emissions	
CAS No.	Pollutant	ppm	lb/hr	ton/yr
7440-22-4	Silver	0.5	0.000003	0.00001
7440-39-3	Barium	800	0.004705	0.0206
7440-50-8	Copper	5	0.000029	0.0001
7439-98-7	Molybdenum	1	0.000006	0.00003
7440-28-0	Thallium	10	0.000059	0.00026
7440-61-1	Uranium	10	0.000059	0.0003
Dust HAP Total			0.004861	0.0213

[1] *(Midas Gold 2017c)*

Sb Concentrate Processing PM Emissions 0.12 lb/hr
0.52 ton/yr

Stib. Conc.

Sb Concentrate Dust Non-HAP TAP Concentrations[1] and Emissions

		Concentration	Emissions	
CAS No.	Pollutant	ppm	lb/hr	ton/yr
7440-36-0	Antimony	580,000	0.0684	0.2998

[1] *(Midas Gold 2019d)*

Carbon Disulfide Emissions from Xanthate Decomposition

		Xanthate[1]	Molar	CS_2 MW	Temperature	Emissions	
CAS No.	Pollutant	ton/yr	Decomp.[2]	Ratio	Adj. Factor[3]	lb/hr	ton/yr
75-15-0	Carbon Disulfide	1,700	0.99%	0.376	0.01	0.0145	0.063

[1] *(Midas Gold 2016) p. 12-11*

[2] *(Air Sciences 2020) molar decomposition of of xanthate in solution to CS2 gas*

[3] *(Air Sciences 2020) based on the comparison of CS2 generation at 50C and 70C*

Conversions			MW	
2,000	lb/ton	Xanthate (PAX)	202.37	$C6H11KOS_2$
8,760	hr/yr	Carbon difulfide	76.139	CS_2

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: S. Pryor/E. Memon		
	PROJECT NO: 335-1-4	PAGE: 9	OF: 10	SHEET: ProcHAP
AIR EMISSION CALCULATIONS	SUBJECT: Process HAP Emissions	DATE: June 22, 2020		

MATERIAL PROCESSING HAP/TAP EMISSIONS

TRUE

Lead Emission by Source

Pb_tpy

	Source ID	Description	Pb ton/yr
	CS1L	Cement/Shotcrete Silo #1 Loading	2.21E-5
	CS2L	Cement/Shotcrete Silo #2 Loading	2.21E-5
	CM	Central Mixer Loading	1.15E-5
1	OC1	Loader Transfer of Ore to Grizzly	5.11E-6
1	OC2	Grizzly to Apron Feeder	5.11E-6
1	OC3	Apron Feeder to Dribble Conveyor	5.11E-6
1	OC4	Apron Feeder to Vibrating Grizzly	5.11E-6
1	OC5	Dribble Conveyor to Vibrating Grizzly	5.11E-6
1	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	5.11E-6
5	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	4.38E-5
1	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	5.11E-6
3	OC9	Stockpile Transfers to Reclaim Conveyors	2.42E-5
3	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	2.42E-5
3	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	2.42E-5
6	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	4.84E-5
1	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	5.64E-6
	Total		2.62E-4

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: S. Pryor/E. Memon
	PROJECT NO: 335-1-4	PAGE: 10 OF: 10 SHEET: ProcHAP
AIR EMISSION CALCULATIONS	SUBJECT: Process HAP Emissions	DATE: June 22, 2020

40 CFR 63 Subpart 7E MERCURY SOURCES

Mercury Emissions

Description	Subpart 7E Hg Emissions ton/yr	Oper. hr/yr	% of Subpart 7E for Controlled Systems* %	Controlled Hg Emissions* lb/hr	lb/yr	ton/yr
Autoclave **	0.107	8,760	10.0%	0.002	21.34	0.011
Refinery Sources (Kiln, EW, Retort, Furnace)	0.008	1,248	20.0%	0.003	3.36	0.002
Total 7439-97-6	0.115			0.005	24.70	0.012

**Based on Similar Source Hg Reporting Levels provided below*

***Expected actual emissions from Autoclave:* 0.0105 g/hr 2.3E-05 lb/hr 0.20 lb/yr *(M3 2019)*

Subpart 7E Limit - Ore Pretreatment Processes *(CFR 2018b)*

84 lb / ~~MMton~~ × 2,540,400 ~~ton~~ / yr × ~~MMton~~ / 1.0E+6 ~~ton~~ = 213.39 lb / yr

Subpart 7E Limit - Carbon Processes with Mercury Retorts

0.8 lb / ~~ton~~ × 21 ~~ton~~ / yr = 16.8 lb / yr

Similar Source Hg Reporting Levels

Goldstrike Autoclaves 2 & 3 (2015 & 2016 Hg Reports) *(NDEP 2015a) (NDEP 2016)*

28.79 lb / yr × yr / 3.13 MMton = 9.18 lb / MMton × MMton / 84 lb = 10.9%

Twin Creeks Autoclaves 1 & 2 (2015 & 2016 Hg Reports) *(NDEP 2015a) (NDEP 2016)*

1.01 lb / yr × yr / 7.63 MMton = 0.13 lb / MMton × MMton / 84 lb = 0.2%

Goldstrike Refinery (2015 & 2016 Hg Reports) *(NDEP 2015a) (NDEP 2016)*

28.79 lb / yr × yr / 251.00 ton = 0.11 lb / MMton × ton / 0.8 lb = 14.3%

Twin Creeks Refinery (2015 & 2016 Hg Reports) *(NDEP 2015a) (NDEP 2016)*

31.27 lb / yr × yr / 142.77 ton = 0.22 lb / MMton × ton / 0.8 lb = 27.4%

Fuel Storage Tanks

		Dimensions			VOC		
	Capacity	**Diameter**	**Length**	**Throughput**	**Emissions[(1)]**		**Reference**
Storage Tank	gal	ft	ft	gal/yr	lb/yr	ton/yr	
Mine Site Gasoline Tank #1	5,000	8.5	14.33	250,000	1,914.73	0.96	*(Midas Gold 2016), Table 12-4, annual use*
Mine Site Gasoline Tank #2	5,000	8.5	14.33	250,000	1,914.73	0.96	*(Midas Gold 2016), Table 12-4, annual use*
Mine Site Diesel Tank #3	25,000	12	29.70	725,000	14.60	0.007	*(Midas Gold 2016), (Midas Gold 2018c)*
Mine Site Diesel Tank #4	25,000	12	29.70	725,000	14.60	0.007	*(Midas Gold 2016), (Midas Gold 2018c)*
Mine Site Diesel Tank #5	25,000	12	29.70	725,000	14.60	0.007	*(Midas Gold 2016), (Midas Gold 2018c)*
Mine Site Diesel Tank #6	25,000	12	29.70	725,000	14.60	0.007	*(Midas Gold 2016), (Midas Gold 2018c)*
Mine Site Diesel Tank #7	25,000	12	29.70	725,000	14.60	0.007	*(Midas Gold 2016), (Midas Gold 2018c)*
Mine Site Diesel Tank #8	25,000	12	29.70	725,000	14.60	0.007	*(Midas Gold 2016), (Midas Gold 2018c)*
Mine Site Diesel Tank #9	25,000	12	29.70	725,000	14.60	0.007	*(Midas Gold 2016), (Midas Gold 2018c)*
Mine Site Diesel Tank #10	25,000	12	29.70	725,000	14.60	0.007	*(Midas Gold 2016), (Midas Gold 2018c)*

(1) *Emissions calculated using EPA Tanks 4.0.9d (EPA 1999)*

AIR EMISSION CALCULATIONS	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
	PROJECT NO: 335-1-4	PAGE: 1 OF: 2 SHEET: MineLimits
	SUBJECT: Max Case Operation	DATE: June 22, 2020

Maximum Mining Activity Rate

Maximum Operating Schedule

24	hr/day	
365	day/yr	

Maximum Production

180,000	ton/day, ore and rock	*(Midas Gold 2019b)*	2	blasts per day	*(Midas Gold 2019b)*
180,000	ton/day, ore	*(Midas Gold 2019b)*	600	holes per blast	*(Midas Gold 2019a)*
180,000	ton/day, rock	*(Midas Gold 2019b)*			

Modeling Scenarios

Model	Pit				Ore Destination		Development Rock Destination			
	YPP	HFP	WEP	BT	PC	STKP	FDRSF	HFDRSF	YPDRSF	WEDRSF
Scenario	ton/day	ton/day	ton/day	ton/day	ton/day	ton/day	ton/day	ton/day	ton/day	ton/day
Y1	180,000	--	--	--	--	180,000	--	--	--	--
Y2	180,000	--	--	--	--	--	180,000	--	--	--
Y3	180,000	--	--	--	--	--	--	180,000	--	--
H1	--	180,000	--	--	--	180,000	--	--	--	--
H2	--	180,000	--	--	--	--	180,000	--	--	--
H3	--	180,000	--	--	--	--	--	180,000	--	--
H4	--	180,000	--	--	--	--	--	--	180,000	--
W1	--	--	180,000	--	--	180,000	--	--	--	--
W2	--	--	180,000	--	--	--	180,000	--	--	--
W3	--	--	180,000	--	--	--	--	180,000	--	--
W4	--	--	180,000	--	--	--	--	--	180,000	--
W5	--	--	180,000	--	--	--	--	--	--	180,000
B1	--	--	--	180,000	--	180,000	--	--	--	--
B2	--	--	--	180,000	--	--	--	180,000	--	--

Daily maximum mining equipment

Equipment		Units	
Truck Fleet	Cat 789D	20	*(Midas Gold 2017b)*
Truck Fleet	Cat 740B	12	*(Midas Gold 2019b)*
Water truck	Cat 777D	2	*(Midas Gold 2017b)*
Dozer		6	*(Midas Gold 2017b)*
Grader		3	*(Midas Gold 2017b)*

Daily maximum access road traffic

	One-Way Trips per Day	
Road maintenance equipment	4	*(Midas Gold 2016); Table 12-2*
Light vehicles	19	*(Midas Gold 2016); Table 12-2*
Heavy vehicles	45	*(Midas Gold 2016); Table 12-2*
Total	68	

Acronyms

YPP	Yellow Pine Pit
HFP	Hangar Flats Pit
WEP	West End Pit
BT	Bradley Tailings
FDRSF	Fiddle DRSF
HFDRSF	Hangar Flats DRSF
YPDRSF	Yellow Pine DRSF
WEDRSF	West End DRSF
PC	Primary Crusher
STKP	Primary Crusher Stockpile

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Model Scenario W3

Mining Activity and Emissions Emissions Summary

By Area/Model ID

		PM_TPY	PM10_PPD	PM10_TPY	PM2.5_PPD	PM2.5_TPY	CO_PPH	CO_TPY	NOX_PPH	NOX_TPY	SO2_PPH	SO2_TPY	VOC_TPY
Area/	Location of	PM	PM10		PM2.5		CO		NOX		SO2		VOC
Model ID	Activity	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	ton/yr
Y *YPP*	Yellow Pine Pit	--	--	--	--	--	--	--	--	--	--	--	--
H *HFP*	Hangar Flats Pit	--	--	--	--	--	--	--	--	--	--	--	--
W *WEP*	West End Pit	344.54	885.54	161.61	79.64	14.53	--	--	--	--	--	--	--
B *BT*	Bradley Tailings	--	--	--	--	--	--	--	--	--	--	--	--
YPPBL	Yellow Pine Pit Blasting	--	--	--	--	--	--	--	--	--	--	--	--
HFPBL	Hangar Flats Pit Blasting	--	--	--	--	--	--	--	--	--	--	--	--
WEPBL	West End Pit Blasting	117.35	334.38	61.02	19.29	3.52	1,742.00	635.83	46.80	17.08	0.09	0.03	--
BTBL	Bradley Tailings Blasting	--	--	--	--	--	--	--	--	--	--	--	--
STKP	PC Stockpile	--	--	--	--	--	--	--	--	--	--	--	--
FDRSF	Fiddle DRSF	--	--	--	--	--	--	--	--	--	--	--	--
HFDRSF	Hangar Flats DRSF	52.91	57.12	10.42	30.23	5.52	--	--	--	--	--	--	--
YPDRSF	Yellow Pine DRSF	--	--	--	--	--	--	--	--	--	--	--	--
WEDRSF	West End DRSF	--	--	--	--	--	--	--	--	--	--	--	--
TSF	Tailing Storage Facility	--	--	--	--	--	--	--	--	--	--	--	--
HR	Haul Roads	3,047.34	4,106.76	750.84	410.88	75.12	--	--	--	--	--	--	--
ACCRD	Access Roads	6.95	9.38	1.72	0.94	0.17	--	--	--	--	--	--	--
UGEXP	Scout Portal	0.002	0.004	0.001	0.001	0.0001	--	--	--	--	--	--	--
Total		3,569.10	5,393.19	985.62	540.98	98.87	1,742.00	635.83	46.80	17.08	0.09	0.03	--

See worksheet ROADS for haul road (HR) emissions by Model ID.

By Activity

	chk	chk-12	chk	chk	chk	chk	chk	chk	chk	chk	chk	chk
	PM	PM10		PM2.5		CO		NOX		SO2		VOC
Activity	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	ton/yr
Open Pit Drilling	284.70	811.20	148.04	46.80	8.54							
Open Pit Blasting	117.35	334.38	61.02	19.29	3.52	1,742.00	635.83	46.80	17.08	0.09	0.03	
Onsite Hauling	2,901.27	3,899.39	712.95	389.94	71.29							
Material Load / Unload	8.06	20.88	3.81	3.16	0.58							
Dozing	103.56	108.40	19.78	59.58	10.87							
Grading	36.80	60.51	11.04	6.25	1.14							
Water Truck Travel	109.27	146.86	26.85	14.69	2.69							
Access Road	6.95	9.38	1.72	0.94	0.17							
Wind Erosion	0.02	0.04	0.01	0.01	0.00							
Surface Exploration	1.12	2.14	0.39	0.32	0.06							
Underground Exploration	0.002	0.004	0.0007	0.0006	0.0001							
Total	3,569.10	5,393.19	985.62	540.98	98.87	1,742.00	635.83	46.80	17.08	0.09	0.03	--

W3 Model Input Emission Rates (g/s)

By Area/Model ID

		CO_PPH	NOX_TPY	NOX_PPH	PM2.5_TPY	PM2.5_PPD	PM10_PPD	SO2_PPH
Area/	Location of	CO	NO_X		$PM_{2.5}$		PM_{10}	SO_2
Model ID	Activity	8, 1-hr	Annual	1-hr	Annual	24-hr	24-hr	3, 1-hr
YPP	Yellow Pine Pit	--	--	--	--	--	--	--
HFP	Hangar Flats Pit	--	--	--	--	--	--	--
WEP	West End Pit	--	--	--	0.42	0.42	4.65	--
BT	Bradley Tailings	--	--	--	--	--	--	--
YPPBL	Yellow Pine Pit Blasting	--	--	--	--	--	--	--
HFPBL	Hangar Flats Pit Blasting	--	--	--	--	--	--	--
WEPBL	West End Pit Blasting	219.49	0.49	5.90	0.10	0.10	1.76	0.01
BTBL	Bradley Tailings Blasting	--	--	--	--	--	--	--
STKP	PC Stockpile	--	--	--	--	--	--	--
FDRSF	Fiddle DRSF	--	--	--	--	--	--	--
HFDRSF	Hangar Flats DRSF	--	--	--	0.16	0.16	0.30	--
YPDRSF	Yellow Pine DRSF	--	--	--	--	--	--	--
WEDRSF	West End DRSF	--	--	--	--	--	--	--
TSF	Tailing Storage Facility	--	--	--	--	--	--	--
HR	Haul Roads	--	--	--	2.16	2.16	21.56	--
ACCRD	Access Roads	--	--	--	0.00	0.00	0.05	--
UGEXP	Scout Portal	--	--	--	0.000003	0.000003	0.000021	--
Total		219.49	0.49	5.90	2.844043237	2.84	28.31	0.01
		TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE

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Model Scenario W3

Open Pit Drilling

Activity Information

Operating schedule	365 day/yr		
Total drill holes per year	1,200 hole/day	2 blast/day	600 hole/blast

	Annual LOM-W3 rates	Material blasted	Drilling
YPP	Yellow Pine Pit	0 ton/day	0 hole/day
HFP	Hangar Flats Pit	0 ton/day	0 hole/day
WEP	West End Pit	180,000 ton/day	1,200 hole/day
BT	Bradley Tailings	0 ton/day	0 hole/day
	Total	180,000 ton/day	1,200 hole/day

Emission Factors

TSP (PM) 1.3 lb/hole *AP-42, Tab. 11.9-4, 7/98 (overburden)*

PM Scaling Factors

PM	1	
PM10	0.52	*AP-42, Tab. 11.9-1, 7/98 (blasting, overburden)*
PM2.5	0.03	*AP-42, Tab. 11.9-1, 7/98 (blasting, overburden)*

Emissions by Model ID

		PM_TPY	PM10_PPD	PM10_TPY	PM2.5_PPD	PM2.5_TPY
	Location of	PM	PM10		PM2.5	
Model ID	Activity	ton/yr	lb/day	ton/yr	lb/day	ton/yr
YPP	Yellow Pine Pit	--	--	--	--	--
HFP	Hangar Flats Pit	--	--	--	--	--
WEP	West End Pit	284.70	811.20	148.04	46.80	8.54
BT	Bradley Tailings	--	--	--	--	--
Total	Open Pit Drilling	284.70	811.20	148.04	46.80	8.54

Source Parameters (1)

		TYPE	UTM_E_M	UTM_N_M	ELEV_M	RELHT_M	PITVOL_M3	SXINIT_M	SYINIT_M	SIG_Z_M	ANGL_DEG	Area
		Source	UTM NAD 83		Elev.	Rel. Ht.	Pit Vol.	Len X	Len Y	S-z	Angle	
Model ID	Activity	Type	E m	N m	m	m	m^3	m	m	m	deg	m2
YPP	Yellow Pine Pit	AREA	631,160	4,975,865	1,832	4.75		882.0	882.0	4.42	-8.0	777906
HFP	Hangar Flats Pit	AREA	630,925	4,972,884	1,993	4.75		491.0	491.0	4.42	0.0	241069
WEP	West End Pit	AREA	632,398	4,976,290	2,192	4.75		376.2	376.2	4.42	0.0	141544

(1) *UTM - (Midas Gold 2017d); Rel. Ht. - (EPA 2012); Len X, Len Y, Angle - best-fit equal area rectangle; Elev. - (Midas Gold 2018g)*

Source Parameters (1)

		TYPE	UTM_E_M	UTM_N_M	ELEV_M	RELHT_M		SXINIT_M	SYINIT_M	SIG_Z_M	ANGL_DEG	
		Source	UTM NAD 83		Elev.	Rel. Ht.	Pit Vol.	Len X	Len Y	S-z	Angle	
Model ID	Activity	Type	E m	N m	m	m	m^3	m	m	m	deg	
BT	Bradley Tailings	AREA	630,110	4,972,105	2,012	4.75		820	420	4.42	0.0	344400

(1) *UTM, Elev. - (Midas Gold 2017d); Rel. Ht. - (EPA 2012); Len X, Len Y - best-fit equal area rectangle*

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Model Scenario W3

Open Pit Blasting

Activity Information

Operating schedule	365 day/yr	24 hr/day		
Blast area	80,795 ft^2/blast	*(Midas Gold 2017b)*		
Blast frequency	1 blast/hr	2 blast/day	730 blast/yr	
ANFO use	26 ton/blast	*(Midas Gold 2017b)*	18,980 ton/yr	

Annual LOM-W3 rates	Material blasted	Blasting	ANFO use	
Yellow Pine Pit	0 ton/day	0 blast/day	0 ton ANFO/hr	*(Midas Gold 2017b)*
Hangar Flats Pit	0 ton/day	0 blast/day	0 ton ANFO/hr	*(Midas Gold 2017b)*
West End Pit	180,000 ton/day	2 blast/day	26 ton ANFO/hr	*(Midas Gold 2017b)*
Bradley Tailings	0 ton/day	0 blast/day	0 ton ANFO/hr	
Total	180,000 ton/day	2 blast/day	26 ton ANFO/hr	

Emission Factors

Emission factor equation	TSP (lb/blast) = $0.000014 \times A^{1.5}$	*AP-42, Tab. 11.9-1, 7/98 (blasting, overburden)*		
A = Area per blast	80,795 ft^2			
TSP (PM)	321.52 lb/blast			
CO	67 lb/ton-ANFO	*AP-42, Tab. 13.3-1, 2/80 (ANFO)*		
NOX	0.9 kg/t-ANFO	*(CSIRO 2008)*		
	1.8 lb/ton-ANFO			
SO2	3.6E-03 lb/ton-ANFO	*Based on:* 6% *diesel content in ANFO*		*(Midas Gold 2017e)*

$$\frac{1.5\text{E-}05 \text{ lb S}}{\text{lb FO}} \times \frac{2 \text{ lb SO2}}{\text{lb S}} \times \frac{6\% \text{ lb FO}}{\text{lb ANFO}} \times \frac{2{,}000 \text{ lb ANFO}}{\text{ton ANFO}} = \frac{3.6\text{E-}03 \text{ lb SO2}}{\text{ton ANFO}}$$

PM Scaling Factors

PM10	0.52	*AP-42, Tab. 11.9-1, 7/98 (blasting, overburden)*
PM2.5	0.03	*AP-42, Tab. 11.9-1, 7/98 (blasting, overburden)*

Emissions by Model ID

		PM_TPY	PM10_PPD	PM10_TPY	PM2.5_PPD	PM2.5_TPY	CO_PPH	CO_TPY	NOX_PPH	NOX_TPY	SO2_PPH	SO2_TPY
		PM	PM10		PM2.5		CO		NOX[1]		SO2	
Model ID	Activity	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
YPPBL	Yellow Pine Pit Blasting	--	--	--	--	--	--	--	--	--	--	--
HFPBL	Hangar Flats Pit Blasting	--	--	--	--	--	--	--	--	--	--	--
WEPBL	West End Pit Blasting	117.35	334.38	61.02	19.29	3.52	1,742.00	635.83	46.80	17.08	0.0936	0.0342
BTBL	Bradley Tailings Blasting	--	--	--	--	--	--	--	--	--	--	--
Total	Open Pit Blasting	117.35	334.38	61.02	19.29	3.52	1,742	635.83	46.80	17.08	0.0936	0.0342

(1) *NO2/NOX:* 0.0357 *(CSIRO 2008)*

Source Parameters [1]

		TYPE	UTM_E_M	UTM_N_M	ELEV_M	RELHT_M	SIG_Y_M	SIG_Z_M
		Source	UTM NAD 83		Elev.	Rel. Ht.	S-y	S-z
Model ID	Activity	Type	E m	N m	m	m	m	m
YPPBL	Yellow Pine Pit Blasting	VOLUME	631,471	4,976,374	1,717	15	20.23	6.98
HFPBL	Hangar Flats Pit Blasting	VOLUME	631,171	4,973,129	1,891	15	20.23	6.98
WEPBL	West End Pit Blasting	VOLUME	632,586	4,976,478	1,994	15	20.23	6.98
BTBL	Bradley Tailings Blasting	VOLUME	630,520	4,972,315	2,012	15	20.23	6.98

(1) *UTM, Elev. - (Midas Gold 2017d); Rel. Ht. - (CSIRO 2008); S-y, S-z factors - (EPA 2016)*

			Sigma divider			
Blast height (BH)	30 m	*(CSIRO 2008)/5 for conservatism*	Rel. Ht.	2	of BH	*(EPA 2016)*
Blast width	87 m	*sqrt(blast area)*	S-y	4.3	of SL	*(EPA 2016)*
Blast depth	87 m	*sqrt(blast area)*	S-z	4.3	of BH	*(EPA 2016)*
Equal area side length (SL)	87 m					

Conversions

2,000 lb/ton
2.205 lb/kg
1.102 ton/t
3.281 ft/m

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Model Scenario W3
Onsite Hauling

Activity Information
Operating schedule 365 day/yr 24 hr/day

Hauling Routes, Production Rates and Distances

	Route Origin		Destination		Material Type	Material Hauled [1] Rate ton/day	One-Way Hauling [2] mi	Truck Loads [3] load/day	Total Travel [4] VMT/day
	Unpaved Roads								
YPP-	Yellow Pine Pit	YPP	Process PC	PC	Ore	--	1.84	--	--
YPP-	Yellow Pine Pit	YPP	PC Stockpile	STKP	Ore	--	1.80	--	--
YPP-	Yellow Pine Pit	YPP	Fiddle DRSF	FDRSF	Rock	--	2.81	--	--
YPP-	Yellow Pine Pit	YPP	Hangar Flats DRSF	HFDRSF	Rock	--	4.76	--	--
YPP-	Yellow Pine Pit	YPP	Yellow Pine DRSF	YPDRSF	Rock	--		--	--
YPP-	Yellow Pine Pit	YPP	West End DRSF	WEDRSF	Rock	--		--	--
HFP-	Hangar Flats Pit	HFP	Process PC	PC	Ore	--	3.16	--	--
HFP-	Hangar Flats Pit	HFP	PC Stockpile	STKP	Ore	--	3.12	--	--
HFP-	Hangar Flats Pit	HFP	Fiddle DRSF	FDRSF	Rock	--	4.83	--	--
HFP-	Hangar Flats Pit	HFP	Hangar Flats DRSF	HFDRSF	Rock	--	2.83	--	--
HFP-	Hangar Flats Pit	HFP	Yellow Pine DRSF	YPDRSF	Rock	--	3.72	--	--
HFP-	Hangar Flats Pit	HFP	West End DRSF	WEDRSF	Rock	--		--	--
WEP-	West End Pit	WEP	Process PC	PC	Ore	--	2.68	--	--
WEP-	West End Pit	WEP	PC Stockpile	STKP	Ore	--	2.63	--	--
WEP-	West End Pit	WEP	Fiddle DRSF	FDRSF	Rock	--	4.43	--	--
WEP-	West End Pit	WEP	Hangar Flats DRSF	HFDRSF	Rock	180,000	6.49	1,264	16,415
WEP-	West End Pit	WEP	Yellow Pine DRSF	YPDRSF	Rock	--	2.75	--	--
WEP-	West End Pit	WEP	West End DRSF	WEDRSF	Rock	--	3.07	--	--
BT-P	Bradley Tailings	BT	Process PC	PC	Ore	--		--	--
BT-S	Bradley Tailings	BT	PC Stockpile	STKP	Ore	--	3.59	--	--
BT-F	Bradley Tailings	BT	Fiddle DRSF	FDRSF	Rock	--		--	--
BT-H	Bradley Tailings	BT	Hangar Flats DRSF	HFDRSF	Rock	--	0.60	--	--
BT-Y	Bradley Tailings	BT	Yellow Pine DRSF	YPDRSF	Rock	--		--	--
BT-W	Bradley Tailings	BT	West End DRSF	WEDRSF	Rock	--		--	--
	Total					180,000			16,415

(1) *(Midas Gold 2019b)*
(2) *(Midas Gold 2017d)*
(3) *See truck fleet information below.*
(4) *Truck loads × One-way hauling ×* 2 *(round-trip)*

Truck Fleet

Truck	Payload Capacity [1] ton	Empty Weight [1] ton	Units [2]	Average Weight ton
Cat 789D	201.8	155.7	20	256.6
Cat 740B	43.5	37.6	12	59.4
Weighted Average	142.4		32	182.6

(1) *789D: (Caterpillar 2016), page 10-14*
740B: (Caterpillar 2011), page 13
(2) *(Midas Gold 2017b)* *(Midas Gold 2019b)*

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Model Scenario W3

Onsite Hauling - continued

Hauling Emissions by Route

					Material Hauled	PM_TPY	PM10_PPD	PM10_TPY	PM2.5_PPD	PM2.5_TPY
	Route				Material	PM	PM10		PM2.5	
	Origin		Destination		Type	ton/yr	lb/day	ton/yr	lb/day	ton/yr
	Unpaved Roads									
YPP-	Yellow Pine Pit	YPP	Process PC	PC	Ore	--	--	--	--	--
YPP-	Yellow Pine Pit	YPP	PC Stockpile	STKP	Ore	--	--	--	--	--
YPP-	Yellow Pine Pit	YPP	Fiddle DRSF	FDRSF	Rock	--	--	--	--	--
YPP-	Yellow Pine Pit	YPP	Hangar Flats DRSF	HFDRSF	Rock	--	--	--	--	--
YPP-	Yellow Pine Pit	YPP	Yellow Pine DRSF	YPDRSF	Rock	--	--	--	--	--
YPP-	Yellow Pine Pit	YPP	West End DRSF	WEDRSF	Rock	--	--	--	--	--
HFP-	Hangar Flats Pit	HFP	Process PC	PC	Ore	--	--	--	--	--
HFP-	Hangar Flats Pit	HFP	PC Stockpile	STKP	Ore	--	--	--	--	--
HFP-	Hangar Flats Pit	HFP	Fiddle DRSF	FDRSF	Rock	--	--	--	--	--
HFP-	Hangar Flats Pit	HFP	Hangar Flats DRSF	HFDRSF	Rock	--	--	--	--	--
HFP-	Hangar Flats Pit	HFP	Yellow Pine DRSF	YPDRSF	Rock	--	--	--	--	--
HFP-	Hangar Flats Pit	HFP	West End DRSF	WEDRSF	Rock	--	--	--	--	--
WEP	West End Pit	WEP	Process PC	PC	Ore	--	--	--	--	--
WEP	West End Pit	WEP	PC Stockpile	STKP	Ore	--	--	--	--	--
WEP	West End Pit	WEP	Fiddle DRSF	FDRSF	Rock	--	--	--	--	--
WEP	West End Pit	WEP	Hangar Flats DRSF	HFDRSF	Rock	2,901.27	3,906.57	712.95	390.66	71.29
WEP	West End Pit	WEP	Yellow Pine DRSF	YPDRSF	Rock	--	--	--	--	--
WEP	West End Pit	WEP	West End DRSF	WEDRSF	Rock	--	--	--	--	--
BT-P	Bradley Tailings	BT	Process PC	PC	Ore	--	--	--	--	--
BT-S	Bradley Tailings	BT	PC Stockpile	STKP	Ore	--	--	--	--	--
BT-F	Bradley Tailings	BT	Fiddle DRSF	FDRSF	Rock	--	--	--	--	--
BT-H	Bradley Tailings	BT	Hangar Flats DRSF	HFDRSF	Rock	--	--	--	--	--
BT-Y	Bradley Tailings	BT	Yellow Pine DRSF	YPDRSF	Rock	--	--	--	--	--
BT-W	Bradley Tailings	BT	West End DRSF	WEDRSF	Rock	--	--	--	--	--
	Pit Subtotal					2,901.27	3,906.57	712.95	390.66	71.29

Emission Factors

Unpaved roads

Annual emission factor equation	$E = k(s/12)^a (W/3)^b [(365-P)/365]$				*AP-42, Sec. 13.2.2, Eq. 1a, 11/06*
Daily emission factor equation	$E = k(s/12)^a (W/3)^b$				*AP-42, Sec. 13.2.2, Eq. 1a, 11/06*
s = Surface material silt content	4	%			*(Midas Gold 2015)*
W = Mean vehicle weight	182.6	ton			
P = Days/year with ≥0.01 in precip	120	day/yr			*AP-42 Fig. 13.2.2-1, 11/06*

	PM	PM10	PM2.5		
k = Size-specific empirical constant	4.9	1.5	0.15		*AP-42, Tab. 13.2.2-2, Eqs. 1a and 2, 11/06*
a = Size-specific empirical constant	0.7	0.9	0.9		*AP-42, Tab. 13.2.2-2, Eqs. 1a and 2, 11/06*
b = Size-specific empirical constant	0.45	0.45	0.45		*AP-42, Tab. 13.2.2-2, Eqs. 1a and 2, 11/06*
E = Size-specific emission factor					
Annual	9.68	2.38	0.24	lb/VMT	
Daily	14.43	3.55	0.35	lb/VMT	

Emission Controls

Unpaved roads - periodic application of water and chemical dust suppressant

Control efficiency: 90% *(Air Sciences 2018)* for chemical suppressant; annual and daily

33% *Conservative estimate* for watering; daily only

Model Scenario W3
Onsite Hauling - continued

Emissions by Area

		PM_TPY	PM10_PPD	PM10_TPY	PM2.5_PPD	PM2.5_TPY
		PM	PM10		PM2.5	
Area ID	Activity	ton/yr	lb/day	ton/yr	lb/day	ton/yr
HR	Onsite Hauling	2,901.27	3,899.39	712.95	389.94	71.29

See worksheet ROADS for haul road (HR) emissions by Model ID.

Source Parameters [1]

		TYPE	UTM_E_M	UTM_N_M	ELEV_M	RELHT_M	SIG_Y_M	SIG_Z_M
		Source	UTM NAD 83		Elev.	Rel. Ht.	S-y	S-z
Model ID	Activity	Type	E m	N m	m	m	m	m
HR	Onsite Hauling	VOLUME	*See worksheet: ROADS*			4.75	15.14	4.42

[1] *UTM, Elev. - (Midas Gold 2017d); Rel. Ht., Sy, Sz - (EPA 2012)*

Truck	Height		Reference
Cat 789D	6.5	m	*(Caterpillar 2016), page 10-14*
Cat 740B	4.1	m	*(Caterpillar 2011), page 14*
Weighted	5.58	m	
Road width (RW)	26.5	m	*(Midas Gold 2016), Fig. 9-1*

Plume Parameter	Calculation	Value (m)	Const.
Plume top (PT) - unpaved	1.7 x VH	9.49	1.7
Release height - unpaved	0.5 x PT	4.75	0.5
Plume width (PW)	RW + 6 m	32.55	6
Sigma-z - unpaved	PT / 2.15	4.42	2.15
Sigma-y	PW / 2.15	15.14	2.15

(EPA 2012)

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Model Scenario W3

Material Load / Unload

Activity Information

Operating schedule 365 day/yr

Throughput Rates

Model ID	Location of Activity	No. of Xfers	Rate ton/day (chk)	Total Rate ton/day	Xfer Description
YPP	Yellow Pine Pit	1	0	0	Load
HFP	Hangar Flats Pit	1	0	0	Load
WEP	West End Pit	1	180,000	180,000	Load
BT	Bradley Tailings	1	0	0	Load
PC	Process PC [(1)]	0	0	0	Unload
STKP	PC Stockpile	2	0	0	Unload & Reload
FDRSF	Fiddle DRSF	1	0	0	Unload
HFDRSF	Hangar Flats DRSF	1	180,000	180,000	Unload
YPDRSF	Yellow Pine DRSF	1	0	0	Unload
WEDRSF	West End DRSF	1	0	0	Unload

(1) *Ore unloading at primary crusher is accounted for in process sources*

Emission Factors

		PM	PM10	PM2.5		
k = Particle size multiplier		0.74	0.35	0.053		*AP-42, Sec. 13.2.4, Pg. 4, 11/06*
E = Emission facto	Load	0.00021	0.0001	0.000015	lb/ton	*AP-42, Tab. 11.19.2-2, 8/04 (truck loading - crushed stone)*
	Unload	0.00003	0.000016	0.0000024	lb/ton	*AP-42, Tab. 11.19.2-2, 8/04 (truck unloading - fragmented stone)*
	Unload &	0.00012	0.00006	0.00001	lb/ton	*Average of loading and unloading EF*

Emissions by Model ID

Model ID	Location of Activity	Total Rate ton/day (chk)	PM ton/yr (PM_TPY)	PM10 lb/day (PM10_PPD)	PM10 ton/yr (PM10_TPY)	PM2.5 lb/day (PM2.5_PPD)	PM2.5 ton/yr (PM2.5_TPY)
YPP	Yellow Pine Pit	--	--	--	--	--	--
HFP	Hangar Flats Pit	--	--	--	--	--	--
WEP	West End Pit	180,000	6.95	18.00	3.29	2.73	0.50
BT	Bradley Tailings	--	--	--	--	--	--
PC	Process PC	--	--	--	--	--	--
STKP	PC Stockpile	--	--	--	--	--	--
FDRSF	Fiddle DRSF	--	--	--	--	--	--
HFDRSF	Hangar Flats DRSF	180,000	1.11	2.88	0.53	0.44	0.08
YPDRSF	Yellow Pine DRSF	--	--	--	--	--	--
WEDRSF	West End DRSF	--	--	--	--	--	--
Total	Material Load / Unload	360,000	8.06	20.88	3.81	3.16	0.58

Model Scenario W3

Access Road

Activity Information

Operating schedule 365 day/yr 24 hr/day

Maintenance Equipment, Light and Heavy Truck Specifications and Traffic

Equipment	Equipment Model[1]	Notes	AADT[2]	Annual Traffic	Travel[3] VMT/yr	Vehicle Weight[4] Empty ton	Gross ton	Average Weight ton
Maintenance Equipment	Caterpillar 725C		3	1,095	1,772	25.6	51.6	38.6
Light Vehicles	Ford F-350	5	19	6,935	11,223	4.0	7.9	6.0
Heavy Trucks	Caterpillar CT660 (8X6)	6	45	16,425	26,581	10.1	34.5	22.3
Weighted Average Vehicle Weight								18.4

(1) *Appropriate equipment model from (Midas Gold 2017b)*
(2) *AADT = annual average daily traffic (Midas Gold 2016) Tab. 12-2;*
75% of total maintanance AADT (4) assigned to non-grader maintenance equipment and 25% assigned to grader
(3) *Based on access road length of:* 1.6 *mi (within project boundary)* *(Midas Gold 2017d)*
(4) *(Caterpillar 2016)/manufacturer specifications*
(5) *Light vehicles include visitor and employee vehicles.*
(6) *Heavy trucks include buses, supply, product shipment and trash trucks . 2917 lime delivery trips ((Midas Gold 2017a) Tab. 12-4) are excluded.*

Emission Factors

Annual emission factor equation	$E = k(s/12)^a (W/3)^b [(365-P)/365]$				*AP-42, Sec. 13.2.2, Eq. 1a, 11/06*
Daily emission factor equation	$E = k(s/12)^a (W/3)^b$				*AP-42, Sec. 13.2.2, Eq. 1a, 11/06*
s = Surface material silt content	4 %				*(Midas Gold 2015)*
W = Mean vehicle weight	18.42 ton				
P = Days/year with ≥0.01 in precip.	120 day/yr				*AP-42 Fig. 13.2.2-1, 11/06*
	PM	PM10	PM2.5		
k = Size-specific empirical constant	4.9	1.5	0.15		*AP-42, Tab. 13.2.2-2, Eqs. 1a and 2, 11/06*
a = Size-specific empirical constant	0.7	0.9	0.9		*AP-42, Tab. 13.2.2-2, Eqs. 1a and 2, 11/06*
b = Size-specific empirical constant	0.45	0.45	0.45		*AP-42, Tab. 13.2.2-2, Eqs. 1a and 2, 11/06*
E = Size-specific emission factor					
Annual	3.45	0.85	0.08	lb/VMT	
Daily	5.14	1.26	0.13	lb/VMT	

Emission Controls

Periodic application of water and chemical dust suppressant

Control efficiency: 90% *for chemical suppressant; annual and daily* *See Onsite Hauling*

33% *for watering; daily only*

Emissions by Area

				PM_TPY	PM10_PPD	PM10_TPY	PM2.5_PPD	PM2.5_TPY
				PM	PM10		PM2.5	
Area ID	Activity	VMT/day	VMT/yr	ton/yr	lb/day	ton/yr	lb/day	ton/yr
ACCRD	Vehicle Travel	108.4	39,576	6.83	9.17	1.68	0.92	0.17

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Model Scenario W3

Access Road

Grading Traffic

Equipment	AADT	Annual Traffic	VMT/day	VMT/yr
Grader	1	365	1.6	591

Emission Factors *Detailed emission factor calculations are provided on page 10*

PM 4.3 lb/VMT
PM10 1.3 lb/VMT
PM2.5 0.1 lb/VMT

Emission Controls

Periodic application of water and chemical dust suppressant

Control efficiency: 90% *See Onsite Hauling*

Emissions by Area

				PM_TPY	PM10_PPD	PM10_TPY	PM2.5_PPD	PM2.5_TPY
				PM	PM10		PM2.5	
Area ID	Activity	VMT/day	VMT/yr	ton/yr	lb/day	ton/yr	lb/day	ton/yr
ACCRD	Grading	1.6	591	0.13	0.21	0.04	0.02	0.004

Source Parameters [1]

		TYPE	UTM_E_M	UTM_N_M	ELEV_M	RELHT_M	SIG_Y_M	SIG_Z_M
		Source	UTM NAD 83		Elev.	Rel. Ht.	Width	S-z
Model ID	Activity	Type	E m	N m	m	m	m	m
ACCRD	*Access Roads*	LINE		*Variable*		2.98	6.10	2.77

[1] *UTM, Elev. - (Midas Gold 2017d); Rel. Ht., Sz - (EPA 2012)*

Vehicle	Height	
Average	3.5	m
Grader	3.7	m
HD Truck	3.6	m
LD Truck	3.2	m
Road width (RW)	6.1	m
Road length	2,590	m

(Midas Gold 2016), Fig. 7-2

Plume Parameter	Calculation	Value (m)	Const.
Plume top (PT) - unpaved	1.7 x VH	5.95	1.7
Release height - unpaved	0.5 x PT	2.98	0.5
Plume width (PW)	RW + 6 m	12.096	6
Sigma-z - unpaved	PT / 2.15	2.77	2.15

(EPA 2012)

Source Parameters

See Onsite Hauling for source parameters.

Model Scenario W3

Wind Erosion
Activity Information
Operating schedule 365 day/yr
Erodible Area

Model ID	Location of Activity		Surface Type	Total Rate ton/yr	Erodible Area [3] Flat acre/yr	Erodible Area [3] Pile acre/yr	Surface Footprint
STKP	PC Stockpile		Pile	--		--	13
FDRSF	Fiddle DRSF		Pile	--		--	148
HFDRSF	Hangar Flats DRSF		Pile	180,000		20	140
YPDRSF	Yellow Pine DRSF		Pile	--		--	152
WEDRSF	West End DRSF		Pile	--		--	70
BT	Bradley Tailings		Flat		85		85
TSF	Tailing Storage Facility		Flat		331		331
HR	Haul Roads	(1)	Flat		582		582
ACCRD	Access Roads	(2)	Flat		4		4

(1) *Based on scenario haul road length of* *55 mi* *and width of* *26.5 m* *(Midas Gold 2016), Fig. 9-1*
(2) *Based on access road (within boundary) length of* *1.6 mi* *and width of* *6.1 m* *(Midas Gold 2016), Fig. 7-2*
(3) *Pile surface area calculations:*

Truck dump (TD) size	142.4	ton	
Material density	150.2	lb/ft^3	*(Midas Gold 2017b), Average Ore & Waste (YP, HF, WE, BT)*
	0.075	ton/ft^3	
Material specific volume	13.3	ft^3/ton	
TD volume (V)	1,896	ft^3	
Conical surface calculations			
Side slope	38	deg	*Typical*
	0.7	rad	

Conical surface area (SA) Π × r × (h^2 + r^2)^0.5
Conical volume (V) (Π × h × r^2) ÷ 3
Conical base radius r = s × cos(slope)
Conical height h = s × sin(slope)
Sloped side length s = (h^2 + r^2)^0.5
Solution of conical volume equation
Replacing h and r with s × sin(slope) and s × cos(slope), respectively:

s = [3 × V/(pi × sin(slope) × cos^2(slope)]^(1/3)	16.8	ft
r	13.2	ft
h	10.3	ft
SA	698	ft^2
	0.016	acre
	1.1E-4	acre/ton-TD

Scaling Factors

PM10	0.5	*AP-42, Pg. 13.2.5-3, 11/06*
PM2.5	0.075	*AP-42, Pg. 13.2.5-3, 11/06*

Model Scenario W3

Surface Exploration

Activity Information

Operating schedule	365	day/yr	24	hr/day	
Duration	14	yr	168	mo	*(Midas Gold 2018a)*
Construction disturbance	13	acres	0.08	acre/mo	*(Midas Gold 2016), p. 13-1*
Total wet drilling (maximum)	700	holes	50	holes/yr	*(Midas Gold 2016), p. 13-1*
Material blasted	724.9	ton/hole			

Construction Emission Calculations

Emission Factors

PM 1.2 ton/acre per month of activity *AP-42, Page 13.2.3-1, 1/95*

PM Scaling Factors

PM10 0.35 *AP-42, Sec. 13.2.4, Pg. 4, 11/06*

PM2.5 0.053 *AP-42, Sec. 13.2.4, Pg. 4, 11/06*

Construction Emissions

Activity	PM	PM10		PM2.5	
	ton/yr	lb/day	ton/yr	lb/day	ton/yr
Drill Pad and Temporary Road Construction	1.1	2.1	0.4	0.3	0.1

Wet Drilling Emission Calculations

Emission Factors

PM10 8.0E-5 lb/ton (material blasted) *AP-42, Table 11.19.2-2 (wet drilling), Rev. 8/04*

0.058 lb/hole

PM Scaling Factors

PM	0.74	*AP-42, Sec. 13.2.4-4, 11/06*
PM10	0.35	*AP-42, Sec. 13.2.4-4, 11/06*
PM2.5	0.053	*AP-42, Sec. 13.2.4-4, 11/06*

Wet Drilling Emissions

Activity	PM	PM10		PM2.5	
	ton/yr	lb/day	ton/yr	lb/day	ton/yr
Wet Drilling	0.0031	0.0079	0.0015	0.0012	0.00022

Surface Exploration Total Emissions

PM	PM10		PM2.5	
ton/yr	lb/day	ton/yr	lb/day	ton/yr
1.12	2.14	0.39	0.32	0.06

Emissions by Model ID [1]

		chk PM_TPY	chk PM10_PPD	chk PM10_TPY	chk PM2.5_PPD	chk PM2.5_TPY
		PM	PM10		PM2.5	
Model ID	Activity	ton/yr	lb/day	ton/yr	lb/day	ton/yr
WEP	Surface Exploration	1.12	2.14	0.39	0.32	0.06

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Model Scenario W3

Underground Exploration
Activity Information
Operating schedule 365 day/yr
Wet drilling 25 holes/yr *(Midas Gold 2020)*

Wet Drilling Emission Calculations
Emission Factors
PM10 8.0E-5 lb/ton (material blasted) *AP-42, Table 11.19.2-2 (wet drilling), Rev. 8/04*
0.058 lb/hole

PM Scaling Factors
PM 0.74 *AP-42, Sec. 13.2.4-4, 11/06*
PM10 0.35 *AP-42, Sec. 13.2.4-4, 11/06*
PM2.5 0.053 *AP-42, Sec. 13.2.4-4, 11/06*

Wet Drilling Emissions

Activity	PM	PM10		PM2.5	
	ton/yr	lb/day	ton/yr	lb/day	ton/yr
Wet Drilling	0.0015	0.0040	0.0007	0.0006	0.00011

Source Parameters [1]

		TYPE	UTM_E_M	UTM_N_M	ELEV_M	RELHT_M	SIG_Y_M	SIG_Z_M	SXINIT_M	SYINIT_M
		Source	UTM NAD 83		Elev.	Rel. Ht.	S-y	S-z	Length	Width
Model ID	Activity	Type	E m	N m	m	m	m	m	m	m
UGEXP	*Scout Portal*	AREA	632,362	4,973,690	2018	0	0	0	4.88	4.88

UTM, Elev. - (Midas Gold 2017d)

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Fuel Burning Equipment Emissions

	Source	MMBtu/hr	Flow Rate dscfm (dscfm)	PM lb/hr (PM_pph)	PM gr/dscf	PM Limit [(1)] gr/dscf	
Sb1	Sb Dryer (2.72 MMBtu/hr Propane-Fired)	2.72	461	0.021	0.005	0.015	In Compliance
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	17	2,881	0.130	0.005	0.015	In Compliance
CKB	Carbon Regeneration Kiln (Burners)	2.255	382	0.017	0.005	0.015	In Compliance
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	0.1	17	0.001	0.005	0.015	In Compliance
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	5	847	0.038	0.005	0.015	In Compliance
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	4	678	0.031	0.005	0.015	In Compliance
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	4	678	0.031	0.005	0.015	In Compliance
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	4	678	0.031	0.005	0.015	In Compliance
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	0.25	42	0.002	0.005	0.015	In Compliance
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	0.25	42	0.002	0.005	0.015	In Compliance
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	0.25	42	0.002	0.005	0.015	In Compliance
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	0.5	85	0.004	0.005	0.015	In Compliance
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	2	339	0.015	0.005	0.015	In Compliance
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	3	508	0.023	0.005	0.015	In Compliance
LKC	PFR Shaft Lime Kiln Combustion	22.0	8,000	0.169	0.002	0.015	In Compliance
EDG1	Camp Emergency Generator (Mfr. Yr. >2007; diesel)	9.39	1,259	0.441	0.041	0.05	In Compliance
EDG2	Plant Emergency Generator #1 (Mfr. Yr. >2007; diesel)	9.39	1,259	0.441	0.041	0.05	In Compliance
EDG3	Plant Emergency Generator #2 (Mfr. Yr. >2007; diesel)	9.39	1,259	0.441	0.041	0.05	In Compliance
EDFP	Mill Fire Pump (Mfr. Yr. >2009; diesel)	1.88	252	0.088	0.041	0.05	In Compliance

(1) *58.01.01.676, Fuel Type: Gas, Emission Oxygen 3%*

Baghouse/Bin Vent Filter PM Emission Concentration

	Source	Control (control)	Flow Rate dscfm (dscfm)	PM lb/hr (PM_pph)	PM gr/dscf	PM10 lb/hr (PM10_pph)	PM10 gr/dscf
Sb2	Sb Bagging	Baghouse (BH1)	800	0.118	0.017	0.118	0.017
MF	Induction Melting Furnace	Baghouse (BH2)	3,500	2.839	0.095	2.839	0.095
LSBM	Limestone Ball Mill	Baghouse (BH3)	13,000	1.902	0.017	1.596	0.014
LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	Baghouse (BH4)	8,000	0.915	0.013	0.915	0.013
LCR	Lime Mill Crushing and associated transfers In and Out	Baghouse (BH5)	2,000	0.284	0.017	0.239	0.014
LS1L	Mill Lime Silo #1 Loading	Bin Vent Filter	700	0.059	0.010	0.020	0.003
MillS2L	Mill Lime Silo #2 Loading	Bin Vent Filter	700	0.059	0.010	0.020	0.003
ACS1L	AC Lime Silo #1 Loading	Bin Vent Filter	1,400	0.119	0.010	0.041	0.003
ACS2L	AC Lime Silo #2 Loading	Bin Vent Filter	1,400	0.119	0.010	0.041	0.003
ACS3L	AC Lime Silo #3 Loading	Bin Vent Filter	1,400	0.119	0.010	0.041	0.003
ACS4L	AC Lime Silo #4 Loading	Bin Vent Filter	1,400	0.119	0.010	0.041	0.003
CS1L	Cement/Shotcrete Silo #1 Loading	Bin Vent Filter	930	0.079	0.010	0.027	0.003
CS2L	Cement/Shotcrete Silo #2 Loading	Bin Vent Filter	930	0.079	0.010	0.027	0.003
LSL	Pebble Lime Silo Loading via Bucket Elevator	Bin Vent Filter	70	0.006	0.010	0.006	0.010

PROJECT TITLE: Stibnite Gold Project
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SUBJECT: **Process Activity Uncontrolled Emissions**

SOURCE DESCRIPTION		HOURLY EMISSIONS							DAILY EMISSIONS							ANNUAL EMISSIONS						
Model	Source Description	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC
ID		lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
OC1	Loader Transfer of Ore to Grizzly	3.13	1.15	0.18					75.00	27.50	4.25					13.69	5.02	0.78				
OC2	Grizzly to Apron Feeder	3.13	1.15	0.18					75.00	27.50	4.25					13.69	5.02	0.78				
OC3	Apron Feeder to Dribble Conveyor	3.13	1.15	0.18					75.00	27.50	4.25					13.69	5.02	0.78				
OC4	Apron Feeder to Vibrating Grizzly	3.13	1.15	0.18					75.00	27.50	4.25					13.69	5.02	0.78				
OC5	Dribble Conveyor to Vibrating Grizzly	3.13	1.15	0.18					75.00	27.50	4.25					13.69	5.02	0.78				
OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	3.13	1.15	0.18					75.00	27.50	4.25					13.69	5.02	0.78				
OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	5.63	2.50	0.38					135	60.00	9.00					24.64	10.95	1.64				
OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	3.13	1.15	0.18					75.00	27.50	4.25					13.69	5.02	0.78				
OC9	Stockpile Transfers to Reclaim Conveyors	3.45	1.27	0.20					82.80	30.36	4.69					15.11	5.54	0.86				
OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	3.45	1.27	0.20					82.80	30.36	4.69					15.11	5.54	0.86				
OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	3.45	1.27	0.20					82.80	30.36	4.69					15.11	5.54	0.86				
OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	6.21	2.76	0.41					149	66.24	9.94					27.20	12.09	1.81				
OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	3.45	1.27	0.20					82.80	30.36	4.69					15.11	5.54	0.86				
LS1L	Mill Lime Silo #1 Loading	43.80	28.20	4.27					183	118	17.79					1.60	1.03	0.16				
LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	9.60E-2	5.60E-2	8.40E-3					1.20	0.70	0.11					1.05E-2	6.13E-3	9.19E-4				
MillS2L	Mill Lime Silo #2 Loading	43.80	28.20	4.27					183	118	17.79					1.60	1.03	0.16				
MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	9.60E-2	5.60E-2	8.40E-3					1.20	0.70	0.11					1.05E-2	6.13E-3	9.19E-4				
Sb1	Sb Dryer (2.72 MMBtu/hr Propane-Fired)	2.08E-2	2.08E-2	2.08E-2	0.22	0.39	4.73E-2	2.38E-2	0.50	0.50	0.50	5.35	9.27	1.13	0.57	9.11E-2	9.11E-2	9.11E-2	0.98	1.69	0.21	0.10
Sb2	Sb Bagging	1.18	1.18	1.18					28.27	28.27	28.27					5.16	5.16	5.16				
AC	Autoclave	16.92	16.92	16.92			0.65		406	406	406			15.66		74.10	74.10	74.10			2.86	
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	0.13	0.13	0.13	1.39	2.42	0.30	0.15	0.13	0.13	0.13	1.39	2.42	0.30	0.15	1.95E-3	1.95E-3	1.95E-3	2.09E-2	3.62E-2	4.43E-3	2.23E-3
ACS1L	AC Lime Silo #1 Loading	87.60	56.40	8.54					730	470	71.17					6.39	4.11	0.62				
ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	9.60E-2	5.60E-2	8.00E-3					2.30	1.34	0.19					4.20E-2	2.45E-2	3.50E-3				
ACS2L	AC Lime Silo #2 Loading	87.60	56.40	8.54					730	470	71.17					6.39	4.11	0.62				
ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	9.60E-2	5.60E-2	8.00E-3					2.30	1.34	0.19					4.20E-2	2.45E-2	3.50E-3				
ACS3L	AC Lime Silo #3 Loading	87.60	56.40	8.54					730	470	71.17					6.39	4.11	0.62				

PROJECT TITLE: Stibnite Gold Project
PROJECT NO.: 335-1-4
SUBJECT: **Process Activity Uncontrolled Emissions**

SOURCE DESCRIPTION		HOURLY EMISSIONS							DAILY EMISSIONS							ANNUAL EMISSIONS						
Model	Source Description	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC
ID		lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	9.60E-2	5.60E-2	8.00E-3					2.30	1.34	0.19					4.20E-2	2.45E-2	3.50E-3				
ACS4L	AC Lime Silo #4 Loading	87.60	56.40	8.54					365	235	35.59					3.19	2.06	0.31				
ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	9.60E-2	5.60E-2	8.00E-3					2.30	1.34	0.19					2.10E-2	1.23E-2	1.75E-3				
CKD	Carbon Regeneration Kiln (Drum)	1.40	1.40	1.40	0.12	1.20E-2		0.11	33.60	33.60	33.60	2.88	0.29	0.00E+0	2.64	6.13	6.13	6.13	0.53	5.26E-2		0.48
CKB	Carbon Regeneration Kiln (Burners)	1.73E-2	1.73E-2	1.73E-2	0.18	0.32	3.92E-2	1.97E-2	0.41	0.41	0.41	4.44	7.69	0.94	0.47	7.56E-2	7.56E-2	7.56E-2	0.81	1.40	0.17	8.64E-2
EW	Electrowinning Cells and Pregnant Solution Tank																					
MR	Mercury Retort																					
MF	Induction Melting Furnace	5.68	5.68	5.68					68.14	68.14	68.14					1.77	1.77	1.77				
EDG1	Camp Emergency Generator (Mfr. Yr. >2007; diesel)	0.44	0.44	0.44	7.72	14.11	1.45E-2	2.87	0.44	0.44	0.44	7.72	14.11	1.45E-2	2.87	2.20E-2	2.20E-2	2.20E-2	0.39	0.71	7.24E-4	0.14
EDG2	Plant Emergency Generator #1 (Mfr. Yr. >2007; diesel)	0.44	0.44	0.44	7.72	14.11	1.45E-2	2.87	0.44	0.44	0.44	7.72	14.11	1.45E-2	2.87	2.20E-2	2.20E-2	2.20E-2	0.39	0.71	7.24E-4	0.14
EDG3	Plant Emergency Generator #2 (Mfr. Yr. >2007; diesel)	0.44	0.44	0.44	7.72	14.11	1.45E-2	2.87	0.44	0.44	0.44	7.72	14.11	1.45E-2	2.87	2.20E-2	2.20E-2	2.20E-2	0.39	0.71	7.24E-4	0.14
EDFP	Mill Fire Pump (Mfr. Yr. >2009; diesel)	8.82E-2	8.82E-2	8.82E-2	1.54	1.76	2.90E-3	1.76	8.82E-2	8.82E-2	8.82E-2	1.54	1.76	2.90E-3	1.76	4.41E-3	4.41E-3	4.41E-3	7.72E-2	8.82E-2	1.45E-4	8.82E-2
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7.65E-4	7.65E-4	7.65E-4	8.20E-3	1.42E-2	1.74E-3	8.74E-4	1.84E-2	1.84E-2	1.84E-2	0.20	0.34	4.17E-2	2.10E-2	3.35E-3	3.35E-3	3.35E-3	3.59E-2	6.22E-2	7.61E-3	3.83E-3
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	3.83E-2	3.83E-2	3.83E-2	0.41	0.71	8.69E-2	4.37E-2	0.92	0.92	0.92	9.84	17.05	2.09	1.05	0.17	0.17	0.17	1.80	3.11	0.38	0.19
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	3.06E-2	3.06E-2	3.06E-2	0.33	0.57	6.95E-2	3.50E-2	0.73	0.73	0.73	7.87	13.64	1.67	0.84	0.13	0.13	0.13	1.44	2.49	0.30	0.15
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	3.06E-2	3.06E-2	3.06E-2	0.33	0.57	6.95E-2	3.50E-2	0.73	0.73	0.73	7.87	13.64	1.67	0.84	0.13	0.13	0.13	1.44	2.49	0.30	0.15
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	3.06E-2	3.06E-2	3.06E-2	0.33	0.57	6.95E-2	3.50E-2	0.73	0.73	0.73	7.87	13.64	1.67	0.84	0.13	0.13	0.13	1.44	2.49	0.30	0.15
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	1.91E-3	1.91E-3	1.91E-3	2.05E-2	3.55E-2	4.34E-3	2.19E-3	4.59E-2	4.59E-2	4.59E-2	0.49	0.85	0.10	5.25E-2	8.38E-3	8.38E-3	8.38E-3	8.98E-2	0.16	1.90E-2	9.57E-3
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	1.91E-3	1.91E-3	1.91E-3	2.05E-2	3.55E-2	4.34E-3	2.19E-3	4.59E-2	4.59E-2	4.59E-2	0.49	0.85	0.10	5.25E-2	8.38E-3	8.38E-3	8.38E-3	8.98E-2	0.16	1.90E-2	9.57E-3
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	1.91E-3	1.91E-3	1.91E-3	2.05E-2	3.55E-2	4.34E-3	2.19E-3	4.59E-2	4.59E-2	4.59E-2	0.49	0.85	0.10	5.25E-2	8.38E-3	8.38E-3	8.38E-3	8.98E-2	0.16	1.90E-2	9.57E-3
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	3.83E-3	3.83E-3	3.83E-3	4.10E-2	7.10E-2	8.69E-3	4.37E-3	9.18E-2	9.18E-2	9.18E-2	0.98	1.70	0.21	0.10	1.68E-2	1.68E-2	1.68E-2	0.18	0.31	3.81E-2	1.91E-2
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	1.53E-2	1.53E-2	1.53E-2	0.16	0.28	3.48E-2	1.75E-2	0.37	0.37	0.37	3.93	6.82	0.83	0.42	6.70E-2	6.70E-2	6.70E-2	0.72	1.24	0.15	7.66E-2
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	2.30E-2	2.30E-2	2.30E-2	0.25	0.43	5.21E-2	2.62E-2	0.55	0.55	0.55	5.90	10.23	1.25	0.63	0.10	0.10	0.10	1.08	1.87	0.23	0.11
PSL	Prill Silos Loading (2 x 100 ton)	4.00	1.40	0.21					4.00	1.40	0.21					7.30E-2	2.56E-2	3.87E-3				
PSU	Prill Silos Unloading (2 x 100 ton)	4.00	1.40	0.21					4.00	1.40	0.21					7.30E-2	2.56E-2	3.87E-3				
CS1L	Cement/Shotcrete Silo #1 Loading	58.40	37.60	5.69					58.40	37.60	5.69					21.90	14.10	2.14				
CS1U	Cement/Shotcrete Silo #1 Unloading	9.60E-2	5.60E-2	8.00E-3					0.38	0.22	3.20E-2					0.14	8.40E-2	1.20E-2				
CS2L	Cement/Shotcrete Silo #2 Loading	58.40	37.60	5.69					58.40	37.60	5.69					21.90	14.10	2.14				
CS2U	Cement/Shotcrete Silo #2 Unloading	9.60E-2	5.60E-2	8.00E-3					0.38	0.22	3.20E-2					0.14	8.40E-2	1.20E-2				
CAL	Aggregate Bin Loading	0.69	0.33	5.00E-2					16.56	7.92	1.20					1.73	0.83	0.13				
CAU	Aggregate Bin Unloading	0.69	0.33	5.00E-2					16.56	7.92	1.20					1.73	0.83	0.13				
CM	Central Mixer Loading	11.44	3.12	0.47					45.76	12.48	1.89					17.16	4.68	0.71				

PROJECT TITLE: Stibnite Gold Project
PROJECT NO.: 335-1-4
SUBJECT: **Process Activity Uncontrolled Emissions**

SOURCE DESCRIPTION		HOURLY EMISSIONS							DAILY EMISSIONS							ANNUAL EMISSIONS						
Model ID	Source Description	PM lb/hr	PM_{10} lb/hr	$PM_{2.5}$ lb/hr	CO lb/hr	NOx lb/hr	SO_2 lb/hr	VOC lb/hr	PM lb/day	PM_{10} lb/day	$PM_{2.5}$ lb/day	CO lb/day	NOx lb/day	SO_2 lb/day	VOC lb/day	PM ton/yr	PM_{10} ton/yr	$PM_{2.5}$ ton/yr	CO ton/yr	NOx ton/yr	SO_2 ton/yr	VOC ton/yr
TG1	Mine Site Gasoline Tank #1							0.22							5.25							0.96
TG2	Mine Site Gasoline Tank #2							0.22							5.25							0.96
TD3	Mine Site Diesel Tank #3							1.67E-3							4.00E-2							7.30E-3
TD4	Mine Site Diesel Tank #4							1.67E-3							4.00E-2							7.30E-3
TD5	Mine Site Diesel Tank #5							1.67E-3							4.00E-2							7.30E-3
TD6	Mine Site Diesel Tank #6							1.67E-3							4.00E-2							7.30E-3
TD7	Mine Site Diesel Tank #7							1.67E-3							4.00E-2							7.30E-3
TD8	Mine Site Diesel Tank #8							1.67E-3							4.00E-2							7.30E-3
TD9	Mine Site Diesel Tank #9							1.67E-3							4.00E-2							7.30E-3
TD10	Mine Site Diesel Tank #10							1.67E-3							4.00E-2							7.30E-3
PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	6.32	2.31	0.35					152	55.40	8.42					27.67	10.11	1.54				
PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	6.32	2.31	0.35					152	55.40	8.42					27.67	10.11	1.54				
TRUE	LIME PRODUCTION																					
LS1	Limestone transfer to Primary Crusher Hopper	0.14	5.18E-2	8.00E-3					3.39	1.24	0.19					0.48	0.17	2.70E-2				
LS2	Primary Crushing and Associated Transfers In and Out	0.25	0.11	1.69E-2					6.10	2.71	0.41					0.86	0.38	5.72E-2				
LS3	Primary Screening and Associated Transfers In and Out	1.18	0.41	6.21E-2					28.25	9.83	1.49					3.97	1.38	0.21				
LS4	Secondary Crushing and Associated Transfers In and Out	0.25	0.11	1.69E-2					6.10	2.71	0.41					0.86	0.38	5.72E-2				
LS5	Secondary Screening and Associated Transfers In and Out	1.18	0.41	6.21E-2					28.25	9.83	1.49					3.97	1.38	0.21				
LS6	Limestone transfer to Ball Mill Feed Bin	0.14	5.18E-2	8.00E-3					3.39	1.24	0.19					0.48	0.17	2.70E-2				
LS7	Limestone transfer to Ball Mill Feed Conveyor	0.14	5.18E-2	8.00E-3					3.39	1.24	0.19					0.48	0.17	2.70E-2				
LS8	Ball Mill Feed transfer to Ball Mill	0.14	5.18E-2	8.00E-3					3.39	1.24	0.19					0.48	0.17	2.70E-2				
LSBM	Limestone Ball Mill	19.02	15.96	5.70					456	383	137					64.22	53.89	19.23				
LS9	Limestone transfer to Kiln Feed Bin	3.34E-2	1.22E-2	1.89E-3					0.80	0.29	4.54E-2					0.12	4.55E-2	7.03E-3				
LS10	Limestone transfer to Lime Kiln Feed Conveyor	3.34E-2	1.22E-2	1.89E-3					0.80	0.29	4.54E-2					0.12	4.55E-2	7.03E-3				
LS11	Fines Screening and Associated Transfers In and Out	0.28	9.68E-2	1.47E-2					6.68	2.32	0.35					1.03	0.36	5.46E-2				
LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	3.34E-2	1.22E-2	1.89E-3					0.80	0.29	4.54E-2					0.12	4.55E-2	7.03E-3				
LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	9.15	9.15	9.15	3.17	1.69	8.45E-3		220	220	220	76.05	40.56	0.20		34.05	34.05	34.05	11.78	6.29	3.14E-2	
LKC	PFR Shaft Lime Kiln Combustion	0.17	0.17	0.17	1.81	3.13	0.38	0.19	4.05	4.05	4.05	43.36	75.15	9.19	4.62	0.63	0.63	0.63	6.72	11.65	1.42	0.72
LCR	Lime Mill Crushing and associated transfers In and Out	2.84	2.39	0.85					68.28	57.29	20.45					10.58	8.88	3.17				
LSL	Pebble Lime Silo Loading via Bucket Elevator	6.20E-2	6.20E-2	6.20E-2					1.49	1.49	1.49					0.23	0.23	0.23				
LSU	Pebble Lime Silo discharge to Lime Slaker	6.20E-3	6.20E-3	6.20E-3					0.15	0.15	0.15					2.30E-2	2.30E-2	2.30E-2				
Total		**699**	**443**	**102**	**33.50**	**55.37**	**1.88**	**11.51**	**5,964**	**3,786**	**1,316**	**204**	**259**	**37.21**	**34.53**	**565**	**342**	**169**	**30.45**	**37.85**	**6.48**	**4.78**

SOURCE DESCRIPTION		OPERATING LIMITS							EMISSION FACTORS									EMISSION CON	
Model ID	Source Description	Design Throughput unit/hr	unit/day	unit/yr	units	Material	hr/yr	Throughput reference	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC	unit	reference	control system	efficiency
OC1	Loader Transfer of Ore to Grizzly	1,042	25,000	9,125,000	ton	Ore	8,760	(Midas Gold 2016), Sec. 10.1	0.00014	4.6E-05	1.3E-05					lb/ton	AP-42, Table 11.19.2-2 (08/04) Conv. transfer - ctrl.	Water Sprays	
OC2	Grizzly to Apron Feeder	1,042	25,000	9,125,000	ton	Ore	8,760		0.00014	4.6E-05	1.3E-05					lb/ton	AP-42, Table 11.19.2-2 (08/04) Conv. transfer - ctrl.	Moisture Carry-Over	
OC3	Apron Feeder to Dribble Conveyor	1,042	25,000	9,125,000	ton	Ore	8,760		0.00014	4.6E-05	1.3E-05					lb/ton	AP-42, Table 11.19.2-2 (08/04) Conv. transfer - ctrl.	Moisture Carry-Over	
OC4	Apron Feeder to Vibrating Grizzly	1,042	25,000	9,125,000	ton	Ore	8,760		0.00014	4.6E-05	1.3E-05					lb/ton	AP-42, Table 11.19.2-2 (08/04) Conv. transfer - ctrl.	Moisture Carry-Over	
OC5	Dribble Conveyor to Vibrating Grizzly	1,042	25,000	9,125,000	ton	Ore	8,760		0.00014	4.6E-05	1.3E-05					lb/ton	AP-42, Table 11.19.2-2 (08/04) Conv. transfer - ctrl.	Moisture Carry-Over	
OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	1,042	25,000	9,125,000	ton	Ore	8,760		0.00014	4.6E-05	1.3E-05					lb/ton	AP-42, Table 11.19.2-2 (08/04) Conv. transfer - ctrl.	Moisture Carry-Over	
OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	1,042	25,000	9,125,000	ton	Ore	8,760		0.0012	0.00054	0.0001					lb/ton	AP-42, Table 11.19.2-2 (08/04) Tert. Crushing - ctrl.	Water Sprays	
OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	1,042	25,000	9,125,000	ton	Ore	8,760		0.00014	4.6E-05	1.3E-05					lb/ton	AP-42, Table 11.19.2-2 (08/04) Conv. transfer - ctrl.	Moisture Carry-Over	
OC9	Stockpile Transfers to Reclaim Conveyors	1,150	27,600	10,074,000	ton	Ore	8,760	(M3 2017b)	0.003	0.0011	0.00017					lb/ton	AP-42, Table 11.19.2-2 (08/04) Conv. transfer - unctrl.; PM2.5 Ch. 13.2.4	Undergrnd	80%
OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	1,150	27,600	10,074,000	ton	Ore	8,760		0.003	0.0011	0.00017					lb/ton	AP-42, Table 11.19.2-2 (08/04) Conv. transfer - unctrl.; PM2.5 Ch. 13.2.4	Undergrnd	80%
OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	1,150	27,600	10,074,000	ton	Ore	8,760		0.003	0.0011	0.00017					lb/ton	AP-42, Table 11.19.2-2 (08/04) Conv. transfer - unctrl.; PM2.5 Ch. 13.2.4	Enclosure	80%
OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	1,150	27,600	10,074,000	ton	Ore	8,760		0.0012	0.00054	0.0001					lb/ton	AP-42, Table 11.19.2-2 (08/04) Tert. Crushing - ctrl.	Water Sprays	
OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	1,150	27,600	10,074,000	ton	Ore	8,760		0.00014	4.6E-05	1.3E-05					lb/ton	AP-42, Table 11.19.2-2 (08/04) Conv. transfer - ctrl.	Moisture Carry-Over	
LS1L	Mill Lime Silo #1 Loading	60	250	4,375	ton	Lime	8,760	(Midas Gold 2016), Sec. 12.3 (facility-wide silo capacity)	0.00099	0.00034	0.00005					lb/ton	AP-42, Table 11.12-2 (6/06), pneumatic loading-ctrl.; PM2.5 Ch. 13.2.4	Bin Vent Filter	
LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	20	250	4,375	ton	Lime	8,760	Typical Ind. Oper.	0.0048	0.0028	0.00042					lb/ton	AP-42, Table 11.12-2 (6/06), weigh hopper loading-unctrl.; PM2.5 Ch. 13.2.4	None	0%
MillS2L	Mill Lime Silo #2 Loading	60	250	4,375	ton	Lime	8,760	(Midas Gold 2016), Sec. 12.3 (facility-wide silo capacity)	0.00099	0.00034	0.00005					lb/ton	AP-42, Table 11.12-2 (6/06), pneumatic loading-ctrl.; PM2.5 Ch. 13.2.4	Bin Vent Filter	
MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	20	250	4,375	ton	Lime	8,760	Typical Ind. Oper.	0.0048	0.0028	0.00042					lb/ton	AP-42, Table 11.12-2 (6/06), weigh hopper loading-unctrl.; PM2.5 Ch. 13.2.4	None	0%
Sb1	Sb Dryer (2.72 MMBtu/hr Propane-Fired)	2.72	65.28	23,827	MMBtu	Propane	8,760	(M3 2017d)	0.00765	0.00765	0.00765	0.0820	0.142	0.01738	0.00874	lb/MMBtu	AP-42, Table 1.5-1 (07/08) Com. Boilers; SO2 - 15.9 gr/100ft^3 & 91,500 Btu/gal	None	NA
Sb2	Sb Bagging	4.5	108	39,420	ton	Stib. Conc.	8,760	(M3 2017d)	0.118	0.118	0.118					lb/hr	Based on NDEP-BAPC Permit for Clay Bagging Operation (Hectatone) (NDEP 2015b)	Baghouse (BH1)	NA
AC	Autoclave	290	6,960	2,540,400	ton	Float Conc.	8,760	(M3 2017b)	5.075	5.075	5.075			0.6525		lb/hr	Based on NDEP-BAPC Permits/test data for Autoclaves: PM & SO2 - [Goldstrike (NDEP 2012)]. Negligible CO due to no organic carbon in the feed (M3 2017a)	Wet Scrubber (WS1)	NA
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	17	17	510	MMBtu	Propane	30	(M3 2017b)	0.00765	0.00765	0.00765	0.0820	0.142	0.01738	0.00874	lb/MMBtu	AP-42, Table 1.5-1 (07/08) Ind. Boilers; SO2 - 15.9 gr/100ft^3 & 91,500 Btu/gal	None	NA
ACS1L	AC Lime Silo #1 Loading	120	1,000	17,500	ton	Lime	8,760	(Midas Gold 2016), Sec. 12.3 (facility-wide silo capacity)	0.00099	0.00034	0.00005					lb/ton	AP-42, Table 11.12-2 (6/06), pneumatic loading-ctrl.; PM2.5 Ch. 13.2.4	Bin Vent Filter	
ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	20	480	17,500	ton	Lime	8,760	Typical Ind. Oper.	0.0048	0.0028	0.0004					lb/ton	AP-42, Table 11.12-2 (6/06), weigh hopper loading-unctrl.; PM2.5 Ch. 13.2.4	None	0%
ACS2L	AC Lime Silo #2 Loading	120	1,000	17,500	ton	Lime	8,760	(Midas Gold 2016), Sec. 12.3 (facility-wide silo capacity)	0.00099	0.00034	0.00005					lb/ton	AP-42, Table 11.12-2 (6/06), pneumatic loading-ctrl.; PM2.5 Ch. 13.2.4	Bin Vent Filter	
ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	20	480	17,500	ton	Lime	8,760	Typical Ind. Oper.	0.0048	0.0028	0.0004					lb/ton	AP-42, Table 11.12-2 (6/06), weigh hopper loading-unctrl.; PM2.5 Ch. 13.2.4	None	0%
ACS3L	AC Lime Silo #3 Loading	120	1,000	17,500	ton	Lime	8,760	(Midas Gold 2016), Sec. 12.3 (facility-wide silo capacity)	0.00099	0.00034	0.00005					lb/ton	AP-42, Table 11.12-2 (6/06), pneumatic loading-ctrl.; PM2.5 Ch. 13.2.4	Bin Vent Filter	
ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	20	480	17,500	ton	Lime	8,760	Typical Ind. Oper.	0.0048	0.0028	0.0004					lb/ton	AP-42, Table 11.12-2 (6/06), weigh hopper loading-unctrl.; PM2.5 Ch. 13.2.4	None	0%
ACS4L	AC Lime Silo #4 Loading	120	500	8,750	ton	Lime	8,760	(Midas Gold 2016), Sec. 12.3 (facility-wide silo capacity)	0.00099	0.00034	0.00005					lb/ton	AP-42, Table 11.12-2 (6/06), pneumatic loading-ctrl.; PM2.5 Ch. 13.2.4	Bin Vent Filter	
ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	20	480	8,750	ton	Lime	8,760	Typical Ind. Oper.	0.0048	0.0028	0.0004					lb/ton	AP-42, Table 11.12-2 (6/06), weigh hopper loading-unctrl.; PM2.5 Ch. 13.2.4	None	0%
CKD	Carbon Regeneration Kiln (Drum)	0.3	7.2	2,628	ton	Carbon	8,760	(M3 2017b)	0.42	0.42	0.42	0.12	0.012		0.11	lb/hr	Based on NDEP-BAPC Permit for Carbon Regeneration Kiln [Goldstrike (NDEP 2012)]	Wet Scrubber (WS2) / Carbon Filter (CA1)	NA
CKB	Carbon Regeneration Kiln (Burners)	2.255	54.12	19,754	MMBtu	Propane	8,760	(M3 2017b)	0.00765	0.00765	0.00765	0.0820	0.142	0.01738	0.00874	lb/MMBtu	AP-42, Table 1.5-1 (07/08) Com. Boilers; SO2 - 15.9 gr/100ft^3 & 91,500 Btu/gal	None	NA
EW	Electrowinning Cells and Pregnant Solution Tank	100	24 hr		gpm	Au Sol.	8,760	Typical Ind. Oper.	0.07	0.07	0.07					lb/hr	Based on similar source stack test data and 5× safety factor (APT 2016)	Shared Carbon Filter (CA2)	
MR	Mercury Retort	0.5/batch	24 hr	21	ton	Au Conc.	1,248	(M3 2017b) & (M3 2017a)	0.01	0.01	0.01					lb/hr	Based on similar source stack test data and 5× safety factor (APT 2017)	Condenser / Carbon Filter (CA3)	
MF	Induction Melting Furnace	0.5/batch	12 hr	21	ton	Au Conc.	624	(M3 2017b) & (M3 2017a)	2.84	2.84	2.84					lb/hr	Based on IDAPA 58.01.01.701 PM Weight Limit	Baghouse (BH2) / Carbon Filter (CA4)	NA

SOURCE DESCRIPTION		TROLS	HOURLY EMISSIONS							DAILY EMISSIONS							ANNUAL EMISSIONS								
Model	Source Description	reference	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC	UTM E	UTM N
ID			lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	m	m
OC1	Loader Transfer of Ore to Grizzly	Control efficiency included in emission factor	0.146	0.0479	0.0135					3.50	1.15	0.325					0.639	0.210	0.0593					632,045	4,974,583
OC2	Grizzly to Apron Feeder	Control efficiency included in emission factor	0.146	0.0479	0.0135					3.50	1.15	0.325					0.639	0.210	0.0593					632,045	4,974,583
OC3	Apron Feeder to Dribble Conveyor	Control efficiency included in emission factor	0.146	0.0479	0.0135					3.50	1.15	0.325					0.639	0.210	0.0593					632,045	4,974,583
OC4	Apron Feeder to Vibrating Grizzly	Control efficiency included in emission factor	0.146	0.0479	0.0135					3.50	1.15	0.325					0.639	0.210	0.0593					632,045	4,974,583
OC5	Dribble Conveyor to Vibrating Grizzly	Control efficiency included in emission factor	0.146	0.0479	0.0135					3.50	1.15	0.325					0.639	0.210	0.0593					632,045	4,974,583
OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	Control efficiency included in emission factor	0.146	0.0479	0.0135					3.50	1.15	0.325					0.639	0.210	0.0593					632,045	4,974,583
OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	Control efficiency included in emission factor	1.25	0.563	0.104					30.0	13.5	2.50					5.48	2.46	0.456					632,045	4,974,583
OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	Control efficiency included in emission factor	0.146	0.0479	0.0135					3.50	1.15	0.325					0.639	0.210	0.0593					631,947	4,974,520
OC9	Stockpile Transfers to Reclaim Conveyors	Based on AP-42, Chapter 13.2.4, reduction in EF due to wind speed reduction	0.690	0.253	0.0391					16.6	6.07	0.938					3.02	1.11	0.171					631,947	4,974,520
OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	Based on AP-42, Chapter 13.2.4, reduction in EF due to wind speed reduction	0.690	0.253	0.0391					16.6	6.07	0.938					3.02	1.11	0.171					631,947	4,974,520
OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	Based on AP-42, Chapter 13.2.4, reduction in EF due to wind speed reduction	0.690	0.253	0.0391					16.6	6.07	0.94					3.02	1.11	0.171					632,113	4,974,243
OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	Control efficiency included in emission factor	1.380	0.621	0.1150					33.12	14.90	2.760					6.04	2.720	0.504					632,028	4,974,187
OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	Control efficiency included in emission factor	0.1610	0.0529	0.01495					3.864	1.270	0.3588					0.705	0.2317	0.0655					632,028	4,974,187
LS1L	Mill Lime Silo #1 Loading	Control efficiency included in emission factor	0.0594	0.0204	0.00300					0.248	0.0850	0.0125					0.00217	7.44E-4	1.09E-4					632,095	4,974,272
LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor		0.0960	0.0560	0.00840					1.20	0.700	0.105					0.0105	0.00613	9.19E-4					632,095	4,974,272
MillS2L	Mill Lime Silo #2 Loading	Control efficiency included in emission factor	0.0594	0.0204	0.00300					0.248	0.0850	0.0125					0.00217	7.44E-4	1.09E-4					632,090	4,974,282
MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor		0.0960	0.0560	0.00840					1.20	0.700	0.105					0.0105	0.00613	9.19E-4					632,090	4,974,282
Sb1	Sb Dryer (2.72 MMBtu/hr Propane-Fired)		0.0208	0.0208	0.0208	0.223	0.386	0.0473	0.0238	0.499	0.499	0.499	5.35	9.27	1.13	0.571	0.0911	0.0911	0.0911	0.977	1.69	0.207	0.104	632,231	4,974,183
Sb2	Sb Bagging	Control efficiency included in emission factor	0.118	0.118	0.118					2.83	2.83	2.83					0.517	0.517	0.517					632,208	4,974,221
AC	Autoclave	PM control efficiency included in emission factor	5.08	5.08	5.08			0.653		122	122	122			15.7		22.2	22.2	22.2			2.86		632,229	4,974,096
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)		0.130	0.130	0.130	1.39	2.42	0.295	0.149	0.130	0.130	0.130	1.39	2.42	0.295	0.149	0.00195	0.00195	0.00195	0.0209	0.0362	0.00443	0.00223	632,261	4,974,116
ACS1L	AC Lime Silo #1 Loading	Control efficiency included in emission factor	0.119	0.0408	0.00600					0.990	0.340	0.0500					0.00866	0.00298	4.38E-4					632,267	4,974,124
ACS1U	AC Lime Silo #1 Unloading to Lime Slaker		0.0960	0.0560	0.00800					2.30	1.34	0.192					0.0420	0.0245	0.00350					632,267	4,974,124
ACS2L	AC Lime Silo #2 Loading	Control efficiency included in emission factor	0.119	0.0408	0.00600					0.990	0.340	0.0500					0.00866	0.00298	4.38E-4					632,257	4,974,140
ACS2U	AC Lime Silo #2 Unloading to Lime Slaker		0.0960	0.0560	0.00800					2.30	1.34	0.192					0.0420	0.0245	0.00350					632,257	4,974,140
ACS3L	AC Lime Silo #3 Loading	Control efficiency included in emission factor	0.119	0.0408	0.00600					0.990	0.340	0.0500					0.00866	0.00298	4.38E-4					632,248	4,974,156
ACS3U	AC Lime Silo #3 Unloading to Lime Slaker		0.0960	0.0560	0.00800					2.30	1.34	0.192					0.0420	0.0245	0.00350					632,248	4,974,156
ACS4L	AC Lime Silo #4 Loading	Control efficiency included in emission factor	0.119	0.0408	0.00600					0.495	0.170	0.0250					0.00433	0.00149	2.19E-4					632,238	4,974,171
ACS42U	AC Lime Silo #4 Unloading to Lime Slaker		0.0960	0.0560	0.00800					2.30	1.34	0.192					0.0210	0.0123	0.00175					632,238	4,974,171
CKD	Carbon Regeneration Kiln (Drum)	PM control efficiency included in emission factor	0.420	0.420	0.420	0.120	0.0120		0.110	10.1	10.1	10.1	2.88	0.288	0	2.64	1.84	1.84	1.84	0.526	0.0526		0.482	632,013	4,974,051
CKB	Carbon Regeneration Kiln (Burners)		0.0173	0.0173	0.0173	0.185	0.320	0.0392	0.0197	0.414	0.414	0.414	4.44	7.69	0.940	0.473	0.0756	0.0756	0.0756	0.810	1.40	0.172	0.0864	631,998	4,974,042
EW	Electrowinning Cells and Pregnant Solution Tank		0.07	0.07	0.07					1.68	1.68	1.68					0.31	0.31	0.31					631,983	4,974,033
MR	Mercury Retort		0.01	0.01	0.01					0.24	0.24	0.24					0.006	0.006	0.006					632,003	4,974,001
MF	Induction Melting Furnace	Control efficiency included in emission factor	2.84	2.84	2.84					34.1	34.1	34.1					0.89	0.89	0.89					632,032	4,974,019

SOURCE DESCRIPTION		TROLS	HOURLY EMISSIONS							DAILY EMISSIONS							ANNUAL EMISSIONS								
Model	Source Description	reference	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC	UTM E	UTM N
ID			lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	m	m
EDG1	Camp Emergency Generator (Mfr. Yr. >2007; diesel)		0.441	0.441	0.441	7.72	14.1	0.0145	2.87	0.441	0.441	0.441	7.72	14.11	0.01448	2.866	0.0220	0.0220	0.0220	0.386	0.705	7.24E-4	0.143	634,274	4,972,050
EDG2	Plant Emergency Generator #1 (Mfr. Yr. >2007; diesel)		0.441	0.441	0.441	7.72	14.1	0.0145	2.87	0.441	0.441	0.441	7.72	14.11	0.01448	2.866	0.0220	0.0220	0.0220	0.386	0.705	7.24E-4	0.143	632,105	4,974,154
EDG3	Plant Emergency Generator #2 (Mfr. Yr. >2007; diesel)		0.441	0.441	0.441	7.72	14.1	0.0145	2.87	0.441	0.441	0.441	7.72	14.11	0.01448	2.866	0.0220	0.0220	0.0220	0.386	0.705	7.24E-4	0.143	632,109	4,974,148
EDFP	Mill Fire Pump (Mfr. Yr. >2009; diesel)		0.0882	0.0882	0.0882	1.54	1.76	0.00290	1.76	0.0882	0.0882	0.0882	1.543	1.764	2.90E-3	1.764	0.00441	0.00441	0.00441	0.0772	0.0882	1.45E-4	0.0882	632,113	4,974,141
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)		7.65E-4	7.65E-4	7.65E-4	0.00820	0.0142	0.00174	8.74E-4	0.0184	0.0184	0.0184	0.197	0.341	0.0417	0.0210	0.00335	0.00335	0.00335	0.0359	0.0622	0.00761	0.00383	632,216	4,974,118
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)		0.0383	0.0383	0.0383	0.410	0.710	0.0869	0.0437	0.918	0.918	0.918	9.84	17.0	2.09	1.05	0.168	0.168	0.168	1.80	3.11	0.381	0.191	632,017	4,974,010
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)		0.0306	0.0306	0.0306	0.328	0.568	0.0695	0.0350	0.734	0.734	0.734	7.87	13.6	1.67	0.839	0.134	0.134	0.134	1.44	2.49	0.304	0.153	632,287	4,974,227
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)		0.0306	0.0306	0.0306	0.328	0.568	0.0695	0.0350	0.734	0.734	0.734	7.87	13.6	1.67	0.839	0.134	0.134	0.134	1.44	2.49	0.304	0.153	632,288	4,974,228
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)		0.0306	0.0306	0.0306	0.328	0.568	0.0695	0.0350	0.734	0.734	0.734	7.87	13.6	1.67	0.839	0.134	0.134	0.134	1.44	2.49	0.304	0.153	632,168	4,974,191
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)		0.00191	0.00191	0.00191	0.0205	0.0355	0.00434	0.00219	0.0459	0.0459	0.0459	0.492	0.852	0.104	0.0525	0.00838	0.00838	0.00838	0.0898	0.156	0.0190	0.00957	632,238	4,974,130
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)		0.00191	0.00191	0.00191	0.0205	0.0355	0.00434	0.00219	0.0459	0.0459	0.0459	0.492	0.852	0.104	0.0525	0.00838	0.00838	0.00838	0.0898	0.156	0.0190	0.00957	632,008	4,974,026
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)		0.00191	0.00191	0.00191	0.0205	0.0355	0.00434	0.00219	0.0459	0.0459	0.0459	0.492	0.852	0.104	0.0525	0.00838	0.00838	0.00838	0.0898	0.156	0.0190	0.00957	632,038	4,973,751
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)		0.00383	0.00383	0.00383	0.0410	0.0710	0.00869	0.00437	0.0918	0.0918	0.0918	0.984	1.70	0.209	0.105	0.0168	0.0168	0.0168	0.180	0.311	0.0381	0.0191	631,889	4,973,472
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)		0.0153	0.0153	0.0153	0.164	0.284	0.0348	0.0175	0.367	0.367	0.367	3.93	6.82	0.834	0.420	0.0670	0.0670	0.0670	0.718	1.24	0.152	0.0766	631,848	4,973,398
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)		0.0230	0.0230	0.0230	0.246	0.426	0.0521	0.0262	0.551	0.551	0.551	5.90	10.2	1.25	0.630	0.101	0.101	0.101	1.08	1.87	0.228	0.115	632,060	4,973,664
PSL	Prill Silos Loading (2 x 100 ton)		4.00	1.40	0.212					4.00	1.40	0.212					0.0730	0.0256	0.00387					632,346	4,973,500
PSU	Prill Silos Unloading (2 x 100 ton)		4.00	1.40	0.212					4.00	1.40	0.212					0.0730	0.0256	0.00387					632,346	4,973,500
CS1L	Cement/Shotcrete Silo #1 Loading	Control efficiency included in emission factor	0.0792	0.0272	0.00400					0.0792	0.0272	0.00400					0.0297	0.0102	0.00150					632,095	4,974,272
CS1U	Cement/Shotcrete Silo #1 Unloading		0.0960	0.0560	0.00800					0.384	0.224	0.0320					0.144	0.0840	0.0120					632,095	4,974,272
CS2L	Cement/Shotcrete Silo #2 Loading	Control efficiency included in emission factor	0.0792	0.0272	0.00400					0.0792	0.0272	0.00400					0.0297	0.0102	0.00150					632,095	4,974,272
CS2U	Cement/Shotcrete Silo #2 Unloading		0.0960	0.0560	0.00800					0.384	0.224	0.0320					0.144	0.0840	0.0120					632,095	4,974,272
CAL	Aggregate Bin Loading		0.690	0.330	0.0500					16.6	7.92	1.20					1.73	0.825	0.125					632,095	4,974,272
CAU	Aggregate Bin Unloading		0.690	0.330	0.0500					16.6	7.92	1.20					1.73	0.825	0.125					632,095	4,974,272
CM	Central Mixer Loading	Control efficiency included in emission factor	0.368	0.110	0.0160					1.47	0.440	0.0640					0.552	0.165	0.0240					632,095	4,974,272
TG1	Mine Site Gasoline Tank #1								0.219							5.25							0.957		
TG2	Mine Site Gasoline Tank #2								0.219							5.25							0.957		
TD3	Mine Site Diesel Tank #3								0.00167							0.0400							0.00730		
TD4	Mine Site Diesel Tank #4								0.00167							0.0400							0.00730		
TD5	Mine Site Diesel Tank #5								0.00167							0.0400							0.00730		
TD6	Mine Site Diesel Tank #6								0.00167							0.0400							0.00730		
TD7	Mine Site Diesel Tank #7								0.00167							0.0400							0.00730		
TD8	Mine Site Diesel Tank #8								0.00167							0.0400							0.00730		

SOURCE DESCRIPTION		TROLS	HOURLY EMISSIONS							DAILY EMISSIONS							ANNUAL EMISSIONS								
Model	Source Description	reference	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC	PM	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC	UTM E	UTM N
ID			lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	m	m
TD9	Mine Site Diesel Tank #9								0.00167							0.0400							0.00730		
TD10	Mine Site Diesel Tank #10								0.00167							0.0400							0.00730		
PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	Control efficiency included in emission factor	0.63	0.233	0.030					15.0	5.6	0.73					2.74	1.02	0.133					632,348	4,973,429
PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conveyor transfers)	Control efficiency included in emission factor	0.625	0.2325	0.0304					15.00	5.58	0.730					2.738	1.018	0.1332					632,348	4,973,369
TRUE	LIME PRODUCTION																								
LS1	Limestone transfer to Primary Crusher Hopper		0.141	0.0518	0.0080					3.39	1.24	0.192	0	0	0	0	0.477	0.175	0.0270					632,239	4,974,256
LS2	Primary Crushing and Associated Transfers In and Out		0.254	0.113	0.0169					6.10	2.71	0.407	0	0	0	0	0.86	0.381	0.057					632,239	4,974,256
LS3	Primary Screening and Associated Transfers In and Out		1.18	0.410	0.0621					28.2	9.8	1.49	0	0	0	0	3.97	1.38	0.210					632,239	4,974,256
LS4	Secondary Crushing and Associated Transfers In and Out		0.254	0.113	0.0169					6.10	2.71	0.407	0	0	0	0	0.86	0.381	0.057					632,227	4,974,268
LS5	Secondary Screening and Associated Transfers In and Out		1.18	0.410	0.0621					28.2	9.8	1.49	0	0	0	0	3.97	1.38	0.210					632,227	4,974,268
LS6	Limestone transfer to Ball Mill Feed Bin		0.141	0.0518	0.0080					3.39	1.24	0.192	0	0	0	0	0.477	0.175	0.0270					632,181	4,974,307
LS7	Limestone transfer to Ball Mill Feed Conveyor		0.141	0.0518	0.00800					3.39	1.243	0.192	0	0	0	0	0.477	0.175	0.0270					632,181	4,974,307
LS8	Ball Mill Feed transfer to Ball Mill		0.141	0.0518	0.00800					3.39	1.243	0.192	0	0	0	0	0.477	0.175	0.0270					632,200	4,974,273
LSBM	Limestone Ball Mill	Control efficiency included in emission factor	1.902	1.5959	0.56964					45.65	38.303	13.671	0	0	0	0	6.422	5.389	1.9233					632,215	4,974,248
LS9	Limestone transfer to Kiln Feed Bin		0.033	0.0122	0.0019					0.80	0.29	0.045	0	0	0	0	0.124	0.045	0.0070					632,169	4,974,325
LS10	Limestone transfer to Lime Kiln Feed Conveyor		0.033	0.0122	0.00189					0.80	0.294	0.045	0	0	0	0	0.124	0.045	0.0070					632,169	4,974,325
LS11	Fines Screening and Associated Transfers In and Out		0.28	0.097	0.0147					6.7	2.3	0.35	0	0	0	0	1.03	0.36	0.055					632,151	4,974,314
LS12	Kiln Feed transfer to PFR Shaft Lime Kiln		0.033	0.0122	0.00189					0.80	0.294	0.045	0	0	0	0	0.124	0.045	0.0070					632,056	4,974,285
LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	Control efficiency included in emission factor	0.915	0.915	0.915	3.17	1.69	0.0085		21.97	21.97	21.97	76.05	40.6	0.203	0.00	3.40	3.40	3.40	11.8	6.29	0.0314		632,057	4,974,265
LKC	PFR Shaft Lime Kiln Combustion		0.169	0.169	0.169	1.81	3.13	0.383	0.193	4.05	4.05	4.05	43.4	75.2	9.2	4.62	0.627	0.627	0.627	6.72	11.6	1.42	0.72	632,057	4,974,265
LCR	Lime Mill Crushing and associated transfers In and Out	Control efficiency included in emission factor	0.28448	0.23871	0.08520					6.828	5.729	2.045	0	0	0	0	1.0580	0.8878	0.3169					632,073	4,974,233
LSL	Pebble Lime Silo Loading via Bucket Elevator	Control efficiency included in emission factor	6.20E-3	6.20E-3	6.20E-3					0.1487	0.1487	0.1487	0	0	0	0	0.02305	0.02305	0.02305					632,069	4,974,206
LSU	Pebble Lime Silo discharge to Lime Slaker	Control efficiency included in emission factor	6.20E-4	6.20E-4	6.20E-4					0.0149	0.0149	0.0149	0	0	0	0	0.00230	0.00230	0.00230					632,069	4,974,206
Total			**35.8**	**21.7**	**13.4**	**33.5**	**55.4**	**1.88**	**11.5**	**578**	**376**	**241**	**204**	**259**	**37.2**	**34.5**	**87.3**	**56.3**	**36.4**	**30.5**	**37.9**	**6.48**	**4.78**		

UPDATED EMISSIONS INVENTORIES AS SUBMITTED ON 10/8/2021

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
	PROJECT NO: 335-20-3	PAGE: 1 OF: 19 SHEET: Calcs
AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary lb/hr ton/yr

		Emissions(1)									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk-15	chk	chk	chk	chk	chk

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
	PROJECT NO: 335-20-3	PAGE: 1 OF: 19 SHEET: Calcs
AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk-15	chk	chk	chk	chk	chk

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
	PROJECT NO: 335-20-3	PAGE: 2 OF: 19 SHEET: Calcs
AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

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

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
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AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

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

PROPANE COMBUSTION

Source Data

Source ID	Description	MMBtu/day	MMBtu/yr
Lime Process Heating			
LKC	PFR Shaft Lime Kiln Combustion	529.0	163,935
Ore Process Heating			
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	17.0	510
CKB	Carbon Regeneration Kiln (Burners)	54.1	19,754
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	2.4	876
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	120.0	43,800
Subtotal		193.5	64,940
HVAC			
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	96.0	35,040
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	96.0	35,040
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	96.0	35,040
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	12.0	4,380
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	48.0	17,520
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	72.0	26,280
Subtotal		438.0	159,870

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
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Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary

		Emissions[1]						lb/hr	ton/yr		
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk-15	chk	chk	chk	chk	chk

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
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AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk-15	chk	chk	chk	chk	chk

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

2,000 lb/ton

8,760 hr/yr

24 hr/day

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Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[(1)]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

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

PROPANE COMBUSTION

Source Data

Source ID	Description	MMBtu/day	MMBtu/yr
Lime Process Heating			
LKC	PFR Shaft Lime Kiln Combustion	529.0	163,935
Ore Process Heating			
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	17.0	510
CKB	Carbon Regeneration Kiln (Burners)	54.1	19,754
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	2.4	876
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	120.0	43,800
Subtotal		193.5	64,940
HVAC			
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	96.0	35,040
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	96.0	35,040
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	96.0	35,040
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	12.0	4,380
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	48.0	17,520
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	72.0	26,280
Subtotal		438.0	159,870

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PROPANE COMBUSTION

Source Data

Source ID	Description	MMBtu/day	MMBtu/yr
Lime Process Heating			
LKC	PFR Shaft Lime Kiln Combustion	529.0	163,935
Ore Process Heating			
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	17.0	510
CKB	Carbon Regeneration Kiln (Burners)	54.1	19,754
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	2.4	876
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	120.0	43,800
Subtotal		193.5	64,940
HVAC			
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	96.0	35,040
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	96.0	35,040
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	96.0	35,040
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	12.0	4,380
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	48.0	17,520
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	72.0	26,280
Subtotal		438.0	159,870

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
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AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary lb/hr ton/yr

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk-15	chk	chk	chk	chk	chk

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
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AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

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

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Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary lb/hr ton/yr

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk-15	chk	chk	chk	chk	chk

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
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Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk-15	chk	chk	chk	chk	chk

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
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Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

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

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

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

PROPANE COMBUSTION

Source Data

Source ID	Description	MMBtu/day	MMBtu/yr
Lime Process Heating			
LKC	PFR Shaft Lime Kiln Combustion	529.0	163,935
Ore Process Heating			
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	17.0	510
CKB	Carbon Regeneration Kiln (Burners)	54.1	19,754
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	2.4	876
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	120.0	43,800
Subtotal		193.5	64,940
HVAC			
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	96.0	35,040
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	96.0	35,040
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	96.0	35,040
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	12.0	4,380
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	48.0	17,520
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	72.0	26,280
Subtotal		438.0	159,870

Air Sciences Inc.	**PROJECT TITLE:** Stibnite Gold Project	**BY:** K. Lewis
	PROJECT NO: 335-20-3	**PAGE:** 1 **OF:** 19 **SHEET:** Calcs
AIR EMISSION CALCULATIONS	**SUBJECT:** HAP/TAP Emission Calculations	**DATE:** October 4, 2021

Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary

		Emissions[(1)]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
								lb/hr	ton/yr		
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		
		0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060		
TRUE		0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060		
		chk	chk	chk-15	chk	chk	chk	chk	chk		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
	PROJECT NO: 335-20-3	PAGE: 1 OF: 19 SHEET: Calcs
AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk-15	chk	chk	chk	chk	chk

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
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AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

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

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
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AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

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

PROPANE COMBUSTION

Source Data

Source ID	Description	MMBtu/day	MMBtu/yr
Lime Process Heating			
LKC	PFR Shaft Lime Kiln Combustion	529.0	163,935
Ore Process Heating			
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	17.0	510
CKB	Carbon Regeneration Kiln (Burners)	54.1	19,754
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	2.4	876
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	120.0	43,800
Subtotal		193.5	64,940
HVAC			
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	96.0	35,040
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	96.0	35,040
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	96.0	35,040
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	12.0	4,380
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	48.0	17,520
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	72.0	26,280
Subtotal		438.0	159,870

PROPANE COMBUSTION

Source Data

Source ID	Description	MMBtu/day	MMBtu/yr
Lime Process Heating			
LKC	PFR Shaft Lime Kiln Combustion	529.0	163,935
Ore Process Heating			
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	17.0	510
CKB	Carbon Regeneration Kiln (Burners)	54.1	19,754
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	2.4	876
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	120.0	43,800
Subtotal		193.5	64,940
HVAC			
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	96.0	35,040
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	96.0	35,040
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	96.0	35,040
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	12.0	4,380
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	48.0	17,520
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	72.0	26,280
Subtotal		438.0	159,870

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
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AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary lb/hr ton/yr

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk-15	chk	chk	chk	chk	chk

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
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Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
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7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

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

PROPANE COMBUSTION

Source Data

Source ID	Description	MMBtu/day	MMBtu/yr
Lime Process Heating			
LKC	PFR Shaft Lime Kiln Combustion	529.0	163,935
Ore Process Heating			
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	17.0	510
CKB	Carbon Regeneration Kiln (Burners)	54.1	19,754
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	2.4	876
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	120.0	43,800
Subtotal		193.5	64,940
HVAC			
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	96.0	35,040
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	96.0	35,040
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	96.0	35,040
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	12.0	4,380
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	48.0	17,520
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	72.0	26,280
Subtotal		438.0	159,870

PROPANE COMBUSTION

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HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
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Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
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AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary lb/hr ton/yr

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk-15	chk	chk	chk	chk	chk

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AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

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

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
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AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

PROPANE COMBUSTION

Source Data

Source ID	Description	MMBtu/day	MMBtu/yr
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Subtotal		193.5	64,940
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H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	96.0	35,040
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	96.0	35,040
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
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Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
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PROPANE COMBUSTION - CONTINUED

HAP/TAP Emission Factors and Emissions

				O.Heat_pph	O.Heat_tpy	L.Heat_pph	L.Heat_tpy	HVAC_pph	HVAC_tpy	lb/hr	ton/yr		
				Emissions[1]									
		Emission Factor[2]		Ore Proc Heat		Lime Proc Heat		HVAC		Total			
CAS	Pollutant	lb/MMscf	lb/MMBtu[3]	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	TAP	A/C
91-57-6	2-Methylnaphthalene	2.4E-05	2.35E-8	1.9E-07	7.6E-07	5.2E-07	1.9E-06	4.3E-07	1.9E-06	1.1E-06	4.6E-06	N	
56-49-5	3-Methylchloranthrene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
57-97-6	7,12-Dimethylbenz(a)ant	< 1.6E-05	1.57E-8	1.3E-07	5.1E-07	3.5E-07	1.3E-06	2.9E-07	1.3E-06	7.6E-07	3.0E-06	N	
83-32-9	Acenaphthene	< 1.8E-06	1.76E-9	1.4E-08	5.7E-08	3.9E-08	1.4E-07	3.2E-08	1.4E-07	8.5E-08	3.4E-07	N	
208-96-8	Acenaphthylene	< 1.8E-06	1.76E-9	1.4E-08	5.7E-08	3.9E-08	1.4E-07	3.2E-08	1.4E-07	8.5E-08	3.4E-07	N	
120-12-7	Anthracene	< 2.4E-06	2.35E-9	1.9E-08	7.6E-08	5.2E-08	1.9E-07	4.3E-08	1.9E-07	1.1E-07	4.6E-07	N	
7440-38-2	Arsenic	2.0E-04	1.96E-7	1.5E-06	6.4E-06	3.7E-06	1.6E-05	3.6E-06	1.6E-05	8.7E-06	3.8E-05	Y	C
56-55-3	Benz(a)anthracene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
71-43-2	Benzene	2.1E-03	2.06E-6	1.5E-05	6.7E-05	3.9E-05	1.7E-04	3.8E-05	1.6E-04	9.1E-05	4.0E-04	Y	C
50-32-8	Benzo(a)pyrene	< 1.2E-06	1.18E-9	8.7E-09	3.8E-08	2.2E-08	9.6E-08	2.1E-08	9.4E-08	5.2E-08	2.3E-07	Y	C
205-99-2	Benzo(b)fluoranthene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
191-24-2	Benzo(g,h,i)perylene	< 1.2E-06	1.18E-9	9.5E-09	3.8E-08	2.6E-08	9.6E-08	2.1E-08	9.4E-08	5.7E-08	2.3E-07	N	
207-08-9	Benzo(k)fluoranthene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
7440-41-7	Beryllium	< 1.2E-05	1.18E-8	8.7E-08	3.8E-07	2.2E-07	9.6E-07	2.1E-07	9.4E-07	5.2E-07	2.3E-06	Y	C
7440-43-9	Cadmium	1.1E-03	1.08E-6	8.0E-06	3.5E-05	2.0E-05	8.8E-05	2.0E-05	8.6E-05	4.8E-05	2.1E-04	Y	C
7440-47-3	Chromium	1.4E-03	1.37E-6	1.1E-05	4.5E-05	3.0E-05	1.1E-04	2.5E-05	1.1E-04	6.6E-05	2.7E-04	Y	A
218-01-9	Chrysene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
7440-48-4	Cobalt	8.4E-05	8.24E-8	6.6E-07	2.7E-06	1.8E-06	6.8E-06	1.5E-06	6.6E-06	4.0E-06	1.6E-05	Y	A
53-70-3	Dibenzo(a,h)anthracene	< 1.2E-06	1.18E-9	8.7E-09	3.8E-08	2.2E-08	9.6E-08	2.1E-08	9.4E-08	5.2E-08	2.3E-07	Y	C
106-46-7	Dichlorobenzene	1.2E-03	1.18E-6	9.5E-06	3.8E-05	2.6E-05	9.6E-05	2.1E-05	9.4E-05	5.7E-05	2.3E-04	Y	A
206-44-0	Fluoranthene	3.0E-06	2.94E-9	2.4E-08	9.5E-08	6.5E-08	2.4E-07	5.4E-08	2.4E-07	1.4E-07	5.7E-07	N	
86-73-7	Fluorene	2.8E-06	2.75E-9	2.2E-08	8.9E-08	6.1E-08	2.3E-07	5.0E-08	2.2E-07	1.3E-07	5.3E-07	N	
50-00-0	Formaldehyde	7.5E-02	7.35E-5	5.5E-04	2.4E-03	1.4E-03	6.0E-03	1.3E-03	5.9E-03	3.3E-03	1.4E-02	Y	C
110-54-3	Hexane	1.8E+00	1.76E-3	1.4E-02	5.7E-02	3.9E-02	1.4E-01	3.2E-02	1.4E-01	8.5E-02	3.4E-01	Y	A
193-39-5	Indeno(1,2,3-cd)pyrene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
7439-96-5	Manganese	3.8E-04	3.73E-7	3.0E-06	1.2E-05	8.2E-06	3.1E-05	6.8E-06	3.0E-05	1.8E-05	7.2E-05	Y	A
7439-97-6	Mercury	2.6E-04	2.55E-7	2.1E-06	8.3E-06	5.6E-06	2.1E-05	4.7E-06	2.0E-05	1.2E-05	5.0E-05	N	
91-20-3	Naphthalene	6.1E-04	5.98E-7	4.8E-06	1.9E-05	1.3E-05	4.9E-05	1.1E-05	4.8E-05	2.9E-05	1.2E-04	Y	A
7440-02-0	Nickel	2.1E-03	2.06E-6	1.5E-05	6.7E-05	3.9E-05	1.7E-04	3.8E-05	1.6E-04	9.1E-05	4.0E-04	Y	C
85-01-8	Phenanthrene	1.7E-05	1.67E-8	1.3E-07	5.4E-07	3.7E-07	1.4E-06	3.0E-07	1.3E-06	8.1E-07	3.2E-06	N	
129-00-0	Pyrene	5.0E-06	4.90E-9	4.0E-08	1.6E-07	1.1E-07	4.0E-07	8.9E-08	3.9E-07	2.4E-07	9.5E-07	N	
7782-49-2	Selenium	< 2.4E-05	2.35E-8	1.9E-07	7.6E-07	5.2E-07	1.9E-06	4.3E-07	1.9E-06	1.1E-06	4.6E-06	Y	A
108-88-3	Toluene	3.4E-03	3.33E-6	2.7E-05	1.1E-04	7.3E-05	2.7E-04	6.1E-05	2.7E-04	1.6E-04	6.5E-04	Y	A
109-66-0	Pentane	2.6E+00	2.55E-3	2.1E-02	8.3E-02	5.6E-02	2.1E-01	4.7E-02	2.0E-01	1.2E-01	5.0E-01	Y	A
7440-39-3	Barium	4.4E-03	4.31E-6	3.5E-05	1.4E-04	9.5E-05	3.5E-04	7.9E-05	3.4E-04	2.1E-04	8.4E-04	Y	A
7440-50-8	Copper	8.5E-04	8.33E-7	6.7E-06	2.7E-05	1.8E-05	6.8E-05	1.5E-05	6.7E-05	4.0E-05	1.6E-04	Y	A
7439-98-7	Molybdenum	1.1E-03	1.08E-6	8.7E-06	3.5E-05	2.4E-05	8.8E-05	2.0E-05	8.6E-05	5.2E-05	2.1E-04	Y	A
7440-62-2	Vanadium	2.3E-03	2.25E-6	1.8E-05	7.3E-05	5.0E-05	1.8E-04	4.1E-05	1.8E-04	1.1E-04	4.4E-04	Y	A
7440-66-6	Zinc	2.9E-02	2.84E-5	2.3E-04	9.2E-04	6.3E-04	2.3E-03	5.2E-04	2.3E-03	1.4E-03	5.5E-03	Y	A
Total				3.6E-02	1.4E-01	9.8E-02	3.6E-01	8.1E-02	3.5E-01	2.1E-01	8.6E-01		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *AP-42, Table 1.4-3 & 1.4-4 (7/98) Natural Gas Combustion* 1.0766 1.0766

(3) *Natural Gas Higher Heating Value* 1,020 *MMBtu/MMscf* chk

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DIESEL COMBUSTION

Source Data

		Power Rating		Operation	Operation	Fuel Consumption[(1) & (2)]	
Source ID	Description	kW	hp	hr/day	hr/yr	MMBtu/day	MMBtu/yr
EDG1	Camp Emergency Generator	1,000	1,341	1	100	9.39	938.70
EDG2	Plant Emergency Generator #1	1,000	1,341	1	100	9.39	938.7
EDG3	Plant Emergency Generator #2	1,000	1,341	1	100	9.39	938.7
EDFP	Mill Fire Pump	200	268	1	100	1.88	187.7
Total						30.0	3,003.8

(1) *Based on brake specific fuel consumption for diesel generators* 7,000 *Btu/hp-hr* *AP-42 Tbl 3.3-1*

(2) *Heat Content of* 0.137 *MMBtu/gal* 1E+6 *Btu/MMBtu* 1.341 *hp/kW*

HAP/TAP Emission Factors and Emissions

		Factor (lb/MMBtu)		Emissions (≤600 hp)		Emissions (>600 hp)		Total Emissions[(1)]			
								lb/hr	ton/yr		
	Pollutant	≤600 hp[(2)]	>600hp[(3)]	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	TAP	A/C
106-99-0	1,3-Butadiene	< 3.9E-05		8.4E-07	3.7E-06	0.0E+00	0.0E+00	8.4E-07	3.7E-06	Y	C
83-32-9	Acenaphthene	< 1.4E-06	4.7E-06	1.1E-07	1.3E-07	5.5E-06	6.6E-06	5.6E-06	6.7E-06	N	
208-96-8	Acenaphthylene	< 5.1E-06	9.2E-06	4.0E-07	4.7E-07	1.1E-05	1.3E-05	1.1E-05	1.3E-05	N	
75-07-0	Acetaldehyde	7.7E-04	2.5E-05	1.6E-05	7.2E-05	8.1E-06	3.5E-05	2.5E-05	1.1E-04	Y	C
107-02-8	Acrolein	< 9.3E-05	7.9E-06	7.2E-06	8.7E-06	9.2E-06	1.1E-05	1.6E-05	2.0E-05	Y	A
120-12-7	Anthracene	1.9E-06	1.2E-06	1.5E-07	1.8E-07	1.4E-06	1.7E-06	1.6E-06	1.9E-06	N	
56-55-3	Benz(a)anthracene	1.7E-06	6.2E-07	3.6E-08	1.6E-07	2.0E-07	8.8E-07	2.4E-07	1.0E-06	Y	C
71-43-2	Benzene	9.3E-04	7.8E-04	2.0E-05	8.8E-05	2.5E-04	1.1E-03	2.7E-04	1.2E-03	Y	C
50-32-8	Benzo(a)pyrene	< 1.9E-07	< 2.6E-07	4.0E-09	1.8E-08	8.3E-08	3.6E-07	8.7E-08	3.8E-07	Y	C
205-99-2	Benzo(b)fluoranthene	< 9.9E-08	< 1.1E-06	2.1E-09	9.3E-09	3.6E-07	1.6E-06	3.6E-07	1.6E-06	Y	C
191-24-2	Benzo(g,h,i)perylene	< 4.9E-07	< 5.6E-07	3.8E-08	4.6E-08	6.5E-07	7.8E-07	6.9E-07	8.3E-07	N	
207-08-9	Benzo(k)fluoranthene	< 1.6E-07	< 2.2E-07	3.3E-09	1.5E-08	7.0E-08	3.1E-07	7.3E-08	3.2E-07	Y	C
218-01-9	Chrysene	3.5E-07	1.5E-06	7.6E-09	3.3E-08	4.9E-07	2.2E-06	5.0E-07	2.2E-06	Y	C
53-70-3	Dibenzo(a,h)anthracene	< 5.8E-07	< 3.5E-07	1.2E-08	5.5E-08	1.1E-07	4.9E-07	1.2E-07	5.4E-07	Y	C
206-44-0	Fluoranthene	7.6E-06	4.0E-06	6.0E-07	7.1E-07	4.7E-06	5.7E-06	5.3E-06	6.4E-06	N	
86-73-7	Fluorene	2.9E-05	1.3E-05	2.3E-06	2.7E-06	1.5E-05	1.8E-05	1.7E-05	2.1E-05	N	
50-00-0	Formaldehyde	1.2E-03	7.9E-05	2.5E-05	1.1E-04	2.5E-05	1.1E-04	5.1E-05	2.2E-04	Y	C
193-39-5	Indeno(1,2,3-cd)pyrene	< 3.8E-07	< 4.1E-07	8.0E-09	3.5E-08	1.3E-07	5.8E-07	1.4E-07	6.2E-07	Y	C
91-20-3	Naphthalene	8.5E-05	1.3E-04	6.6E-06	8.0E-06	1.5E-04	1.8E-04	1.6E-04	1.9E-04	Y	A
85-01-8	Phenanthrene	2.9E-05	4.1E-05	2.3E-06	2.8E-06	4.8E-05	5.7E-05	5.0E-05	6.0E-05	N	
129-00-0	Pyrene	4.8E-06	3.7E-06	3.7E-07	4.5E-07	4.4E-06	5.2E-06	4.7E-06	5.7E-06	N	
108-88-3	Toluene	4.1E-04	2.8E-04	3.2E-05	3.8E-05	3.3E-04	4.0E-04	3.6E-04	4.3E-04	Y	A
1330-20-7	Xylene	2.9E-04	1.9E-04	2.2E-05	2.7E-05	2.3E-04	2.7E-04	2.5E-04	3.0E-04	Y	A
Total				1.4E-04	3.6E-04	1.1E-03	2.2E-03	1.2E-03	2.6E-03		
								chk	chk		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

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

(3) *AP-42, Tabs. 3.4-3 & 3.4-4, 10/96, large diesel engines (> 600 hp)*

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Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	lb/hr	ton/yr						
	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk-15	chk	chk	chk	chk	chk

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AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk-15	chk	chk	chk	chk	chk

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
	PROJECT NO: 335-20-3	PAGE: 2 OF: 19 SHEET: Calcs
AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

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

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[(1)]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions
2,000 lb/ton
8,760 hr/yr
24 hr/day

PROPANE COMBUSTION

Source Data

Source ID	Description	MMBtu/day	MMBtu/yr
Lime Process Heating			
LKC	PFR Shaft Lime Kiln Combustion	529.0	163,935
Ore Process Heating			
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	17.0	510
CKB	Carbon Regeneration Kiln (Burners)	54.1	19,754
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	2.4	876
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	120.0	43,800
Subtotal		193.5	64,940
HVAC			
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	96.0	35,040
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	96.0	35,040
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	96.0	35,040
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	12.0	4,380
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	48.0	17,520
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	72.0	26,280
Subtotal		438.0	159,870

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
	PROJECT NO: 335-20-3	PAGE: 1 OF: 19 SHEET: Calcs
AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
chk	chk	chk-15	chk	chk	chk	chk	chk

TRUE

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project			BY: K. Lewis
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AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021		

Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk-15	chk	chk	chk	chk	chk

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
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AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

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

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis		
	PROJECT NO: 335-20-3	PAGE: 2	OF: 19	SHEET: Calcs
AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021		

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

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

PROPANE COMBUSTION

Source Data

Source ID	Description	MMBtu/day	MMBtu/yr
Lime Process Heating			
LKC	PFR Shaft Lime Kiln Combustion	529.0	163,935
Ore Process Heating			
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	17.0	510
CKB	Carbon Regeneration Kiln (Burners)	54.1	19,754
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	2.4	876
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	120.0	43,800
Subtotal		193.5	64,940
HVAC			
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	96.0	35,040
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	96.0	35,040
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	96.0	35,040
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	12.0	4,380
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	48.0	17,520
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	72.0	26,280
Subtotal		438.0	159,870

PROPANE COMBUSTION

Source Data

Source ID	Description	MMBtu/day	MMBtu/yr
Lime Process Heating			
LKC	PFR Shaft Lime Kiln Combustion	529.0	163,935
Ore Process Heating			
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	17.0	510
CKB	Carbon Regeneration Kiln (Burners)	54.1	19,754
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	2.4	876
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	120.0	43,800
Subtotal		193.5	64,940
HVAC			
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	96.0	35,040
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	96.0	35,040
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	96.0	35,040
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	12.0	4,380
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	48.0	17,520
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	72.0	26,280
Subtotal		438.0	159,870

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis		
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AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021		

Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	lb/hr	ton/yr						
	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk-15	chk	chk	chk	chk	chk

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Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

2,000 lb/ton

8,760 hr/yr

24 hr/day

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PROPANE COMBUSTION

Source Data

Source ID	Description	MMBtu/day	MMBtu/yr
Lime Process Heating			
LKC	PFR Shaft Lime Kiln Combustion	529.0	163,935
Ore Process Heating			
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	17.0	510
CKB	Carbon Regeneration Kiln (Burners)	54.1	19,754
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	2.4	876
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	120.0	43,800
Subtotal		193.5	64,940
HVAC			
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	96.0	35,040
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	96.0	35,040
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	96.0	35,040
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	12.0	4,380
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	48.0	17,520
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	72.0	26,280
Subtotal		438.0	159,870

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Model Scenario W3 180,000 T/day Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.9E-02	8.2E-02	1.9E-02	8.5E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.54	2.38	0.55	2.40	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	2.6E-03	1.1E-02	3.0E-03	1.3E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.7E-04	3.8E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	7.3E-03	3.2E-02	8.0E-03	3.5E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	3.3E-03	1.4E-02	3.7E-03	1.6E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	6.5E-03	2.9E-02	7.0E-03	3.1E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.24	1.07	0.25	1.08	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.3E-03	5.7E-03	2.0E-03	8.6E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.6E-03	7.1E-03	2.2E-03	9.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.53	2.32	0.54	2.34	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	3.3E-04	1.4E-03	7.4E-04	3.2E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	1.36	5.95	3.03	12.56		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
TRUE	0.2155	0.8650	8.3307	31.6474	86.1858	377.4936	94.7319	410.0060
	chk	chk	chk-15	chk	chk	chk	chk	chk

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Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[(1)]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	57.86	253.41	58.50	255.98	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.65	2.86	0.66	2.88	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	11.41	49.97	13.65	58.09	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	4.1E-03	1.8E-02	4.6E-03	2.0E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	14.83	64.96	15.04	65.77	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	8.1E-04	3.6E-03	1.3E-03	5.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	4.1E-04	1.8E-03	8.2E-04	3.6E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	2.3E-02	1.0E-01	2.4E-02	0.10	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	8.1E-03	3.6E-02	8.7E-03	3.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.9E-02	0.12	3.1E-02	0.13	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	84.83	371.54	91.71	397.44		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

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

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PROPANE COMBUSTION

Source Data

Source ID	Description	MMBtu/day	MMBtu/yr
Lime Process Heating			
LKC	PFR Shaft Lime Kiln Combustion	529.0	163,935
Ore Process Heating			
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	17.0	510
CKB	Carbon Regeneration Kiln (Burners)	54.1	19,754
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	2.4	876
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	120.0	43,800
Subtotal		193.5	64,940
HVAC			
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	96.0	35,040
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	96.0	35,040
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	96.0	35,040
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	12.0	4,380
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	48.0	17,520
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	72.0	26,280
Subtotal		438.0	159,870

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PROPANE COMBUSTION - CONTINUED

HAP/TAP Emission Factors and Emissions

				O.Heat_pph	O.Heat_tpy	L.Heat_pph	L.Heat_tpy	HVAC_pph	HVAC_tpy	lb/hr	ton/yr		
				Emissions[(1)]									
		Emission Factor[(2)]		Ore Proc Heat		Lime Proc Heat		HVAC		Total			
CAS	Pollutant	lb/MMscf	lb/MMBtu[(3)]	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	TAP	A/C
91-57-6	2-Methylnaphthalene	2.4E-05	2.35E-8	1.9E-07	7.6E-07	5.2E-07	1.9E-06	4.3E-07	1.9E-06	1.1E-06	4.6E-06	N	
56-49-5	3-Methylchloranthrene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
57-97-6	7,12-Dimethylbenz(a)ant	< 1.6E-05	1.57E-8	1.3E-07	5.1E-07	3.5E-07	1.3E-06	2.9E-07	1.3E-06	7.6E-07	3.0E-06	N	
83-32-9	Acenaphthene	< 1.8E-06	1.76E-9	1.4E-08	5.7E-08	3.9E-08	1.4E-07	3.2E-08	1.4E-07	8.5E-08	3.4E-07	N	
208-96-8	Acenaphthylene	< 1.8E-06	1.76E-9	1.4E-08	5.7E-08	3.9E-08	1.4E-07	3.2E-08	1.4E-07	8.5E-08	3.4E-07	N	
120-12-7	Anthracene	< 2.4E-06	2.35E-9	1.9E-08	7.6E-08	5.2E-08	1.9E-07	4.3E-08	1.9E-07	1.1E-07	4.6E-07	N	
7440-38-2	Arsenic	2.0E-04	1.96E-7	1.5E-06	6.4E-06	3.7E-06	1.6E-05	3.6E-06	1.6E-05	8.7E-06	3.8E-05	Y	C
56-55-3	Benz(a)anthracene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
71-43-2	Benzene	2.1E-03	2.06E-6	1.5E-05	6.7E-05	3.9E-05	1.7E-04	3.8E-05	1.6E-04	9.1E-05	4.0E-04	Y	C
50-32-8	Benzo(a)pyrene	< 1.2E-06	1.18E-9	8.7E-09	3.8E-08	2.2E-08	9.6E-08	2.1E-08	9.4E-08	5.2E-08	2.3E-07	Y	C
205-99-2	Benzo(b)fluoranthene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
191-24-2	Benzo(g,h,i)perylene	< 1.2E-06	1.18E-9	9.5E-09	3.8E-08	2.6E-08	9.6E-08	2.1E-08	9.4E-08	5.7E-08	2.3E-07	N	
207-08-9	Benzo(k)fluoranthene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
7440-41-7	Beryllium	< 1.2E-05	1.18E-8	8.7E-08	3.8E-07	2.2E-07	9.6E-07	2.1E-07	9.4E-07	5.2E-07	2.3E-06	Y	C
7440-43-9	Cadmium	1.1E-03	1.08E-6	8.0E-06	3.5E-05	2.0E-05	8.8E-05	2.0E-05	8.6E-05	4.8E-05	2.1E-04	Y	C
7440-47-3	Chromium	1.4E-03	1.37E-6	1.1E-05	4.5E-05	3.0E-05	1.1E-04	2.5E-05	1.1E-04	6.6E-05	2.7E-04	Y	A
218-01-9	Chrysene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
7440-48-4	Cobalt	8.4E-05	8.24E-8	6.6E-07	2.7E-06	1.8E-06	6.8E-06	1.5E-06	6.6E-06	4.0E-06	1.6E-05	Y	A
53-70-3	Dibenzo(a,h)anthracene	< 1.2E-06	1.18E-9	8.7E-09	3.8E-08	2.2E-08	9.6E-08	2.1E-08	9.4E-08	5.2E-08	2.3E-07	Y	C
106-46-7	Dichlorobenzene	1.2E-03	1.18E-6	9.5E-06	3.8E-05	2.6E-05	9.6E-05	2.1E-05	9.4E-05	5.7E-05	2.3E-04	Y	A
206-44-0	Fluoranthene	3.0E-06	2.94E-9	2.4E-08	9.5E-08	6.5E-08	2.4E-07	5.4E-08	2.4E-07	1.4E-07	5.7E-07	N	
86-73-7	Fluorene	2.8E-06	2.75E-9	2.2E-08	8.9E-08	6.1E-08	2.3E-07	5.0E-08	2.2E-07	1.3E-07	5.3E-07	N	
50-00-0	Formaldehyde	7.5E-02	7.35E-5	5.5E-04	2.4E-03	1.4E-03	6.0E-03	1.3E-03	5.9E-03	3.3E-03	1.4E-02	Y	C
110-54-3	Hexane	1.8E+00	1.76E-3	1.4E-02	5.7E-02	3.9E-02	1.4E-01	3.2E-02	1.4E-01	8.5E-02	3.4E-01	Y	A
193-39-5	Indeno(1,2,3-cd)pyrene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
7439-96-5	Manganese	3.8E-04	3.73E-7	3.0E-06	1.2E-05	8.2E-06	3.1E-05	6.8E-06	3.0E-05	1.8E-05	7.2E-05	Y	A
7439-97-6	Mercury	2.6E-04	2.55E-7	2.1E-06	8.3E-06	5.6E-06	2.1E-05	4.7E-06	2.0E-05	1.2E-05	5.0E-05	N	
91-20-3	Naphthalene	6.1E-04	5.98E-7	4.8E-06	1.9E-05	1.3E-05	4.9E-05	1.1E-05	4.8E-05	2.9E-05	1.2E-04	Y	A
7440-02-0	Nickel	2.1E-03	2.06E-6	1.5E-05	6.7E-05	3.9E-05	1.7E-04	3.8E-05	1.6E-04	9.1E-05	4.0E-04	Y	C
85-01-8	Phenanthrene	1.7E-05	1.67E-8	1.3E-07	5.4E-07	3.7E-07	1.4E-06	3.0E-07	1.3E-06	8.1E-07	3.2E-06	N	
129-00-0	Pyrene	5.0E-06	4.90E-9	4.0E-08	1.6E-07	1.1E-07	4.0E-07	8.9E-08	3.9E-07	2.4E-07	9.5E-07	N	
7782-49-2	Selenium	< 2.4E-05	2.35E-8	1.9E-07	7.6E-07	5.2E-07	1.9E-06	4.3E-07	1.9E-06	1.1E-06	4.6E-06	Y	A
108-88-3	Toluene	3.4E-03	3.33E-6	2.7E-05	1.1E-04	7.3E-05	2.7E-04	6.1E-05	2.7E-04	1.6E-04	6.5E-04	Y	A
109-66-0	Pentane	2.6E+00	2.55E-3	2.1E-02	8.3E-02	5.6E-02	2.1E-01	4.7E-02	2.0E-01	1.2E-01	5.0E-01	Y	A
7440-39-3	Barium	4.4E-03	4.31E-6	3.5E-05	1.4E-04	9.5E-05	3.5E-04	7.9E-05	3.4E-04	2.1E-04	8.4E-04	Y	A
7440-50-8	Copper	8.5E-04	8.33E-7	6.7E-06	2.7E-05	1.8E-05	6.8E-05	1.5E-05	6.7E-05	4.0E-05	1.6E-04	Y	A
7439-98-7	Molybdenum	1.1E-03	1.08E-6	8.7E-06	3.5E-05	2.4E-05	8.8E-05	2.0E-05	8.6E-05	5.2E-05	2.1E-04	Y	A
7440-62-2	Vanadium	2.3E-03	2.25E-6	1.8E-05	7.3E-05	5.0E-05	1.8E-04	4.1E-05	1.8E-04	1.1E-04	4.4E-04	Y	A
7440-66-6	Zinc	2.9E-02	2.84E-5	2.3E-04	9.2E-04	6.3E-04	2.3E-03	5.2E-04	2.3E-03	1.4E-03	5.5E-03	Y	A
Total				3.6E-02	1.4E-01	9.8E-02	3.6E-01	8.1E-02	3.5E-01	2.1E-01	8.6E-01		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *AP-42, Table 1.4-3 & 1.4-4 (7/98) Natural Gas Combustion* 1.0766 1.0766

(3) *Natural Gas Higher Heating Value* 1,020 *MMBtu/MMscf* chk

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DIESEL COMBUSTION

Source Data

Source ID	Description	Power Rating kW	Power Rating hp	Operation hr/day	Operation hr/yr	Fuel Consumption[(1) & (2)] MMBtu/day	Fuel Consumption[(1) & (2)] MMBtu/yr
EDG1	Camp Emergency Generator	1,000	1,341	1	100	9.39	938.70
EDG2	Plant Emergency Generator #1	1,000	1,341	1	100	9.39	938.7
EDG3	Plant Emergency Generator #2	1,000	1,341	1	100	9.39	938.7
EDFP	Mill Fire Pump	200	268	1	100	1.88	187.7
Total						30.0	3,003.8

(1) *Based on brake specific fuel consumption for diesel generators* 7,000 *Btu/hp-hr* *AP-42 Tbl 3.3-1*

(2) *Heat Content of* 0.137 *MMBtu/gal* 1E+6 *Btu/MMBtu* 1.341 *hp/kW*

HAP/TAP Emission Factors and Emissions

	Pollutant	Factor (lb/MMBtu) ≤600 hp[(2)]	Factor (lb/MMBtu) >600hp[(3)]	Emissions (≤600 hp) lb/hr	Emissions (≤600 hp) ton/yr	Emissions (>600 hp) lb/hr	Emissions (>600 hp) ton/yr	Total Emissions[(1)] lb/hr	Total Emissions[(1)] ton/yr	TAP	A/C
106-99-0	1,3-Butadiene	< 3.9E-05		8.4E-07	3.7E-06	0.0E+00	0.0E+00	8.4E-07	3.7E-06	Y	C
83-32-9	Acenaphthene	< 1.4E-06	4.7E-06	1.1E-07	1.3E-07	5.5E-06	6.6E-06	5.6E-06	6.7E-06	N	
208-96-8	Acenaphthylene	< 5.1E-06	9.2E-06	4.0E-07	4.7E-07	1.1E-05	1.3E-05	1.1E-05	1.3E-05	N	
75-07-0	Acetaldehyde	7.7E-04	2.5E-05	1.6E-05	7.2E-05	8.1E-06	3.5E-05	2.5E-05	1.1E-04	Y	C
107-02-8	Acrolein	< 9.3E-05	7.9E-06	7.2E-06	8.7E-06	9.2E-06	1.1E-05	1.6E-05	2.0E-05	Y	A
120-12-7	Anthracene	1.9E-06	1.2E-06	1.5E-07	1.8E-07	1.4E-06	1.7E-06	1.6E-06	1.9E-06	N	
56-55-3	Benz(a)anthracene	1.7E-06	6.2E-07	3.6E-08	1.6E-07	2.0E-07	8.8E-07	2.4E-07	1.0E-06	Y	C
71-43-2	Benzene	9.3E-04	7.8E-04	2.0E-05	8.8E-05	2.5E-04	1.1E-03	2.7E-04	1.2E-03	Y	C
50-32-8	Benzo(a)pyrene	< 1.9E-07	< 2.6E-07	4.0E-09	1.8E-08	8.3E-08	3.6E-07	8.7E-08	3.8E-07	Y	C
205-99-2	Benzo(b)fluoranthene	< 9.9E-08	< 1.1E-06	2.1E-09	9.3E-09	3.6E-07	1.6E-06	3.6E-07	1.6E-06	Y	C
191-24-2	Benzo(g,h,i)perylene	< 4.9E-07	< 5.6E-07	3.8E-08	4.6E-08	6.5E-07	7.8E-07	6.9E-07	8.3E-07	N	
207-08-9	Benzo(k)fluoranthene	< 1.6E-07	< 2.2E-07	3.3E-09	1.5E-08	7.0E-08	3.1E-07	7.3E-08	3.2E-07	Y	C
218-01-9	Chrysene	3.5E-07	1.5E-06	7.6E-09	3.3E-08	4.9E-07	2.2E-06	5.0E-07	2.2E-06	Y	C
53-70-3	Dibenzo(a,h)anthracene	< 5.8E-07	< 3.5E-07	1.2E-08	5.5E-08	1.1E-07	4.9E-07	1.2E-07	5.4E-07	Y	C
206-44-0	Fluoranthene	7.6E-06	4.0E-06	6.0E-07	7.1E-07	4.7E-06	5.7E-06	5.3E-06	6.4E-06	N	
86-73-7	Fluorene	2.9E-05	1.3E-05	2.3E-06	2.7E-06	1.5E-05	1.8E-05	1.7E-05	2.1E-05	N	
50-00-0	Formaldehyde	1.2E-03	7.9E-05	2.5E-05	1.1E-04	2.5E-05	1.1E-04	5.1E-05	2.2E-04	Y	C
193-39-5	Indeno(1,2,3-cd)pyrene	< 3.8E-07	< 4.1E-07	8.0E-09	3.5E-08	1.3E-07	5.8E-07	1.4E-07	6.2E-07	Y	C
91-20-3	Naphthalene	8.5E-05	1.3E-04	6.6E-06	8.0E-06	1.5E-04	1.8E-04	1.6E-04	1.9E-04	Y	A
85-01-8	Phenanthrene	2.9E-05	4.1E-05	2.3E-06	2.8E-06	4.8E-05	5.7E-05	5.0E-05	6.0E-05	N	
129-00-0	Pyrene	4.8E-06	3.7E-06	3.7E-07	4.5E-07	4.4E-06	5.2E-06	4.7E-06	5.7E-06	N	
108-88-3	Toluene	4.1E-04	2.8E-04	3.2E-05	3.8E-05	3.3E-04	4.0E-04	3.6E-04	4.3E-04	Y	A
1330-20-7	Xylene	2.9E-04	1.9E-04	2.2E-05	2.7E-05	2.3E-04	2.7E-04	2.5E-04	3.0E-04	Y	A
Total				1.4E-04	3.6E-04	1.1E-03	2.2E-03	1.2E-03	2.6E-03		
								chk	chk		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

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

(3) *AP-42, Tabs. 3.4-3 & 3.4-4, 10/96, large diesel engines (> 600 hp)*

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ORE PROCESSING

Source Data

		PM Emissions	
Source ID	Description	lb/day	ton/yr
OC1	Loader Transfer of Ore to Grizzly	3.500	0.639
OC2	Grizzly to Apron Feeder	3.500	0.639
OC3	Apron Feeder to Dribble Conveyor	3.500	0.639
OC4	Apron Feeder to Vibrating Grizzly	3.500	0.639
OC5	Dribble Conveyor to Vibrating Grizzly	3.500	0.639
OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	3.500	0.639
OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	30.000	5.475
OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	3.500	0.639
OC9	Stockpile Transfers to Reclaim Conveyors	16.560	3.022
OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	16.560	3.022
OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	16.560	3.022
OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge C	33.120	6.044
OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	3.864	0.705
Total		141.164	25.762

HAP/TAP Emission Factors and Emissions lb/hr ton/yr

		Concentration	Emissions[1]			
CAS No.	Pollutant	ppm[2]	lb/hr	ton/yr	TAP	A/C
7440-38-2	Arsenic	667	3.9E-03	1.7E-02	Y	C
7440-41-7	Beryllium	3.2	1.9E-05	8.2E-05	Y	C
7440-43-9	Cadmium	0.50	2.9E-06	1.3E-05	Y	C
7440-48-4	Cobalt	4	2.4E-05	1.0E-04	Y	A
7440-47-3	Chromium	9	5.3E-05	2.3E-04	Y	A
7439-97-6	Mercury [3]	0.96	5.6E-06	2.5E-05	N	
7439-96-5	Manganese	299	1.8E-03	7.7E-03	Y	A
7440-02-0	Nickel	2	1.2E-05	5.2E-05	Y	C
7439-92-1	Lead	8	4.7E-05	2.1E-04	N	
7440-36-0	Antimony	23	1.4E-04	5.9E-04	Y	A
7723-14-0	Phosphorus	650	3.8E-03	1.7E-02	Y	A
7782-49-2	Selenium [4]	0.40	2.4E-06	1.0E-05	Y	A
7440-22-4	Silver	0.50	2.9E-06	1.3E-05	Y	A
7429-90-5	Aluminum	71,000	4.2E-01	1.8E+00	Y	A
7440-39-3	Barium	800	4.7E-03	2.1E-02	Y	A
1317-65-3	Calcium Carbonate	14,000	8.2E-02	3.6E-01	Y	A
7440-50-8	Copper	5	2.9E-05	1.3E-04	Y	A
7439-89-6	Iron [4]	18,200	1.1E-01	4.7E-01	Y	A
7439-98-7	Molybdenum	1	5.9E-06	2.6E-05	Y	A
7440-28-0	Thallium	10	5.9E-05	2.6E-04	Y	A
7440-61-1	Uranium	10	5.9E-05	2.6E-04	Y	A
7440-62-2	Vanadium	28	1.6E-04	7.2E-04	Y	A
7440-33-7	Tungsten	10	5.9E-05	2.6E-04	Y	A
7440-66-6	Zinc	35	2.1E-04	9.0E-04	Y	A
Total			6.2E-01	2.7E+00		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

[2] *(Midas Gold 2017c) Median concentration of 55,000 SGP samples.*

[3] *(Midas Gold 2018e) Median ore concentration of 151,000 SGP samples; resource block model.*

[4] *(Midas Gold 2020) Median concentration of 56,000 SGP samples for Fe and 1,500 SGP samples for Se.*

1E+6 parts/ppm

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis		
	PROJECT NO: 335-20-3	PAGE: 7	OF: 19	SHEET: Calcs
AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021		

ORE CONCETRATION AND REFINING

Source Data

Source ID	Description	Subpart 7E Allowable Limit lb/yr(1)	Oper. hr/yr	% of Subpart 7E for Controlled Systems %		Controlled Hg Emissions lb/hr	ton/yr	lb/yr
AC	Autoclave	213.4	8,760	(2)		0.000023	0.00010	0.20
EW,MR,MF,CKD	Refinery Sources (C. Kiln, EW, Retort, Furr	16.8		20%	(3)	0.000384	0.00168	3.36
7439-97-6 Mercury	Total	230.2				0.000407	0.00178	3.56

(1) *Subpart 7E Limit - Ore Pretreatment Processes* *(CFR 2018b)*

84 lb	*2,540,400 ~~ton~~*	*~~MMton~~*	=	*213.4 lb*
~~MMton~~	*yr*	*1.0E+6 ~~ton~~*		*yr*

(1) *Subpart 7E Limit - Carbon Processes with Mercury Retorts*

0.8 lb	*21 ~~ton~~*	=	*16.8 lb*
~~ton~~	*yr*		*yr*

(2) *Controlled SysCAD modeled emissions from Autoclave:* *0.0105 g/hr* *2.3E-05 lb/hr* *0.20 lb/yr* *(M3 2019)*

(3) *Based on similar source (but with much higher ore Hg content) Hg reporting levels provided below:*

Goldstrike Refinery (2015 & 2016 Hg Reports) *(NDEP 2015a) (NDEP 2016)*

28.79 lb	*yr*	=	*0.11 lb*	*ton*	=	*14.3%*
yr	*251.00 ton*		*MMton*	*0.8 lb*		

Twin Creeks Refinery (2015 & 2016 Hg Reports) *(NDEP 2015a) (NDEP 2016)*

31.27 lb	*yr*	=	*0.22 lb*	*ton*	=	*27.4%*
yr	*142.77 ton*		*MMton*	*0.8 lb*		

HAP/TAP Emission Factors and Emission

CAS No.	Pollutant	Emission Factor(1)	Autoclave lb/hr (AC_pph)	Autoclave ton/yr (AC_tpy)	Refinery lb/hr (Refin_pph)	Refinery ton/yr (Refin_tpy)	Total Emissions lb/hr	Total Emissions ton/yr	TAP	A/C
7440-38-2	Arsenic	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	C
7440-41-7	Beryllium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	C
7440-43-9	Cadmium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	C
7440-48-4	Cobalt	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-47-3	Chromium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7439-97-6	Mercury	see above	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	N	
7439-96-5	Manganese	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-02-0	Nickel	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	C
7439-92-1	Lead	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	N	
7440-36-0	Antimony	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7723-14-0	Phosphorus	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7782-49-2	Selenium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-22-4	Silver	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7429-90-5	Aluminum	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-39-3	Barium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
1317-65-3	Calcium Carbonate	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-50-8	Copper	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7439-89-6	Iron	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7439-98-7	Molybdenum	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-28-0	Thallium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-61-1	Uranium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-62-2	Vanadium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-33-7	Tungsten	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-66-6	Zinc	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
Total			5.5E-04	2.4E-03	9.2E-03	4.0E-02	9.8E-03	4.3E-02		

(1) *Hg is the most difficult metal to control due to it existing in both particulate and gaseous form. Therefore, all other metals are conservatively estimated to be equal to or less than the Hg emissions.* 0.0525 0.0525 chk

7664-93-9	Sulfuric Acid	Autoclave	2.03	8.89			2.03	8.89
7783-06-4	Hydrogen Sulfic	Autoclave	0.90	3.94			0.90	3.94
592-01-8	Cyanide	Point Sources - S EW Cells			0.0012	0.0053	0.00	0.01
Total			2.93	12.84	0.01	0.05	2.94	12.88

ORE CONCETRATION AND REFINING - CONTINUED

Source Data

		Throughput		Operation	
Source ID	Description	ton/day	ton/yr	hr/day	hr/yr
AC	Autoclave	6,960	2,540,400	24	8,760

Autoclave HAP/TAP Emission Factors and Emission lb/hr ton/yr

				Emissions[1]	
CAS No.	Pollutant	Emission Factor		lb/hr	ton/yr
7664-93-9	Sulfuric Acid	0.007	lb/ton[2]	2.03	8.89
7783-06-4	Hydrogen Sulfide	0.9	lb/hr[3]	0.90	3.94

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *H2SO4 is based on Acidic Autoclave test data (APT 2010)*

(3) *H2S is based on Acidic Autoclave test data (APT 2013)*

LEACHING OPERATION

Cyanide (HCN) Source Data, Emission Factors, and Emissions

Source ID	Description	Dia. ft[1]	pH[1]	Free CN- g/m3[1]	T C[1]	pKa	a0	H	kG[2] m/s	Fa*Fw	g/s	lb/hr	ton/yr
TSF	*Fugitive Sources*												
TSF	Tailings Maint. Pond	76	7.75	1	3.74	9.803	0.9912	0.0025	1.89E-05	0.641	1.27E-05	0.0001	0.0004
MILLTA	CN Detox Tank 1	40	8.5	25	25	9.250	0.8490	0.0055	0.000311	0.688	0.002891	0.0229	0.101
MILLTA	CN Detox Tank 2	40	8.5	25	25	9.250	0.8490	0.0055	0.000311	0.688	0.002891	0.0229	0.101
MILLTA	CIP Leach Tank 1	52	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.668	0.001435	0.0114	0.050
MILLTA	CIP Leach Tank 2	52	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.668	0.001435	0.0114	0.050
MILLTA	CIP Leach Tank 3	52	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.668	0.001435	0.0114	0.050
MILLTA	CIP Leach Tank 4	52	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.668	0.001435	0.0114	0.050
MILLTA	CIL Tank 1	54	10.25	125	30	9.120	0.0690	0.0065	0.000311	0.666	0.002485	0.0197	0.086
MILLTA	CIL Tank 2	54	10.25	125	30	9.120	0.0690	0.0065	0.000311	0.666	0.002485	0.0197	0.086
MILLTA	CIL Tank 3	54	10.25	125	30	9.120	0.0690	0.0065	0.000311	0.666	0.002485	0.0197	0.086
MILLTA	CIL Tank 4	54	10.25	125	30	9.120	0.0690	0.0065	0.000311	0.666	0.002485	0.0197	0.086
MILLTA	CIL Tank 5	54	10.25	125	30	9.120	0.0690	0.0065	0.000311	0.666	0.002485	0.0197	0.086
MILLTA	CIL Tank 6	54	10.25	125	30	9.120	0.0690	0.0065	0.000311	0.666	0.002485	0.0197	0.086
MILLTA	CIP Tank 1	20	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.742	0.000236	0.0019	0.008
MILLTA	CIP Tank 2	20	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.742	0.000236	0.0019	0.008
MILLTA	CIP Tank 3	20	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.742	0.000236	0.0019	0.008
MILLTA	CIP Tank 4	20	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.742	0.000236	0.0019	0.008
MILLTA	CIP Tank 5	20	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.742	0.000236	0.0019	0.008
MILLTA	CIP Tank 6	20	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.742	0.000236	0.0019	0.008
		Acres[1]											
TSF	Tails, Aqueous Surface	110.222	7.75	1	3.74	9.803	0.9912	0.0025	1.89E-05	0.421	0.008845	0.0702	0.307
TSF	Tails, Wet Sediment	110.222							5.31E-08	0.421	0.009961	0.0791	0.346
TSF	Tails, Dry Sediment	110.222							2.33E-08	1	0.010375	0.0823	0.361
		330.666											
592-01-8	Cyanide Fugitive Sources - Subtotal											0.4527	1.983
75-15-0	Carbon Disulfide											0.01446	0.06332
	Point Sources												
EW	EW Cells [3]											0.0006	0.003
EW	Preg/Barren Tanks [3]											0.0006	0.003
592-01-8	Cyanide Point Sources - Subtotal											0.0012	0.0053
Total												0.454	1.988

(1) *(Midas Gold 2016)(M3 2017c)(M3 2017d)*

(2) *The emission factors and caculation methodology are from the EPA directed HCN study: (Card, T. 2009)(EPA 2009)(Schmidt 2010)*

(3) *(APT 2009)*

Carbon Disulfide Emissions from Xanthate Decomposition

CAS No.	Pollutant	Xanthate[1] ton/yr	Molar Decomp.[2]	CS_2 MW Ratio	Temperature Adj. Factor[3]	Emissions lb/hr	Emissions ton/yr
75-15-0	Carbon Disulfide	1,700	0.99%	0.376	1%	0.0145	0.063

	MW	
Xanthate (PAX)	202.37	$C6H11KOS_2$
Carbon disulfide	76.139	CS_2

(1) *(Midas Gold 2016) p. 12-11*

(2) *(Air Sciences 2020) molar decomposition of xanthate in solution to CS2 gas*

(3) *(Air Sciences 2020) based on the comparison of CS2 generation at 25C and 70C*

Conversions

8,760	hr/yr	453.5929	g/lb
2,000	lb/ton	3.28084	ft/m
4,046.86	m2/acre	3,600	s/hr

Wind adjustment factor Fw 1

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis		
	PROJECT NO: 335-20-3	PAGE: 10	OF: 19	SHEET: Calcs
AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021		

LIME PRODUCTION

Source Data

		Throughput		PM Emissions	
Source ID	Description	ton/day	ton/yr	lb/day	ton/yr
LS1	Limestone transfer to Primary Crusher Hopper			3.39	0.48
LS2	Primary Crushing and Associated Transfers In and Out			6.10	0.86
LS3	Primary Screening and Associated Transfers In and Out			28.25	3.97
LS4	Secondary Crushing and Associated Transfers In and Out			6.10	0.86
LS5	Secondary Screening and Associated Transfers In and Out			28.25	3.97
LS6	Limestone transfer to Ball Mill Feed Bin			3.39	0.48
LS7	Limestone transfer to Ball Mill Feed Conveyor			3.39	0.48
LS8	Ball Mill Feed transfer to Ball Mill			3.39	0.48
LSBM	Limestone Ball Mill			45.65	6.42
LS9	Limestone transfer to Kiln Feed Bin			0.80	0.12
LS10	Limestone transfer to Lime Kiln Feed Conveyor			0.80	0.12
LS11	Fines Screening and Associated Transfers In and Out			6.68	1.03
Subtotal LS1-11				136.18	19.28
LS12	Kiln Feed transfer to PFR Shaft Lime Kiln			0.80	0.12
LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	169	52,377	21.97	3.40
Subtotal LS12,LK				22.77	3.53
Total				158.95	22.80

HAP/TAP Emission Factors and Emissions

			LS_pph	LS_tpy	LS12_pph	LS12_tpy	LK_pph	LK_tpy	lb/hr	ton/yr		
		Concentration	LS1-11,LSBM		LS12		Lime Kiln		Emissions[1]			
CAS No.	Pollutant	ppm[2]	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	TAP	A/C
7440-38-2	Arsenic	23	1.01E-04	4.43E-04	6.51E-07	2.85E-06	1.79E-05	7.83E-05	1.20E-04	5.24E-04	Y	C
7440-41-7	Beryllium	0.8	3.52E-06	1.54E-05	2.27E-08	9.92E-08	6.22E-07	2.72E-06	4.17E-06	1.82E-05	Y	C
7440-43-9	Cadmium	0.25	1.10E-06	4.82E-06	7.08E-09	3.10E-08	1.94E-07	8.51E-07	1.30E-06	5.70E-06	Y	C
7440-48-4	Cobalt	4	2.27E-05	7.71E-05	1.34E-07	4.96E-07	3.66E-06	1.36E-05	2.65E-05	9.12E-05	Y	A
7440-47-3	Chromium	15	8.51E-05	2.89E-04	5.01E-07	1.86E-06	1.37E-05	5.11E-05	9.93E-05	3.42E-04	Y	A
7439-97-6	Mercury [3]	0.02	1.13E-07	3.86E-07	6.68E-10	2.48E-09	2.82E-04	1.05E-03	2.82E-04	1.05E-03	N	
7439-96-5	Manganese	236.5	1.34E-03	4.56E-03	7.89E-06	2.93E-05	2.16E-04	8.05E-04	1.57E-03	5.39E-03	Y	A
7440-02-0	Nickel	5	2.20E-05	9.64E-05	1.42E-07	6.20E-07	3.89E-06	1.70E-05	2.60E-05	1.14E-04	Y	C
7439-92-1	Lead	3	1.70E-05	5.78E-05	1.00E-07	3.72E-07	2.75E-06	1.02E-05	1.99E-05	6.84E-05	N	
7440-36-0	Antimony	2.5	1.42E-05	4.82E-05	8.34E-08	3.10E-07	2.29E-06	8.51E-06	1.66E-05	5.70E-05	Y	A
7723-14-0	Phosphorus	130	7.38E-04	2.51E-03	4.34E-06	1.61E-05	1.19E-04	4.43E-04	8.61E-04	2.96E-03	Y	A
7440-22-4	Silver	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Y	A
7429-90-5	Aluminum	22600	1.28E-01	4.36E-01	7.54E-04	2.80E-03	2.07E-02	7.69E-02	1.50E-01	5.15E-01	Y	A
7440-39-3	Barium	145	8.23E-04	2.79E-03	4.84E-06	1.80E-05	1.33E-04	4.94E-04	9.60E-04	3.31E-03	Y	A
1317-65-3	Calcium Carbonate	274500	1.56E+00	5.29E+00	9.16E-03	3.40E-02	2.51E-01	9.35E-01	1.82E+00	6.26E+00	Y	A
7440-50-8	Copper	5	2.84E-05	9.64E-05	1.67E-07	6.20E-07	4.58E-06	1.70E-05	3.31E-05	1.14E-04	Y	A
7439-89-6	Iron	10350	5.87E-02	1.99E-01	3.45E-04	1.28E-03	9.47E-03	3.52E-02	6.85E-02	2.36E-01	Y	A
7439-98-7	Molybdenum	0.5	2.84E-06	9.64E-06	1.67E-08	6.20E-08	4.58E-07	1.70E-06	3.31E-06	1.14E-05	Y	A
7440-28-0	Thallium	5	2.84E-05	9.64E-05	1.67E-07	6.20E-07	4.58E-06	1.70E-05	3.31E-05	1.14E-04	Y	A
7440-61-1	Uranium	5	2.84E-05	9.64E-05	1.67E-07	6.20E-07	4.58E-06	1.70E-05	3.31E-05	1.14E-04	Y	A
7440-62-2	Vanadium	15.5	8.79E-05	2.99E-04	5.17E-07	1.92E-06	1.42E-05	5.28E-05	1.03E-04	3.53E-04	Y	A
7440-33-7	Tungsten	5	2.84E-05	9.64E-05	1.67E-07	6.20E-07	4.58E-06	1.70E-05	3.31E-05	1.14E-04	Y	A
7440-66-6	Zinc	18	1.02E-04	3.47E-04	6.01E-07	2.23E-06	1.65E-05	6.13E-05	1.19E-04	4.10E-04	Y	A
Subtotal			1.75E+00	5.94E+00	1.03E-02	3.82E-02	2.82E-01	1.05E+00	2.04E+00	7.03E+00	9.0667	9.0667
7647-01-0	Hydrogen Chloride	0.14 lb/ton product[4]					0.99	3.67	0.99	3.67		chk

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

[2] *(M3 2018) Median concentrations of SGP limestone material. Metals with medians below the detection limit (DL) are set to 1/2DL.*

[3] *Hg emissions from the Lime Kiln are conservatively estimated assuming 100% volatilization of all Hg in the limestone*

[4] *(EPA 1999b)*

1E+6 parts/ppm

LIME PRODUCTION - CONTINUED

Source Data

Source ID	Description	PM Emissions lb/day	ton/yr
LS1L	Mill Lime Silo #1 Loading	0.248	0.002
LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	1.200	0.011
MillS2L	Mill Lime Silo #2 Loading	0.248	0.002
MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	1.200	0.011
ACS1L	AC Lime Silo #1 Loading	0.990	0.009
ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	2.304	0.042
ACS2L	AC Lime Silo #2 Loading	0.990	0.009
ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	2.304	0.042
ACS3L	AC Lime Silo #3 Loading	0.990	0.009
ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	2.304	0.042
ACS4L	AC Lime Silo #4 Loading	0.495	0.004
ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	2.304	0.021
Subtotal - Mill & AC Lime Silos		15.576	0.203
LCR	Lime Mill Crushing and associated transfers In and Out	6.828	1.058
LSL	Pebble Lime Silo Loading via Bucket Elevator	0.149	0.023
LSU	Pebble Lime Silo discharge to Lime Slaker	0.015	0.002
Subtotal - Lime Mfg		6.991	1.083
Total		22.567	1.286

HAP/TAP Emission Factors and Emissions

CAS No.	Pollutant	Concentration ppm[2]	Mill and AC lb/hr	Mill and AC ton/yr	Lime Mfg lb/hr	Lime Mfg ton/yr	Emissions[1] lb/hr	Emissions[1] ton/yr	TAP	A/C
7440-38-2	Arsenic	23	1.06E-06	4.66E-06	5.69E-06	2.49E-05	6.75E-06	2.96E-05	Y	C
7440-41-7	Beryllium	0.8	3.70E-08	1.62E-07	1.98E-07	8.67E-07	2.35E-07	1.03E-06	Y	C
7440-43-9	Cadmium	0.25	1.16E-08	5.07E-08	6.18E-08	2.71E-07	7.34E-08	3.22E-07	Y	C
7440-48-4	Cobalt	4	2.60E-06	8.11E-07	1.17E-06	4.33E-06	3.76E-06	5.14E-06	Y	A
7440-47-3	Chromium	15	9.74E-06	3.04E-06	4.37E-06	1.63E-05	1.41E-05	1.93E-05	Y	A
7439-97-6	Mercury	0.02	1.30E-08	4.05E-09	5.83E-09	2.17E-08	1.88E-08	2.57E-08	N	
7439-96-5	Manganese	236.5	1.53E-04	4.79E-05	6.89E-05	2.56E-04	2.22E-04	3.04E-04	Y	A
7440-02-0	Nickel	5	2.31E-07	1.01E-06	1.24E-06	5.42E-06	1.47E-06	6.43E-06	Y	C
7439-92-1	Lead	3	1.95E-06	6.08E-07	8.74E-07	3.25E-06	2.82E-06	3.86E-06	N	
7440-36-0	Antimony	2.5	1.62E-06	5.07E-07	7.28E-07	2.71E-06	2.35E-06	3.22E-06	Y	A
7723-14-0	Phosphorus	130	8.44E-05	2.63E-05	3.79E-05	1.41E-04	1.22E-04	1.67E-04	Y	A
7440-22-4	Silver	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Y	A
7429-90-5	Aluminum	22,600	1.47E-02	4.58E-03	6.58E-03	2.45E-02	2.13E-02	2.91E-02	Y	A
7440-39-3	Barium	145	9.41E-05	2.94E-05	4.22E-05	1.57E-04	1.36E-04	1.86E-04	Y	A
1305-78-8	Calcium Oxide	740,000 [3]	4.80E-01	1.50E-01	2.16E-01	8.02E-01	6.96E-01	9.52E-01	Y	A
7440-50-8	Copper	5	3.25E-06	1.01E-06	1.46E-06	5.42E-06	4.70E-06	6.43E-06	Y	A
7439-89-6	Iron	10350	6.72E-03	2.10E-03	3.01E-03	1.12E-02	9.73E-03	1.33E-02	Y	A
7439-98-7	Molybdenum	0.5	3.25E-07	1.01E-07	1.46E-07	5.42E-07	4.70E-07	6.43E-07	Y	A
7440-28-0	Thallium	5	3.25E-06	1.01E-06	1.46E-06	5.42E-06	4.70E-06	6.43E-06	Y	A
7440-61-1	Uranium	5	3.25E-06	1.01E-06	1.46E-06	5.42E-06	4.70E-06	6.43E-06	Y	A
7440-62-2	Vanadium	15.5	1.01E-05	3.14E-06	4.52E-06	1.68E-05	1.46E-05	1.99E-05	Y	A
7440-33-7	Tungsten	5	3.25E-06	1.01E-06	1.46E-06	5.42E-06	4.70E-06	6.43E-06	Y	A
7440-66-6	Zinc	18	1.17E-05	3.65E-06	5.24E-06	1.95E-05	1.69E-05	2.31E-05	Y	A
Total			5.02E-01	1.57E-01	2.25E-01	8.38E-01	7.27E-01	9.95E-01		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *See LIME PRODUCTION, page 10*

(3) *(NLA 2007) 40% to 74% CaO in lime*

1E+6 parts/ppm

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AGGREGATE PRODUCTION

Source Data

	description	PM_ppd	PM_tpy
		PM Emissions	
Source ID	Description	lb/day	ton/yr
PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conve	15.00	2.74
PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conve	15.00	2.74
Total		30.00	5.48

HAP/TAP Emission Factors and Emissions

			lb/hr	ton/yr		
		Concentration	Emissions(1)			
CAS No.	Pollutant	ppm(2)	lb/hr	ton/yr	TAP	A/C
7440-38-2	Arsenic	23	2.88E-05	1.26E-04	Y	C
7440-41-7	Beryllium	0.8	1.00E-06	4.38E-06	Y	C
7440-43-9	Cadmium	0.25	3.13E-07	1.37E-06	Y	C
7440-48-4	Cobalt	4	5.00E-06	2.19E-05	Y	A
7440-47-3	Chromium	15	1.88E-05	8.21E-05	Y	A
7439-97-6	Mercury	0.02	2.50E-08	1.10E-07	N	
7439-96-5	Manganese	236.5	2.96E-04	1.29E-03	Y	A
7440-02-0	Nickel	5	6.25E-06	2.74E-05	Y	C
7439-92-1	Lead	3	3.75E-06	1.64E-05	N	
7440-36-0	Antimony	2.5	3.13E-06	1.37E-05	Y	A
7723-14-0	Phosphorus	130	1.63E-04	7.12E-04	Y	A
7440-22-4	Silver	0	0.00E+00	0.00E+00	Y	A
7429-90-5	Aluminum	22600	2.83E-02	1.24E-01	Y	A
7440-39-3	Barium	145	1.81E-04	7.94E-04	Y	A
1317-65-3	Calcium Carbonate	274500	3.43E-01	1.50E+00	Y	A
7440-50-8	Copper	5	6.25E-06	2.74E-05	Y	A
7439-89-6	Iron	10350	1.29E-02	5.67E-02	Y	A
7439-98-7	Molybdenum	0.5	6.25E-07	2.74E-06	Y	A
7440-28-0	Thallium	5	6.25E-06	2.74E-05	Y	A
7440-61-1	Uranium	5	6.25E-06	2.74E-05	Y	A
7440-62-2	Vanadium	15.5	1.94E-05	8.49E-05	Y	A
7440-33-7	Tungsten	5	6.25E-06	2.74E-05	Y	A
7440-66-6	Zinc	18	2.25E-05	9.86E-05	Y	A
Total			3.85E-01	1.69E+00		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *See LIME PRODUCTION, page 10*

1E+6 parts/ppm

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CONCRETE PRODUCTION

Source Data

	description	TP_unit/day	TP_unit/yr
		Throughput	
Source ID	Description	ton/day	ton/yr
CS1L	Cement/Shotcrete Silo #1 Loading	164	60,000
CS1U	Cement/Shotcrete Silo #1 Unloading	164	60,000
CS2L	Cement/Shotcrete Silo #2 Loading	164	60,000
CS2U	Cement/Shotcrete Silo #2 Unloading	164	60,000
CM	Central Mixer Loading	164	60,000
	Subtotal Cement Silo Filling	658	240,000
	Subtotal Central Mix Batching	164	60,000

HAP/TAP Emission Factors and Emissions

				CF_pph	CF_tpy	CM_pph	CM_tpy	lb/hr	ton/yr		
		Silo Fill	Central Mixer	Cement Silo L/U		Central Mix Batching		Total Emissions[3]			
CAS No.	HAP/TAP	lb/ton[2]	lb/ton[3]	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	TAP	A/C
7440-38-2	Arsenic	4.24E-09	2.96E-07	1.16E-7	5.09E-7	2.03E-6	8.88E-6	2.14E-6	9.39E-6	Y	C
7440-41-7	Beryllium	4.86E-10		1.33E-8	5.83E-8	--	--	1.33E-8	5.83E-8	Y	C
7440-43-9	Cadmium		7.10E-10	--	--	4.86E-9	2.13E-8	4.86E-9	2.13E-8	Y	C
7440-47-3	Chromium	2.90E-08	1.27E-07	7.95E-7	3.48E-6	8.70E-7	3.81E-6	1.66E-6	7.29E-6	Y	A
18540-29-9	Cr (VI)	5.80E-09	2.70E-08	1.59E-7	6.96E-7	1.85E-7	8.11E-7	3.44E-7	1.51E-6	Y	C
7439-92-1	Lead	1.09E-08	3.66E-08	2.99E-7	1.31E-6	2.51E-7	1.10E-6	5.49E-7	2.41E-6	N	
7439-96-5	Manganese	1.17E-07	3.78E-06	3.21E-6	1.40E-5	2.59E-5	1.13E-4	2.91E-5	1.27E-4	Y	A
7440-02-0	Nickel	4.18E-08	2.48E-07	1.15E-6	5.02E-6	1.70E-6	7.44E-6	2.84E-6	1.25E-5	Y	C
7723-14-0	Phosphorus		1.20E-06	--	--	8.22E-6	3.60E-5	8.22E-6	3.60E-5	Y	A
Total				5.73E-6	2.51E-5	3.91E-5	1.71E-4	4.49E-5	1.97E-4		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *AP-42, Table 11.12-8, (06/06) Cement Silo Filing, Controlled.* 20% *Cr (VI), IDEQ email on 11/23/2020* 0.0002 0.0002

(3) *AP-42, Table 11.12-8, (06/06) Central Mix Batching, Controlled.* 21.29% *Cr (VI), IDEQ email on 11/23/2020* chk

Conversions

24 hr/day

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CONCRETE PRODUCTION - CONTINUED

Source Data

	description	PM_ppd	PM_tpy
		PM Emissions	
Source ID	Description	lb/day	ton/yr
CAL	Aggregate Bin Loading	16.56	1.73
CAU	Aggregate Bin Unloading	16.56	1.73
Total		33.12	3.45

HAP/TAP Emission Factors and Emissions

			lb/hr	ton/yr		
		Concentration	Emissions[1]			
CAS No.	Pollutant	ppm[2]	lb/hr	ton/yr	TAP	A/C
7440-38-2	Arsenic	23	1.81E-05	7.94E-05	Y	C
7440-41-7	Beryllium	0.8	6.30E-07	2.76E-06	Y	C
7440-43-9	Cadmium	0.25	1.97E-07	8.63E-07	Y	C
7440-48-4	Cobalt	4	5.52E-06	1.38E-05	Y	A
7440-47-3	Chromium	15	2.07E-05	5.18E-05	Y	A
7439-97-6	Mercury	0.02	2.76E-08	6.90E-08	N	
7439-96-5	Manganese	236.5	3.26E-04	8.16E-04	Y	A
7440-02-0	Nickel	5	3.94E-06	1.73E-05	Y	C
7439-92-1	Lead	3	4.14E-06	1.04E-05	N	
7440-36-0	Antimony	2.5	3.45E-06	8.63E-06	Y	A
7723-14-0	Phosphorus	130	1.79E-04	4.49E-04	Y	A
7440-22-4	Silver	0	0.00E+00	0.00E+00	Y	A
7429-90-5	Aluminum	22600	3.12E-02	7.80E-02	Y	A
7440-39-3	Barium	145	2.00E-04	5.00E-04	Y	A
7440-50-8	Copper	5	6.90E-06	1.73E-05	Y	A
7439-89-6	Iron	10350	1.43E-02	3.57E-02	Y	A
7439-98-7	Molybdenum	0.5	6.90E-07	1.73E-06	Y	A
7440-28-0	Thallium	5	6.90E-06	1.73E-05	Y	A
7440-61-1	Uranium	5	6.90E-06	1.73E-05	Y	A
7440-62-2	Vanadium	15.5	2.14E-05	5.35E-05	Y	A
7440-33-7	Tungsten	5	6.90E-06	1.73E-05	Y	A
7440-66-6	Zinc	18	2.48E-05	6.21E-05	Y	A
Total			4.63E-02	1.16E-01		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *See LIME PRODUCTION, page 10*

1E+6 parts/ppm

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FUEL STORAGE - GASOLINE

Source Data

	description	VOC_ppd	VOC_tpy
		VOC Emissions	
Source ID	Description	lb/day	ton/yr
TG1	Mine Site Gasoline Tank #1	5.25	0.96
TG2	Mine Site Gasoline Tank #2	5.25	0.96
Total		10.49	1.91

HAP/TAP Emission Factors and Emissions

		Concentration	lb/hr	ton/yr		
			Emissions[1]			
CAS No.	Pollutant	wt. %[2]	lb/hr	ton/yr	TAP	A/C
71-43-2	Benzene	1.608%	7.03E-03	3.08E-02	Y	C
92-52-4	Biphenyl	0.010%	4.37E-05	1.91E-04	Y	A
110-82-7	Cyclohexane	0.240%	1.05E-03	4.60E-03	Y	A
110-54-3	Hexane	7.138%	3.12E-02	1.37E-01	Y	A
91-20-3	Naphthalene	0.444%	1.94E-03	8.50E-03	Y	A
108-95-2	Phenol	0.055%	2.40E-04	1.05E-03	Y	A
108-88-3	Toluene	7.212%	3.15E-02	1.38E-01	Y	A
25551-13-7	Trimethyl benzene	2.500%	1.09E-02	4.79E-02	Y	A
1330-20-7	Xylene	7.170%	3.13E-02	1.37E-01	Y	A
Total			1.15E-01	5.05E-01		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *(EPA 1999a)*

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MINING FUGITIVE EMISSIONS

Dust Emissions

Source Data **Model Scenario** **W3** **180,000 T/day Emissions**

Source ID	Description	PM Emissions lb/day	ton/yr
YPP	Yellow Pine Pit	--	--
HFP	Hangar Flats Pit	--	--
WEP	West End Pit	1,887.91	344.54
BT	Bradley Tailings	--	--
YPPBL	Yellow Pine Pit Blasting	--	--
HFPBL	Hangar Flats Pit Blasting	--	--
WEPBL	West End Pit Blasting	643.03	117.35
BTBL	Bradley Tailings Blasting	--	--
STKP	PC Stockpile	--	--
FDRSF	Fiddle DRSF	--	--
HFDRSF	Hangar Flats DRSF	289.91	52.91
YPDRSF	Yellow Pine DRSF	--	--
WEDRSF	West End DRSF	--	--
HR000	Haul Roads	16,697.74	3,047.34
TSF	Tailing Storage Facility	--	--
ACCRD	Access Roads	38.10	6.95
UGEXP	Scout Portal	0.008	0.002
Total		19,556.71	3,569.10
TSF, ACCRD, UGEXP		38.11	6.95

chk 3569.10

Operating schedule 365 day/yr

Clean rock cap (CR) >0% [1]

[1] *(Perpetua 2021h) Percent of VMTs on haul roads capped with CR*
Roads outside of the pits and DRSFs are capped with CR

HAP/TAP Emission Factors		ORE	DR	CR	HRD	Borrow	AR
		Concentration					
CAS No.	Pollutant	ppm[1]	ppm[1]	ppm[3]	ppm[4]	ppm[5]	ppm
7440-38-2	Arsenic	667	667	90	667	2.5	667
7440-41-7	Beryllium	3.2	3.2		3.2		3.2
7440-43-9	Cadmium	0.5	0.5		0.5		0.5
7440-48-4	Cobalt	4	4		4		4
7440-47-3	Chromium	9	9		9		9
7439-97-6	Mercury [2]	0.96	0.6		0.6		0.6
7439-96-5	Manganese	299	299		299		299
7440-02-0	Nickel	2	2		2		2
7439-92-1	Lead	8	8		8		8
7440-36-0	Antimony	23	23		23		23
7723-14-0	Phosphorus	650	650		650		650
7782-49-2	Selenium	0.4	0.4		0.4		0.4
7440-22-4	Silver	0.5	0.5		0.5		0.5
7429-90-5	Aluminum	71000	71000		71000		71000
7440-39-3	Barium	800	800		800		800
1317-65-3	Calcium Carbonate	14000	14000		14000		14000
7440-50-8	Copper	5	5		5		5
7439-89-6	Iron	18200	18200		18200		18200
7439-98-7	Molybdenum	1	1		1		1
7440-28-0	Thallium	10	10		10		10
7440-61-1	Uranium	10	10		10		10
7440-62-2	Vanadium	28	28		28		28
7440-33-7	Tungsten	10	10		10		10
7440-66-6	Zinc	35	35		35		35

[1] *(Midas Gold 2017c) Median concentration of 55,000 SGP samples.* *1E+6 parts/ppm*
[2] *(Midas Gold 2018e) Median ore and development rock (DR) concentrations of 151,000 samples; resource block model.*
[3] *(Perpetua 2021g) Median concentration of 265 SGP samples.*
[4] *HRD: haul road - emissions calculated based on 0% of the total VMT occuring on CR*
[5] *(ALS 2018) Median concentration of 8 SGP samples.*

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MINING FUGITIVE EMISSIONS - CONTINUED **Model Scenario W3** DR **180,000 T/day Emissions**

HAP/TAP Emissions

Hourly [1]

		DR	DR	DR	DR	DR	DR	DR	DR	ORE	DR	DR	DR	DR	HRD	DR/AR	
		YPP_pph	HFP_pph	WEP_pph	BT_pph	YPPBL_pph	HFPBL_pph	WEPBL_pph	BTBL_pph	STKP_pph	FDRSF_pph	HFDRSF_pph	YPDRSF_pph	WEDRSF_pph	HR000_pph	CCRD, UGE	lb/hr
		YPP	HFP	WEP	BT	YPPBL	HFPBL	WEPBL	BTBL	STKP	FDRSF	HFDRSF	YPDRSF	WEDRSF	HR000	TSF, ACCRD, UGEXP	Total
CAS No.	Pollutant	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr
7440-38-2	Arsenic	0	0	0.052	0	0	0	0.018	0	0	0	8.1E-3	0	0	0.464	1.1E-3	0.544
7440-41-7	Beryllium	0	0	2.5E-4	0	0	0	8.6E-5	0	0	0	3.9E-5	0	0	2.2E-3	5.1E-6	2.6E-3
7440-43-9	Cadmium	0	0	3.9E-5	0	0	0	1.3E-5	0	0	0	6.0E-6	0	0	3.5E-4	7.9E-7	4.1E-4
7440-48-4	Cobalt	0	0	3.1E-4	0	0	0	1.1E-4	0	0	0	4.8E-5	0	0	2.8E-3	6.4E-6	3.3E-3
7440-47-3	Chromium	0	0	7.1E-4	0	0	0	2.4E-4	0	0	0	1.1E-4	0	0	6.3E-3	1.4E-5	7.3E-3
7439-97-6	Mercury	0	0	4.7E-5	0	0	0	1.6E-5	0	0	0	7.2E-6	0	0	4.2E-4	9.5E-7	4.9E-4
7439-96-5	Manganese	0	0	0.024	0	0	0	8.0E-3	0	0	0	3.6E-3	0	0	0.208	4.7E-4	0.244
7440-02-0	Nickel	0	0	1.6E-4	0	0	0	5.4E-5	0	0	0	2.4E-5	0	0	1.4E-3	3.2E-6	1.6E-3
7439-92-1	Lead	0	0	6.3E-4	0	0	0	2.1E-4	0	0	0	9.7E-5	0	0	5.6E-3	1.3E-5	6.5E-3
7440-36-0	Antimony	0	0	1.8E-3	0	0	0	6.2E-4	0	0	0	2.8E-4	0	0	0.016	3.7E-5	0.019
7723-14-0	Phosphorus	0	0	0.051	0	0	0	0.017	0	0	0	7.9E-3	0	0	0.452	1.0E-3	0.530
7782-49-2	Selenium	0	0	3.1E-5	0	0	0	1.1E-5	0	0	0	4.8E-6	0	0	2.8E-4	6.4E-7	3.3E-4
7440-22-4	Silver	0	0	3.9E-5	0	0	0	1.3E-5	0	0	0	6.0E-6	0	0	3.5E-4	7.9E-7	4.1E-4
7429-90-5	Aluminum	0	0	5.585	0	0	0	1.902	0	0	0	0.858	0	0	49.397	0.113	57.855
7440-39-3	Barium	0	0	0.063	0	0	0	0.021	0	0	0	9.7E-3	0	0	0.557	1.3E-3	0.652
1317-65-3	Calcium Ca	0	0	1.101	0	0	0	0.375	0	0	0	0.169	0	0	9.740	0.022	11.408
7440-50-8	Copper	0	0	3.9E-4	0	0	0	1.3E-4	0	0	0	6.0E-5	0	0	3.5E-3	7.9E-6	4.1E-3
7439-89-6	Iron	0	0	1.432	0	0	0	0.488	0	0	0	0.220	0	0	12.662	0.029	14.831
7439-98-7	Molybdenu	0	0	7.9E-5	0	0	0	2.7E-5	0	0	0	1.2E-5	0	0	7.0E-4	1.6E-6	8.1E-4
7440-28-0	Thallium	0	0	7.9E-4	0	0	0	2.7E-4	0	0	0	1.2E-4	0	0	7.0E-3	1.6E-5	8.1E-3
7440-61-1	Uranium	0	0	7.9E-4	0	0	0	2.7E-4	0	0	0	1.2E-4	0	0	7.0E-3	1.6E-5	8.1E-3
7440-62-2	Vanadium	0	0	2.2E-3	0	0	0	7.5E-4	0	0	0	3.4E-4	0	0	0.019	4.4E-5	0.023
7440-33-7	Tungsten	0	0	7.9E-4	0	0	0	2.7E-4	0	0	0	1.2E-4	0	0	7.0E-3	1.6E-5	8.1E-3
7440-66-6	Zinc	0	0	2.8E-3	0	0	0	9.4E-4	0	0	0	4.2E-4	0	0	0.024	5.6E-5	0.029
Total		0	0	8.320	0	0	0	2.834	0	0	0	1.278	0	0	73.586	0.168	86.185
															chk	86.1849	86.1849

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
	PROJECT NO: 335-20-3	PAGE: 18 OF: 19 SHEET: Calcs
AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

MINING FUGITIVE EMISSIONS - CONTINUED **Model Scenario W3** DR **180,000 T/day Emissions**

HAP/TAP Emissions

Annual

		DR	DR	DR	DR	DR	DR	DR	DR	ORE	DR	DR	DR	DR	HRD	DR/AR	
		YPP_tpy	HFP_tpy	WEP_tpy	BT_tpy	YPPBL_tpy	HFPBL_tpy	WEPBL_tpy	BTBL_tpy	STKP_tpy	FDRSF_tpy	HFDRSF_tpy	YPDRSF_tpy	WEDRSF_tpy	HR000_tpy	CCRD, UGE	ton/yr
		YPP	HFP	WEP	BT	YPPBL	HFPBL	WEPBL	BTBL	STKP	FDRSF	HFDRSF	YPDRSF	WEDRSF	HR000	TSF, ACCRD, UGEXP	Total
CAS No.	Pollutant	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
7440-38-2	Arsenic	0	0	0.230	0	0	0	0.078	0	0	0	0.035	0	0	2.033	4.6E-3	2.381
7440-41-7	Beryllium	0	0	1.1E-3	0	0	0	3.8E-4	0	0	0	1.7E-4	0	0	9.8E-3	2.2E-5	0.011
7440-43-9	Cadmium	0	0	1.7E-4	0	0	0	5.9E-5	0	0	0	2.6E-5	0	0	1.5E-3	3.5E-6	1.8E-3
7440-48-4	Cobalt	0	0	1.4E-3	0	0	0	4.7E-4	0	0	0	2.1E-4	0	0	0.012	2.8E-5	0.014
7440-47-3	Chromium	0	0	3.1E-3	0	0	0	1.1E-3	0	0	0	4.8E-4	0	0	0.027	6.3E-5	0.032
7439-97-6	Mercury	0	0	2.1E-4	0	0	0	7.0E-5	0	0	0	3.2E-5	0	0	1.8E-3	4.2E-6	2.1E-3
7439-96-5	Manganese	0	0	0.103	0	0	0	0.035	0	0	0	0.016	0	0	0.911	2.1E-3	1.067
7440-02-0	Nickel	0	0	6.9E-4	0	0	0	2.3E-4	0	0	0	1.1E-4	0	0	6.1E-3	1.4E-5	7.1E-3
7439-92-1	Lead	0	0	2.8E-3	0	0	0	9.4E-4	0	0	0	4.2E-4	0	0	0.024	5.6E-5	0.029
7440-36-0	Antimony	0	0	7.9E-3	0	0	0	2.7E-3	0	0	0	1.2E-3	0	0	0.070	1.6E-4	0.082
7723-14-0	Phosphorus	0	0	0.224	0	0	0	0.076	0	0	0	0.034	0	0	1.981	4.5E-3	2.320
7782-49-2	Selenium	0	0	1.4E-4	0	0	0	4.7E-5	0	0	0	2.1E-5	0	0	1.2E-3	2.8E-6	1.4E-3
7440-22-4	Silver	0	0	1.7E-4	0	0	0	5.9E-5	0	0	0	2.6E-5	0	0	1.5E-3	3.5E-6	1.8E-3
7429-90-5	Aluminum	0	0	24.463	0	0	0	8.332	0	0	0	3.756	0	0	216	0.494	253
7440-39-3	Barium	0	0	0.276	0	0	0	0.094	0	0	0	0.042	0	0	2.438	5.6E-3	2.855
1317-65-3	Calcium Ca	0	0	4.824	0	0	0	1.643	0	0	0	0.741	0	0	42.663	0.097	49.967
7440-50-8	Copper	0	0	1.7E-3	0	0	0	5.9E-4	0	0	0	2.6E-4	0	0	0.015	3.5E-5	0.018
7439-89-6	Iron	0	0	6.271	0	0	0	2.136	0	0	0	0.963	0	0	55.462	0.127	64.958
7439-98-7	Molybdenu	0	0	3.4E-4	0	0	0	1.2E-4	0	0	0	5.3E-5	0	0	3.0E-3	7.0E-6	3.6E-3
7440-28-0	Thallium	0	0	3.4E-3	0	0	0	1.2E-3	0	0	0	5.3E-4	0	0	0.030	7.0E-5	0.036
7440-61-1	Uranium	0	0	3.4E-3	0	0	0	1.2E-3	0	0	0	5.3E-4	0	0	0.030	7.0E-5	0.036
7440-62-2	Vanadium	0	0	9.6E-3	0	0	0	3.3E-3	0	0	0	1.5E-3	0	0	0.085	1.9E-4	0.100
7440-33-7	Tungsten	0	0	3.4E-3	0	0	0	1.2E-3	0	0	0	5.3E-4	0	0	0.030	7.0E-5	0.036
7440-66-6	Zinc	0	0	0.012	0	0	0	4.1E-3	0	0	0	1.9E-3	0	0	0.107	2.4E-4	0.125
Total		0	0	36.441	0	0	0	12.412	0	0	0	5.596	0	0	322	0.736	377
															chk	377.4900	377.4900

Air Sciences Inc.	PROJECT TITLE: Stibnite Gold Project	BY: K. Lewis
	PROJECT NO: 335-20-3	PAGE: 19 OF: 19 SHEET: Calcs
AIR EMISSION CALCULATIONS	SUBJECT: HAP/TAP Emission Calculations	DATE: October 4, 2021

MINING FUGITIVE EMISSIONS - CONTINUED

Mercury Evaporative Flux Emissions

Fugitive Mercury Flux and Emissions

			Area		Hg Flux	Emissions[1]		
CAS No.	Pollutant	Source	m^2	ha	$\mu g/m^2$-yr	lb/hr	ton/yr	lb/yr
		Stockpiles	52,623	5.3	556	7.37E-6	3.2E-5	6.5E-2
		Rock Dumps	2,063,990	206.4	76.2	3.96E-5	1.7E-4	0.35
		Tailings	1,338,158	133.8	2,144	7.22E-4	3.2E-3	6.32
		Pits	1,504,919	150.5	132.3	5.01E-5	2.2E-4	0.44
7439-97-6	Mercury					8.2E-4	3.6E-3	7.17

(1) *Hourly emissions based on:* 8,760 *hours per year of operation*

Fugitive Mercury Emission Factors

	Twin Creeks (TC)		Ore Hg Adjusted	Stibnite	
	Hg Flux [1]	Hg [2]	$\mu g/m^2/yr$	Hg Flux [3]	Hg [4]
Source	$\mu g/m^2$-yr	µg/g	TC	$\mu g/m^2$-yr	µg/g
Stockpiles	5,609	33	556	556	0.96
Rock Dumps	768	3.5	76.2	76.2	0.60
Tailings	21,621	33	2,144	2,144	0.96
Pits	1,334	9.5	132	132.3	0.60

(1) *(Eckley 2010)* *Table 1: Hg flux* $\mu g/m^2$*-yr*

(2) *(Eckley 2010)* *Table 1: Average Hg flux mg/g: " Stockpiles - high-grade stockpiles, Rock Dumps - waste rock dumps, Tailings - high-grade stockpiles as a surrogate; Pits - pit"*

(3) *(Eckley 2010)* *Figure 2: log(y) = m*log(x) + b*

y = Hg Flux (ng/m^2*-d)*
x = material Hg concentration (µg/g)]

Slope =	*Solar*	*TC*
	Low	*0.59*
	Medium	*0.6*
	High	*0.77*
	Average	0.65

(4) *(Midas Gold 2018e)*

Sample Calculation: m = log (y1/y2) / log(x1/x2)

m=	0.65	unitless
y1=	5,609	$\mu g/m^2$-yr
x1=	33	$\mu g/m^2$-yr
x2=	0.96	$\mu g/m^2$-yr
log(x1/x2)=	1.536243	unitless
log(y1/y2)=	1.003679	unitless
y1/y2=	10.08506	unitless
y2=	556.2	$\mu g/m^2$-yr

Conversions

2,000	lb/ton
10,000	m2/ha
453.593	g/lb

TABLE A-W3. HAP/TAP Emissions and Exemptions

180,000 T/day Emissions

chk

CAS	HAP/TAP	HAP	TAP	NSPS or NESHAP HAP/TAP -->	Non-Carcinogenic Acute (A) or Carcinogenic (C) --> A/C	MINING: Mining / Model Scenario W3 / YPP,HFP,WEP,BT / Pits lb/hr	ton/yr	YPPBL,HFPBL,WEPBL,BTBL / Blasting lb/hr	ton/yr	HR000 / Haul Roads lb/hr	ton/yr	STKP, FDRSF, HFDRSF, YPDRSF, WEDRSF / Stockpiles and DRFS lb/hr	ton/yr	TSF,ACCRD,UGEXP / Tails, Access Road, Exploration lb/hr	ton/yr	LEACHING: CN Leach/PAX / CN Leach and PAX lb/hr	ton/yr
				Y	A/C	1	1	1	1	1	1	1	1	1	1	1	1
106-99-0	1,3-Butadiene	Y	Y	Y	C				0	0	0		0				
91-57-6	2-Methylnaphthalene	Y	N	n/a								0					
56-49-5	3-Methylchloranthrene	Y	Y	Y	C												
57-97-6	7,12-Dimethylbenz(a)anthracene	Y	N	n/a													
83-32-9	Acenaphthene	Y	N	n/a													
208-96-8	Acenaphthylene	Y	N	n/a													
75-07-0	Acetaldehyde	Y	Y	Y	C												
107-02-8	Acrolein	Y	Y	Y	A												
120-12-7	Anthracene	Y	N	n/a													
7440-36-0	Antimony	Y	Y	Y	A	1.8E-3	7.9E-3	6.2E-4	2.7E-3	0.016	0.070	2.8E-4	1.2E-3	3.7E-5	1.6E-4		
7440-38-2	Arsenic	Y	Y	Y	C	0.052	0.230	0.018	0.078	0.464	2.033	8.1E-3	0.035	1.1E-3	4.6E-3		
71-43-2	Benzene	Y	Y	Y	C												
50-32-8	Benzo(a)pyrene	Y	Y	Y	C												
56-55-3	Benz(a)anthracene	Y	Y	Y	C												
205-99-2	Benzo(b)fluoranthene	Y	Y	Y	C												
207-08-9	Benzo(k)fluoranthene	Y	Y	Y	C												
218-01-9	Chrysene	Y	Y	Y	C												
53-70-3	Dibenzo(a,h)anthracene	Y	Y	Y	C												
193-39-5	Indeno(1,2,3-cd)pyrene	Y	Y	Y	C												
191-24-2	Benzo(g,h,i)perylene	Y	N	n/a													
7440-41-7	Beryllium	Y	Y	Y	C	2.5E-4	1.1E-3	8.6E-5	3.8E-4	2.2E-3	9.8E-3	3.9E-5	1.7E-4	5.1E-6	2.2E-5		
92-52-4	Biphenyl	Y	Y	Y	A												
7440-43-9	Cadmium	Y	Y	Y	C	3.9E-5	1.7E-4	1.3E-5	5.9E-5	3.5E-4	1.5E-3	6.0E-6	2.6E-5	7.9E-7	3.5E-6		
75-15-0	Carbon Disulfide	Y	Y	Y	A											0.014	0.063
7440-47-3	Chromium	Y	Y	Y	A	7.1E-4	3.1E-3	2.4E-4	1.1E-3	6.3E-3	0.027	1.1E-4	4.8E-4	1.4E-5	6.3E-5		
18540-29-9	Cr (VI)	Y	Y	Y	C												
7440-48-4	Cobalt	Y	Y	Y	A	3.1E-4	1.4E-3	1.1E-4	4.7E-4	2.8E-3	0.012	4.8E-5	2.1E-4	6.4E-6	2.8E-5		
592-01-8	Cyanide	Y	Y	Y	A											0.453	1.983
106-46-7	Dichlorobenzene	Y	Y	Y	A												
206-44-0	Fluoranthene	Y	N	n/a													
86-73-7	Fluorene	Y	N	n/a													
50-00-0	Formaldehyde	Y	Y	Y	C												
110-54-3	Hexane	Y	Y	Y	A												
7647-01-0	Hydrogen Chloride	Y	Y	Y	A												
7439-92-1	Lead	Y	N	n/a		6.3E-4	2.8E-3	2.1E-4	9.4E-4	5.6E-3	0.024	9.7E-5	4.2E-4	1.3E-5	5.6E-5		
7439-96-5	Manganese	Y	Y	Y	A	0.024	0.103	8.0E-3	0.035	0.208	0.911	3.6E-3	0.016	4.7E-4	2.1E-3		
7439-97-6	Mercury	Y	N	n/a		9.7E-5	4.3E-4	1.6E-5	7.0E-5	4.2E-4	1.8E-3	5.4E-5	2.4E-4	7.2E-4	3.2E-3		
91-20-3	Naphthalene	Y	Y	Y	A												
7440-02-0	Nickel	Y	Y	Y	C	1.6E-4	6.9E-4	5.4E-5	2.3E-4	1.4E-3	6.1E-3	2.4E-5	1.1E-4	3.2E-6	1.4E-5		
85-01-8	Phenanthrene	Y	N	n/a													
108-95-2	Phenol	Y	Y	Y	A												
7723-14-0	Phosphorus	Y	Y	Y	A	0.051	0.224	0.017	0.076	0.452	1.981	7.9E-3	0.034	1.0E-3	4.5E-3		
129-00-0	Pyrene	Y	N	n/a													
7782-49-2	Selenium	Y	Y	Y	A	3.1E-5	1.4E-4	1.1E-5	4.7E-5	2.8E-4	1.2E-3	4.8E-6	2.1E-5	6.4E-7	2.8E-6		
108-88-3	Toluene	Y	Y	Y	A												
1330-20-7	Xylene	Y	Y	Y	A												
7429-90-5	Aluminum	N	Y	N	A	5.585	24.463	1.902	8.332	49.397	216	0.858	3.756	0.113	0.494		
7440-39-3	Barium	N	Y	N	A	0.063	0.276	0.021	0.094	0.557	2.438	9.7E-3	0.042	1.3E-3	5.6E-3		
1317-65-3	Calcium Carbonate	N	Y	N	A	1.101	4.824	0.375	1.643	9.740	42.663	0.169	0.741	0.022	0.097		
1305-78-8	Calcium Oxide	N	Y	N	A												
7440-50-8	Copper	N	Y	N	A	3.9E-4	1.7E-3	1.3E-4	5.9E-4	3.5E-3	0.015	6.0E-5	2.6E-4	7.9E-6	3.5E-5		
110-82-7	Cyclohexane	N	Y	N	A												
7783-06-4	Hydrogen Sulfide	N	Y	N	A												
7439-89-6	Iron	N	Y	N	A	1.432	6.271	0.488	2.136	12.662	55.462	0.220	0.963	0.029	0.127		
7439-98-7	Molybdenum	N	Y	N	A	7.9E-5	3.4E-4	2.7E-5	1.2E-4	7.0E-4	3.0E-3	1.2E-5	5.3E-5	1.6E-6	7.0E-6		
109-66-0	Pentane	N	Y	N	A												
7440-22-4	Silver	N	Y	N	A	3.9E-5	1.7E-4	1.3E-5	5.9E-5	3.5E-4	1.5E-3	6.0E-6	2.6E-5	7.9E-7	3.5E-6		
7664-93-9	Sulfuric Acid	N	Y	N	A												
7440-28-0	Thallium	N	Y	N	A	7.9E-4	3.4E-3	2.7E-4	1.2E-3	7.0E-3	0.030	1.2E-4	5.3E-4	1.6E-5	7.0E-5		
7440-61-1	Uranium	N	Y	N	A	7.9E-4	3.4E-3	2.7E-4	1.2E-3	7.0E-3	0.030	1.2E-4	5.3E-4	1.6E-5	7.0E-5		
7440-62-2	Vanadium	N	Y	N	A	2.2E-3	9.6E-3	7.5E-4	3.3E-3	0.019	0.085	3.4E-4	1.5E-3	4.4E-5	1.9E-4		
25551-13-7	Trimethyl benzene	N	Y	N	A												
7440-33-7	Tungsten	N	Y	N	A	7.9E-4	3.4E-3	2.7E-4	1.2E-3	7.0E-3	0.030	1.2E-4	5.3E-4	1.6E-5	7.0E-5		
7440-66-6	Zinc	N	Y	N	A	2.8E-3	0.012	9.4E-4	4.1E-3	0.024	0.107	4.2E-4	1.9E-3	5.6E-5	2.4E-4		
HAP TOTAL						***0.131***	***0.574***	***0.045***	***0.196***	***1.160***	***5.079***	***0.020***	***0.088***	***3.4E-3***	***0.015***	***0.467***	***2.046***
MERCURY TOTAL (exempt)						***9.7E-5***	***4.3E-4***	***1.6E-5***	***7.0E-5***	***4.2E-4***	***1.8E-3***	***5.4E-5***	***2.4E-4***	***7.2E-4***	***3.2E-3***		
MERCURY TOTAL (non-exempt)																	
TAP TOTAL (HAP-TAP addressed by NSPS/NESHAP)																	
TAP TOTAL (For EL Evaluation)						***8.319***	***36.438***	***2.834***	***12.411***	***73.580***	***322***	***1.278***	***5.595***	***0.168***	***0.735***	***0.467***	***2.046***

TABLE A-W3. HAP/TAP Emissions and Exemptions

180,000 T/day Emissions

chk

CAS	HAP/TAP	HAP	TAP			PROCESSING AND PRODUCTION											
						Ore Processing				*Ore Concentration and Refining*				*Process Heating*			
						0	0	0	0	1	1	1	1	0	0	1	1
						OC1-13		PS		AC		EW,MR,MF,CKD		ACB, CKB, PV, HS		LKC	
						Crushers & Xfers		Prill Silos		Autoclave		EW, Preg Tank, Retort, Furnace, Carbon Kiln		POX Boiler, C. Kiln Comb., Prop. Vap., Sol'n Heater		Lime Kiln Combustion	
	NSPS or NESHAP HAP/TAP -->			*Y*		*LL*	*LL*			*7E*	*7E*	*7E*	*7E*			*5A*	*5A*
	Non-Carcinogenic Acute (A) or Carcinogenic (C) -->				*A/C*	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
106-99-0	1,3-Butadiene	Y	Y	Y	C												
91-57-6	2-Methylnaphthalene	Y	N	n/a										1.9E-7	7.6E-7	5.2E-7	1.9E-6
56-49-5	3-Methylchloranthrene	Y	Y	Y	C									1.3E-8	5.7E-8	3.3E-8	1.4E-7
57-97-6	7,12-Dimethylbenz(a)anthracene	Y	N	n/a										1.3E-7	5.1E-7	3.5E-7	1.3E-6
83-32-9	Acenaphthene	Y	N	n/a										1.4E-8	5.7E-8	3.9E-8	1.4E-7
208-96-8	Acenaphthylene	Y	N	n/a										1.4E-8	5.7E-8	3.9E-8	1.4E-7
75-07-0	Acetaldehyde	Y	Y	Y	C												
107-02-8	Acrolein	Y	Y	Y	A												
120-12-7	Anthracene	Y	N	n/a										1.9E-8	7.6E-8	5.2E-8	1.9E-7
7440-36-0	Antimony	Y	Y	Y	A	1.4E-4	5.9E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7440-38-2	Arsenic	Y	Y	Y	C	3.9E-3	0.017			2.3E-5	1.0E-4	3.8E-4	1.7E-3	1.5E-6	6.4E-6	3.7E-6	1.6E-5
71-43-2	Benzene	Y	Y	Y	C									1.5E-5	6.7E-5	3.9E-5	1.7E-4
50-32-8	Benzo(a)pyrene	Y	Y	Y	C									8.7E-9	3.8E-8	2.2E-8	9.6E-8
56-55-3	Benz(a)anthracene	Y	Y	Y	C									1.3E-8	5.7E-8	3.3E-8	1.4E-7
205-99-2	Benzo(b)fluoranthene	Y	Y	Y	C									1.3E-8	5.7E-8	3.3E-8	1.4E-7
207-08-9	Benzo(k)fluoranthene	Y	Y	Y	C									1.3E-8	5.7E-8	3.3E-8	1.4E-7
218-01-9	Chrysene	Y	Y	Y	C									1.3E-8	5.7E-8	3.3E-8	1.4E-7
53-70-3	Dibenzo(a,h)anthracene	Y	Y	Y	C									8.7E-9	3.8E-8	2.2E-8	9.6E-8
193-39-5	Indeno(1,2,3-cd)pyrene	Y	Y	Y	C									1.3E-8	5.7E-8	3.3E-8	1.4E-7
191-24-2	Benzo(g,h,i)perylene	Y	N	n/a										9.5E-9	3.8E-8	2.6E-8	9.6E-8
7440-41-7	Beryllium	Y	Y	Y	C	1.9E-5	8.2E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3	8.7E-8	3.8E-7	2.2E-7	9.6E-7
92-52-4	Biphenyl	Y	Y	Y	A												
7440-43-9	Cadmium	Y	Y	Y	C	2.9E-6	1.3E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3	8.0E-6	3.5E-5	2.0E-5	8.8E-5
75-15-0	Carbon Disulfide	Y	Y	Y	A												
7440-47-3	Chromium	Y	Y	Y	A	5.3E-5	2.3E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3	1.1E-5	4.5E-5	3.0E-5	1.1E-4
18540-29-9	Cr (VI)	Y	Y	Y	C												
7440-48-4	Cobalt	Y	Y	Y	A	2.4E-5	1.0E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3	6.6E-7	2.7E-6	1.8E-6	6.8E-6
592-01-8	Cyanide	Y	Y	Y	A							1.2E-3	5.3E-3				
106-46-7	Dichlorobenzene	Y	Y	Y	A									9.5E-6	3.8E-5	2.6E-5	9.6E-5
206-44-0	Fluoranthene	Y	N	n/a										2.4E-8	9.5E-8	6.5E-8	2.4E-7
86-73-7	Fluorene	Y	N	n/a										2.2E-8	8.9E-8	6.1E-8	2.3E-7
50-00-0	Formaldehyde	Y	Y	Y	C									5.5E-4	2.4E-3	1.4E-3	6.0E-3
110-54-3	Hexane	Y	Y	Y	A									0.014	0.057	0.039	0.145
7647-01-0	Hydrogen Chloride	Y	Y	Y	A												
7439-92-1	Lead	Y	N	n/a		4.7E-5	2.1E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7439-96-5	Manganese	Y	Y	Y	A	1.8E-3	7.7E-3			2.3E-5	1.0E-4	3.8E-4	1.7E-3	3.0E-6	1.2E-5	8.2E-6	3.1E-5
7439-97-6	Mercury	Y	N	n/a		5.6E-6	2.5E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3	2.1E-6	8.3E-6	5.6E-6	2.1E-5
91-20-3	Naphthalene	Y	Y	Y	A									4.8E-6	1.9E-5	1.3E-5	4.9E-5
7440-02-0	Nickel	Y	Y	Y	C	1.2E-5	5.2E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3	1.5E-5	6.7E-5	3.9E-5	1.7E-4
85-01-8	Phenanthrene	Y	N	n/a										1.3E-7	5.4E-7	3.7E-7	1.4E-6
108-95-2	Phenol	Y	Y	Y	A												
7723-14-0	Phosphorus	Y	Y	Y	A	3.8E-3	0.017			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
129-00-0	Pyrene	Y	N	n/a										4.0E-8	1.6E-7	1.1E-7	4.0E-7
7782-49-2	Selenium	Y	Y	Y	A	2.4E-6	1.0E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3	1.9E-7	7.6E-7	5.2E-7	1.9E-6
108-88-3	Toluene	Y	Y	Y	A									2.7E-5	1.1E-4	7.3E-5	2.7E-4
1330-20-7	Xylene	Y	Y	Y	A												
7429-90-5	Aluminum	N	Y	N	A	0.418	1.829			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7440-39-3	Barium	N	Y	N	A	4.7E-3	0.021			2.3E-5	1.0E-4	3.8E-4	1.7E-3	3.5E-5	1.4E-4	9.5E-5	3.5E-4
1317-65-3	Calcium Carbonate	N	Y	N	A	0.082	0.361			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
1305-78-8	Calcium Oxide	N	Y	N	A												
7440-50-8	Copper	N	Y	N	A	2.9E-5	1.3E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3	6.7E-6	2.7E-5	1.8E-5	6.8E-5
110-82-7	Cyclohexane	N	Y	N	A												
7783-06-4	Hydrogen Sulfide	N	Y	N	A					0.900	3.942						
7439-89-6	Iron	N	Y	N	A	0.107	0.469			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7439-98-7	Molybdenum	N	Y	N	A	5.9E-6	2.6E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3	8.7E-6	3.5E-5	2.4E-5	8.8E-5
109-66-0	Pentane	N	Y	N	A									0.021	0.083	0.056	0.209
7440-22-4	Silver	N	Y	N	A	2.9E-6	1.3E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7664-93-9	Sulfuric Acid	N	Y	N	A					2.030	8.891						
7440-28-0	Thallium	N	Y	N	A	5.9E-5	2.6E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7440-61-1	Uranium	N	Y	N	A	5.9E-5	2.6E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7440-62-2	Vanadium	N	Y	N	A	1.6E-4	7.2E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3	1.8E-5	7.3E-5	5.0E-5	1.8E-4
25551-13-7	Trimethyl benzene	N	Y	N	A												
7440-33-7	Tungsten	N	Y	N	A	5.9E-5	2.6E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3				
7440-66-6	Zinc	N	Y	N	A	2.1E-4	9.0E-4			2.3E-5	1.0E-4	3.8E-4	1.7E-3	2.3E-4	9.2E-4	6.3E-4	2.3E-3
HAP TOTAL						***9.8E-3***	***0.043***			***2.8E-4***	***1.2E-3***	***5.8E-3***	***0.025***	***0.015***	***0.060***	***0.041***	***0.152***
MERCURY TOTAL (exempt)										***2.3E-5***	***1.0E-4***	***3.8E-4***	***1.7E-3***			***5.6E-6***	***2.1E-5***
MERCURY TOTAL (non-exempt)						***5.6E-6***	***2.5E-5***							***2.1E-6***	***8.3E-6***		
TAP TOTAL (HAP-TAP addressed by NSPS/NESHAP)						***9.8E-3***	***0.043***			***2.3E-4***	***1.0E-3***	***5.0E-3***	***0.022***			***0.041***	***0.152***
TAP TOTAL (For EL Evaluation)						***0.612***	***2.682***			***2.930***	***12.835***	***4.6E-3***	***0.020***	***0.036***	***0.144***	***0.057***	***0.212***

TABLE A-W3. HAP/TAP Emissions and Exemptions

180,000 T/day Emissions

chk

CAS	HAP/TAP	HAP	TAP		A/C	0	0	1	1	0	0	0	0	0	0	0	0	0	0
						PROCESSING AND PRODUCTION - Continued													
						Lime Production						*Aggregate Prod.*		*Concrete Production*					
						LS1-11,LSBM		LK,LS12,LCR,LS-L/U		LS1-L/U,MillS2-L/U,ACS1-4		PCSP1,PCSP2		CM		CS1L,CS1U,CS2L,CS2U		CA-L/U	
						Limestone Crushers, Screens, Mill, Xfers		Lime Kiln, Kiln Feed, Lime Mill, Pebble Lime Silo		Lime Silos and Lime Mill Crushing		Portable Crushers, Screens, Xfers		Central Mixer		Cement Silo #1 and #2 L/U		Aggregate Bin	
	NSPS or NESHAP HAP/TAP -->			*Y*		*OOO*	*OOO*	*5A*	*5A*			*OOO*	*OOO*					*OOO*	*OOO*
	Non-Carcinogenic Acute (A) or Carcinogenic (C) -->				*A/C*	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
106-99-0	1,3-Butadiene	Y	Y	Y	C														
91-57-6	2-Methylnaphthalene	Y	N	n/a															
56-49-5	3-Methylchloranthrene	Y	Y	Y	C														
57-97-6	7,12-Dimethylbenz(a)anthracene	Y	N	n/a															
83-32-9	Acenaphthene	Y	N	n/a															
208-96-8	Acenaphthylene	Y	N	n/a															
75-07-0	Acetaldehyde	Y	Y	Y	C														
107-02-8	Acrolein	Y	Y	Y	A														
120-12-7	Anthracene	Y	N	n/a															
7440-36-0	Antimony	Y	Y	Y	A	1.4E-5	4.8E-5	3.1E-6	1.2E-5	1.6E-6	5.1E-7	3.1E-6	1.4E-5					3.5E-6	8.6E-6
7440-38-2	Arsenic	Y	Y	Y	C	1.0E-4	4.4E-4	2.4E-5	1.1E-4	1.1E-6	4.7E-6	2.9E-5	1.3E-4	2.0E-6	8.9E-6	1.2E-7	5.1E-7	1.8E-5	7.9E-5
71-43-2	Benzene	Y	Y	Y	C														
50-32-8	Benzo(a)pyrene	Y	Y	Y	C														
56-55-3	Benz(a)anthracene	Y	Y	Y	C														
205-99-2	Benzo(b)fluoranthene	Y	Y	Y	C														
207-08-9	Benzo(k)fluoranthene	Y	Y	Y	C														
218-01-9	Chrysene	Y	Y	Y	C														
53-70-3	Dibenzo(a,h)anthracene	Y	Y	Y	C														
193-39-5	Indeno(1,2,3-cd)pyrene	Y	Y	Y	C														
191-24-2	Benzo(g,h,i)perylene	Y	N	n/a															
7440-41-7	Beryllium	Y	Y	Y	C	3.5E-6	1.5E-5	8.4E-7	3.7E-6	3.7E-8	1.6E-7	1.0E-6	4.4E-6			1.3E-8	5.8E-8	6.3E-7	2.8E-6
92-52-4	Biphenyl	Y	Y	Y	A														
7440-43-9	Cadmium	Y	Y	Y	C	1.1E-6	4.8E-6	2.6E-7	1.2E-6	1.2E-8	5.1E-8	3.1E-7	1.4E-6	4.9E-9	2.1E-8			2.0E-7	8.6E-7
75-15-0	Carbon Disulfide	Y	Y	Y	A														
7440-47-3	Chromium	Y	Y	Y	A	8.5E-5	2.9E-4	1.9E-5	6.9E-5	9.7E-6	3.0E-6	1.9E-5	8.2E-5	8.7E-7	3.8E-6	7.9E-7	3.5E-6	2.1E-5	5.2E-5
18540-29-9	Cr (VI)	Y	Y	Y	C									1.9E-7	8.1E-7	1.6E-7	7.0E-7		
7440-48-4	Cobalt	Y	Y	Y	A	2.3E-5	7.7E-5	5.0E-6	1.8E-5	2.6E-6	8.1E-7	5.0E-6	2.2E-5					5.5E-6	1.4E-5
592-01-8	Cyanide	Y	Y	Y	A														
106-46-7	Dichlorobenzene	Y	Y	Y	A														
206-44-0	Fluoranthene	Y	N	n/a															
86-73-7	Fluorene	Y	N	n/a															
50-00-0	Formaldehyde	Y	Y	Y	C														
110-54-3	Hexane	Y	Y	Y	A														
7647-01-0	Hydrogen Chloride	Y	Y	Y	A	0	0	0.986	3.666										
7439-92-1	Lead	Y	N	n/a		1.7E-5	5.8E-5	3.7E-6	1.4E-5	1.9E-6	6.1E-7	3.8E-6	1.6E-5	2.5E-7	1.1E-6	3.0E-7	1.3E-6	4.1E-6	1.0E-5
7439-96-5	Manganese	Y	Y	Y	A	1.3E-3	4.6E-3	2.9E-4	1.1E-3	1.5E-4	4.8E-5	3.0E-4	1.3E-3	2.6E-5	1.1E-4	3.2E-6	1.4E-5	3.3E-4	8.2E-4
7439-97-6	Mercury	Y	N	n/a		1.1E-7	3.9E-7	2.8E-4	1.0E-3	1.3E-8	4.1E-9	2.5E-8	1.1E-7					2.8E-8	6.9E-8
91-20-3	Naphthalene	Y	Y	Y	A														
7440-02-0	Nickel	Y	Y	Y	C	2.2E-5	9.6E-5	5.3E-6	2.3E-5	2.3E-7	1.0E-6	6.3E-6	2.7E-5	1.7E-6	7.4E-6	1.1E-6	5.0E-6	3.9E-6	1.7E-5
85-01-8	Phenanthrene	Y	N	n/a															
108-95-2	Phenol	Y	Y	Y	A														
7723-14-0	Phosphorus	Y	Y	Y	A	7.4E-4	2.5E-3	1.6E-4	6.0E-4	8.4E-5	2.6E-5	1.6E-4	7.1E-4	8.2E-6	3.6E-5			1.8E-4	4.5E-4
129-00-0	Pyrene	Y	N	n/a															
7782-49-2	Selenium	Y	Y	Y	A														
108-88-3	Toluene	Y	Y	Y	A														
1330-20-7	Xylene	Y	Y	Y	A														
7429-90-5	Aluminum	N	Y	N	A	0.128	0.436	0.028	0.104	0.015	4.6E-3	0.028	0.124					0.031	0.078
7440-39-3	Barium	N	Y	N	A	8.2E-4	2.8E-3	1.8E-4	6.7E-4	9.4E-5	2.9E-5	1.8E-4	7.9E-4					2.0E-4	5.0E-4
1317-65-3	Calcium Carbonate	N	Y	N	A	1.558	5.291	0.260	0.969			0.343	1.503						
1305-78-8	Calcium Oxide	N	Y	N	A			0.216	0.802	0.480	0.150								
7440-50-8	Copper	N	Y	N	A	2.8E-5	9.6E-5	6.2E-6	2.3E-5	3.2E-6	1.0E-6	6.3E-6	2.7E-5					6.9E-6	1.7E-5
110-82-7	Cyclohexane	N	Y	N	A														
7783-06-4	Hydrogen Sulfide	N	Y	N	A														
7439-89-6	Iron	N	Y	N	A	0.059	0.199	0.013	0.048	6.7E-3	2.1E-3	0.013	0.057					0.014	0.036
7439-98-7	Molybdenum	N	Y	N	A	2.8E-6	9.6E-6	6.2E-7	2.3E-6	3.2E-7	1.0E-7	6.3E-7	2.7E-6					6.9E-7	1.7E-6
109-66-0	Pentane	N	Y	N	A														
7440-22-4	Silver	N	Y	N	A	0	0												
7664-93-9	Sulfuric Acid	N	Y	N	A														
7440-28-0	Thallium	N	Y	N	A	2.8E-5	9.6E-5	6.2E-6	2.3E-5	3.2E-6	1.0E-6	6.3E-6	2.7E-5					6.9E-6	1.7E-5
7440-61-1	Uranium	N	Y	N	A	2.8E-5	9.6E-5	6.2E-6	2.3E-5	3.2E-6	1.0E-6	6.3E-6	2.7E-5					6.9E-6	1.7E-5
7440-62-2	Vanadium	N	Y	N	A	8.8E-5	3.0E-4	1.9E-5	7.1E-5	1.0E-5	3.1E-6	1.9E-5	8.5E-5					2.1E-5	5.3E-5
25551-13-7	Trimethyl benzene	N	Y	N	A														
7440-33-7	Tungsten	N	Y	N	A	2.8E-5	9.6E-5	6.2E-6	2.3E-5	3.2E-6	1.0E-6	6.3E-6	2.7E-5					6.9E-6	1.7E-5
7440-66-6	Zinc	N	Y	N	A	1.0E-4	3.5E-4	2.2E-5	8.3E-5	1.2E-5	3.6E-6	2.3E-5	9.9E-5					2.5E-5	6.2E-5
HAP TOTAL						***2.3E-3***	***8.1E-3***	***0.987***	***3.669***	***2.6E-4***	***8.5E-5***	***5.3E-4***	***2.3E-3***	***3.9E-5***	***1.7E-4***	***5.7E-6***	***2.5E-5***	***5.6E-4***	***1.4E-3***
MERCURY TOTAL (exempt)						***0***	***0***	***2.8E-4***	***1.0E-3***										
MERCURY TOTAL (non-exempt)						***1.1E-7***	***3.9E-7***			***1.3E-8***	***4.1E-9***	***2.5E-8***	***1.1E-7***					***2.8E-8***	***6.9E-8***
TAP TOTAL (HAP-TAP addressed by NSPS/NESHAP)						***2.3E-3***	***8.0E-3***	***0.986***	***3.668***			***5.2E-4***	***2.3E-3***					***5.6E-4***	***1.4E-3***
TAP TOTAL (For EL Evaluation)						***1.746***	***5.930***	***0.517***	***1.923***	***0.502***	***0.157***	***0.385***	***1.684***	***3.9E-5***	***1.7E-4***	***5.4E-6***	***2.4E-5***	***0.046***	***0.114***

TABLE A-W3. HAP/TAP Emissions and Exemptions

180,000 T/day Emissions

chk

CAS	HAP/TAP	HAP	TAP	NSPS or NESHAP HAP/TAP	A/C	PROCESSING AND PRODUCTION - Continued: HVAC (H1M,H2M,HM,HAC,HR,HA,HMO,HTS,HW) Heaters lb/hr	HVAC ton/yr	Emer. Power/Fire (EDG1,EDG2,EDG3,EDFP) Emergency Generators and Fire Pump lb/hr	Emer. Power/Fire ton/yr	Fuel Storage (TG1,TG2) Gasoline Fuel Tanks lb/hr	Fuel Storage ton/yr	MINING and LEACHING - Totals: HAP Total lb/hr	HAP Total ton/yr	Mercury Total Exempt lb/hr	Mercury Total Exempt ton/yr	Mercury Total Non-Exempt lb/hr	Mercury Total Non-Exempt ton/yr	TAP Total HAP-TAP addressed by NSPS/NESHAP lb/hr	TAP Total HAP-TAP addressed by NSPS/NESHAP ton/yr	TAP Total For EL Evaluation lb/hr	TAP Total For EL Evaluation ton/yr
						0	0	1	1	1	1			1	1	0	0				
	NSPS or NESHAP HAP/TAP -->			Y				4Z	4Z	6C	6C										
106-99-0	1,3-Butadiene	Y	Y	Y	C			8.4E-7	3.7E-6			0	0					0	0	0	0
91-57-6	2-Methylnaphthalene	Y	N	n/a		4.3E-7	1.9E-6														
56-49-5	3-Methylchloranthrene	Y	Y	Y	C	3.2E-8	1.4E-7														
57-97-6	7,12-Dimethylbenz(a)anthracene	Y	N	n/a		2.9E-7	1.3E-6														
83-32-9	Acenaphthene	Y	N	n/a		3.2E-8	1.4E-7	5.6E-6	6.7E-6												
208-96-8	Acenaphthylene	Y	N	n/a		3.2E-8	1.4E-7	1.1E-5	1.3E-5												
75-07-0	Acetaldehyde	Y	Y	Y	C			2.5E-5	1.1E-4												
107-02-8	Acrolein	Y	Y	Y	A			1.6E-5	2.0E-5												
120-12-7	Anthracene	Y	N	n/a		4.3E-8	1.9E-7	1.6E-6	1.9E-6												
7440-36-0	Antimony	Y	Y	Y	A							0.019	0.082							0.019	0.082
7440-38-2	Arsenic	Y	Y	Y	C	3.6E-6	1.6E-5					0.544	2.381							0.544	2.381
71-43-2	Benzene	Y	Y	Y	C	3.8E-5	1.6E-4	2.7E-4	1.2E-3	7.0E-3	0.031										
50-32-8	Benzo(a)pyrene	Y	Y	Y	C	2.1E-8	9.4E-8	8.7E-8	3.8E-7												
56-55-3	Benz(a)anthracene	Y	Y	Y	C	3.2E-8	1.4E-7	2.4E-7	1.0E-6												
205-99-2	Benzo(b)fluoranthene	Y	Y	Y	C	3.2E-8	1.4E-7	3.6E-7	1.6E-6												
207-08-9	Benzo(k)fluoranthene	Y	Y	Y	C	3.2E-8	1.4E-7	7.3E-8	3.2E-7												
218-01-9	Chrysene	Y	Y	Y	C	3.2E-8	1.4E-7	5.0E-7	2.2E-6												
53-70-3	Dibenzo(a,h)anthracene	Y	Y	Y	C	2.1E-8	9.4E-8	1.2E-7	5.4E-7												
193-39-5	Indeno(1,2,3-cd)pyrene	Y	Y	Y	C	3.2E-8	1.4E-7	1.4E-7	6.2E-7												
191-24-2	Benzo(g,h,i)perylene	Y	N	n/a		2.1E-8	9.4E-8	6.9E-7	8.3E-7												
7440-41-7	Beryllium	Y	Y	Y	C	2.1E-7	9.4E-7					2.6E-3	0.011							2.6E-3	0.011
92-52-4	Biphenyl	Y	Y	Y	A					4.4E-5	1.9E-4										
7440-43-9	Cadmium	Y	Y	Y	C	2.0E-5	8.6E-5					4.1E-4	1.8E-3							4.1E-4	1.8E-3
75-15-0	Carbon Disulfide	Y	Y	Y	A							0.014	0.063							0.014	0.063
7440-47-3	Chromium	Y	Y	Y	A	2.5E-5	1.1E-4					7.3E-3	0.032							7.3E-3	0.032
18540-29-9	Cr (VI)	Y	Y	Y	C																
7440-48-4	Cobalt	Y	Y	Y	A	1.5E-6	6.6E-6					3.3E-3	0.014							3.3E-3	0.014
592-01-8	Cyanide	Y	Y	Y	A							0.453	1.983							0.453	1.983
106-46-7	Dichlorobenzene	Y	Y	Y	A	2.1E-5	9.4E-5														
206-44-0	Fluoranthene	Y	N	n/a		5.4E-8	2.4E-7	5.3E-6	6.4E-6												
86-73-7	Fluorene	Y	N	n/a		5.0E-8	2.2E-7	1.7E-5	2.1E-5												
50-00-0	Formaldehyde	Y	Y	Y	C	1.3E-3	5.9E-3	5.1E-5	2.2E-4												
110-54-3	Hexane	Y	Y	Y	A	0.032	0.141			0.031	0.137										
7647-01-0	Hydrogen Chloride	Y	Y	Y	A																
7439-92-1	Lead	Y	N	n/a								6.5E-3	0.029								
7439-96-5	Manganese	Y	Y	Y	A	6.8E-6	3.0E-5					0.244	1.067							0.244	1.067
7439-97-6	Mercury	Y	N	n/a		4.7E-6	2.0E-5					1.3E-3	5.7E-3	1.3E-3	5.7E-3	0	0	0	0	0	0
91-20-3	Naphthalene	Y	Y	Y	A	1.1E-5	4.8E-5	1.6E-4	1.9E-4	1.9E-3	8.5E-3	0	0					0	0	0	0
7440-02-0	Nickel	Y	Y	Y	C	3.8E-5	1.6E-4					1.6E-3	7.1E-3					0	0	1.6E-3	7.1E-3
85-01-8	Phenanthrene	Y	N	n/a		3.0E-7	1.3E-6	5.0E-5	6.0E-5			0	0					0	0	0	0
108-95-2	Phenol	Y	Y	Y	A					2.4E-4	1.1E-3	0	0					0	0	0	0
7723-14-0	Phosphorus	Y	Y	Y	A							0.530	2.320					0	0	0.530	2.320
129-00-0	Pyrene	Y	N	n/a		8.9E-8	3.9E-7	4.7E-6	5.7E-6			0	0					0	0	0	0
7782-49-2	Selenium	Y	Y	Y	A	4.3E-7	1.9E-6					3.3E-4	1.4E-3					0	0	3.3E-4	1.4E-3
108-88-3	Toluene	Y	Y	Y	A	6.1E-5	2.7E-4	3.6E-4	4.3E-4	0.032	0.138	0	0					0	0	0	0
1330-20-7	Xylene	Y	Y	Y	A			2.5E-4	3.0E-4	0.031	0.137	0	0					0	0	0	0
7429-90-5	Aluminum	N	Y	N	A							0	0					0	0	57.855	253
7440-39-3	Barium	N	Y	N	A	7.9E-5	3.4E-4					0	0					0	0	0.652	2.855
1317-65-3	Calcium Carbonate	N	Y	N	A							0	0					0	0	11.408	49.967
1305-78-8	Calcium Oxide	N	Y	N	A							0	0					0	0	0	0
7440-50-8	Copper	N	Y	N	A	1.5E-5	6.7E-5					0	0					0	0	4.1E-3	0.018
110-82-7	Cyclohexane	N	Y	N	A					1.0E-3	4.6E-3	0	0					0	0	0	0
7783-06-4	Hydrogen Sulfide	N	Y	N	A							0	0					0	0	0	0
7439-89-6	Iron	N	Y	N	A							0	0					0	0	14.831	64.958
7439-98-7	Molybdenum	N	Y	N	A	2.0E-5	8.6E-5					0	0					0	0	8.1E-4	3.6E-3
109-66-0	Pentane	N	Y	N	A	0.047	0.204					0	0					0	0	0	0
7440-22-4	Silver	N	Y	N	A							0	0					0	0	4.1E-4	1.8E-3
7664-93-9	Sulfuric Acid	N	Y	N	A							0	0					0	0	0	0
7440-28-0	Thallium	N	Y	N	A							0	0					0	0	8.1E-3	0.036
7440-61-1	Uranium	N	Y	N	A							0	0					0	0	8.1E-3	0.036
7440-62-2	Vanadium	N	Y	N	A	4.1E-5	1.8E-4					0	0					0	0	0.023	0.100
25551-13-7	Trimethyl benzene	N	Y	N	A					0.011	0.048	0	0					0	0	0	0
7440-33-7	Tungsten	N	Y	N	A							0	0					0	0	8.1E-3	0.036
7440-66-6	Zinc	N	Y	N	A	5.2E-4	2.3E-3					0	0					0	0	0.029	0.125
HAP TOTAL						***0.034***	***0.148***	***1.2E-3***	***2.6E-3***	***0.103***	***0.453***	***1.826***	***7.998***								
MERCURY TOTAL (exempt)														***1.3E-3***	***5.7E-3***						
MERCURY TOTAL (non-exempt)						***4.7E-6***	***2.0E-5***									***0***	***0***				
TAP TOTAL (HAP-TAP addressed by NSPS/NESHAP)								***1.1E-3***	***2.5E-3***	***0.103***	***0.453***							***0***	***0***		
TAP TOTAL (For EL Evaluation)						***0.081***	***0.355***			***0.012***	***0.052***									***86.645***	***380***

TABLE A-W3. HAP/TAP Emissions and Exemptions 1 1 0 0

180,000 T/day Emissions

chk

CAS	HAP/TAP	HAP	TAP	NSPS or NESHAP HAP/TAP -->	Non-Carcinogenic Acute (A) or Carcinogenic (C) -->	PROCESSING AND PRODUCTION - Totals: *HAP Total*		*Mercury Total Exempt*		*Mercury Total Non-Exempt*		*TAP Total HAP-TAP addressed by NSPS/NESHAP*		*TAP Total For EL Evaluation*		ALL *HAP*	ALL *Hg Non-Exempt*	ALL *TAP For EL Evaluation*	TAP EL *TAP Emission Screening Level (EL)*	
				Y	A/C	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	ton/yr	ton/yr	lb/hr	Non-car lb/hr	Carcin lb/hr
106-99-0	1,3-Butadiene	Y	Y	Y	C	8.4E-7	3.7E-6					8.4E-7	3.7E-6			3.7E-6		0	--	2.4E-5
91-57-6	2-Methylnaphthalene	Y	N	n/a		1.1E-6	4.6E-6									4.6E-6			--	--
56-49-5	3-Methylchloranthrene	Y	Y	Y	C	7.8E-8	3.4E-7					3.3E-8	1.4E-7	4.5E-8	2.0E-7	3.4E-7		4.5E-8	--	2.5E-6
57-97-6	7,12-Dimethylbenz(a)anthracene	Y	N	n/a		7.6E-7	3.0E-6									3.0E-6			--	--
83-32-9	Acenaphthene	Y	N	n/a		5.7E-6	7.1E-6									7.1E-6			--	--
208-96-8	Acenaphthylene	Y	N	n/a		1.1E-5	1.4E-5									1.4E-5			--	--
75-07-0	Acetaldehyde	Y	Y	Y	C	2.5E-5	1.1E-4					2.5E-5	1.1E-4			1.1E-4			--	3.0E-3
107-02-8	Acrolein	Y	Y	Y	A	1.6E-5	2.0E-5					1.6E-5	2.0E-5			2.0E-5			0.017	--
120-12-7	Anthracene	Y	N	n/a		1.7E-6	2.4E-6									2.4E-6			--	--
7440-36-0	Antimony	Y	Y	Y	A	5.7E-4	2.5E-3					5.7E-4	2.5E-3	1.6E-6	5.1E-7	0.085		0.019	0.033	--
7440-38-2	Arsenic	Y	Y	Y	C	4.5E-3	0.020					4.5E-3	0.020	8.2E-6	3.6E-5	2.400		0.544	--	1.5E-6
71-43-2	Benzene	Y	Y	Y	C	7.4E-3	0.032					7.3E-3	0.032	5.3E-5	2.3E-4	0.032		5.3E-5	--	8.0E-4
50-32-8	Benzo(a)pyrene	Y	Y	Y	C	1.4E-7	6.1E-7					1.1E-7	4.8E-7	3.0E-8	1.3E-7	6.1E-7				
56-55-3	Benz(a)anthracene	Y	Y	Y	C	3.1E-7	1.4E-6					2.7E-7	1.2E-6	4.5E-8	2.0E-7	1.4E-6				
205-99-2	Benzo(b)fluoranthene	Y	Y	Y	C	4.4E-7	1.9E-6					3.9E-7	1.7E-6	4.5E-8	2.0E-7	1.9E-6				
207-08-9	Benzo(k)fluoranthene	Y	Y	Y	C	1.5E-7	6.6E-7					1.1E-7	4.7E-7	4.5E-8	2.0E-7	6.6E-7		2.9E-7	--	2.0E-6
218-01-9	Chrysene	Y	Y	Y	C	5.8E-7	2.5E-6					5.3E-7	2.3E-6	4.5E-8	2.0E-7	2.5E-6				
53-70-3	Dibenzo(a,h)anthracene	Y	Y	Y	C	1.8E-7	7.7E-7					1.5E-7	6.4E-7	3.0E-8	1.3E-7	7.7E-7				
193-39-5	Indeno(1,2,3-cd)pyrene	Y	Y	Y	C	2.2E-7	9.6E-7					1.7E-7	7.6E-7	4.5E-8	2.0E-7	9.6E-7				
191-24-2	Benzo(g,h,i)perylene	Y	N	n/a		7.5E-7	1.1E-6									1.1E-6			--	--
7440-41-7	Beryllium	Y	Y	Y	C	4.3E-4	1.9E-3					4.3E-4	1.9E-3	3.5E-7	1.5E-6	0.013		2.6E-3	--	2.8E-5
92-52-4	Biphenyl	Y	Y	Y	A	4.4E-5	1.9E-4					4.4E-5	1.9E-4			1.9E-4			0.100	--
7440-43-9	Cadmium	Y	Y	Y	C	4.6E-4	2.0E-3					4.3E-4	1.9E-3	2.8E-5	1.2E-4	3.8E-3		4.4E-4	--	3.7E-6
75-15-0	Carbon Disulfide	Y	Y	Y	A											0.063		0.014	2.000	--
7440-47-3	Chromium	Y	Y	Y	A	6.8E-4	2.8E-3					6.3E-4	2.6E-3	4.8E-5	1.6E-4	0.035		7.4E-3	0.033	--
18540-29-9	Cr (VI)	Y	Y	Y	C	3.4E-7	1.5E-6							3.4E-7	1.5E-6	1.5E-6		3.4E-7	--	5.6E-7
7440-48-4	Cobalt	Y	Y	Y	A	4.7E-4	2.0E-3					4.7E-4	2.0E-3	4.8E-6	1.0E-5	0.016		3.3E-3	3.3E-3	--
592-01-8	Cyanide	Y	Y	Y	A	1.2E-3	5.3E-3					1.2E-3	5.3E-3			1.988		0.453	0.333	--
106-46-7	Dichlorobenzene	Y	Y	Y	A	5.7E-5	2.3E-4					2.6E-5	9.6E-5	3.1E-5	1.3E-4	2.3E-4		3.1E-5	30.000	--
206-44-0	Fluoranthene	Y	N	n/a		5.5E-6	7.0E-6									7.0E-6			--	--
86-73-7	Fluorene	Y	N	n/a		1.7E-5	2.1E-5									2.1E-5			--	--
50-00-0	Formaldehyde	Y	Y	Y	C	3.3E-3	0.015					1.4E-3	6.2E-3	1.9E-3	8.3E-3	0.015		1.9E-3	--	5.1E-4
110-54-3	Hexane	Y	Y	Y	A	0.117	0.480					0.070	0.281	0.046	0.198	0.480		0.046	12.000	--
7647-01-0	Hydrogen Chloride	Y	Y	Y	A	0.986	3.666					0.986	3.666			3.666			0.050	--
7439-92-1	Lead	Y	N	n/a		4.8E-4	2.1E-3									0.031			--	--
7439-96-5	Manganese	Y	Y	Y	A	4.6E-3	0.017					4.4E-3	0.017	1.9E-4	2.2E-4	1.085		0.244	0.067	--
7439-97-6	Mercury	Y	N	n/a		7.1E-4	2.9E-3	6.9E-4	2.8E-3	1.3E-5	5.4E-5					8.6E-3	5.4E-5		--	--
91-20-3	Naphthalene	Y	Y	Y	A	2.1E-3	8.8E-3					2.1E-3	8.7E-3	1.6E-5	6.7E-5	8.8E-3		1.6E-5	3.330	--
7440-02-0	Nickel	Y	Y	Y	C	5.5E-4	2.4E-3					4.9E-4	2.2E-3	5.6E-5	2.4E-4	9.5E-3		1.7E-3	--	2.7E-5
85-01-8	Phenanthrene	Y	N	n/a		5.1E-5	6.3E-5									6.3E-5			--	--
108-95-2	Phenol	Y	Y	Y	A	2.4E-4	1.1E-3					2.4E-4	1.1E-3			1.1E-3			1.270	--
7723-14-0	Phosphorus	Y	Y	Y	A	5.6E-3	0.023					5.5E-3	0.023	9.3E-5	6.2E-5	2.343		0.530	7.0E-3	--
129-00-0	Pyrene	Y	N	n/a		5.0E-6	6.6E-6									6.6E-6			--	--
7782-49-2	Selenium	Y	Y	Y	A	4.1E-4	1.8E-3					4.1E-4	1.8E-3	6.2E-7	2.6E-6	3.2E-3		3.3E-4	0.013	--
108-88-3	Toluene	Y	Y	Y	A	0.032	0.139					0.032	0.139	8.8E-5	3.7E-4	0.139		8.8E-5	25.000	--
1330-20-7	Xylene	Y	Y	Y	A	0.032	0.138					0.032	0.138			0.138			29.000	--
7429-90-5	Aluminum	N	Y	N	A									0.648	2.577			58.504	0.667	--
7440-39-3	Barium	N	Y	N	A									6.8E-3	0.028			0.659	0.033	--
1317-65-3	Calcium Carbonate	N	Y	N	A									2.244	8.125			13.652	0.667	--
1305-78-8	Calcium Oxide	N	Y	N	A									0.696	0.952			0.696	0.133	--
7440-50-8	Copper	N	Y	N	A									5.3E-4	2.2E-3			4.6E-3	0.067	--
110-82-7	Cyclohexane	N	Y	N	A									1.0E-3	4.6E-3			1.0E-3	70.000	--
7783-06-4	Hydrogen Sulfide	N	Y	N	A									0.900	3.942			0.900	0.933	--
7439-89-6	Iron	N	Y	N	A									0.213	0.812			15.043	0.067	--
7439-98-7	Molybdenum	N	Y	N	A									4.7E-4	2.0E-3			1.3E-3	0.333	--
109-66-0	Pentane	N	Y	N	A									0.123	0.495			0.123	118	--
7440-22-4	Silver	N	Y	N	A									4.1E-4	1.8E-3			8.2E-4	7.0E-3	--
7664-93-9	Sulfuric Acid	N	Y	N	A									2.030	8.891			2.030	0.067	--
7440-28-0	Thallium	N	Y	N	A									5.2E-4	2.2E-3			8.7E-3	7.0E-3	--
7440-61-1	Uranium	N	Y	N	A									5.2E-4	2.2E-3			8.7E-3	0.013	--
7440-62-2	Vanadium	N	Y	N	A									8.4E-4	3.5E-3			0.024	3.0E-3	--
25551-13-7	Trimethyl benzene	N	Y	N	A									0.011	0.048			0.011	8.200	--
7440-33-7	Tungsten	N	Y	N	A									5.2E-4	2.2E-3	0		8.7E-3	0.333	--
7440-66-6	Zinc	N	Y	N	A									2.2E-3	8.8E-3	0		0.031	0.667	--
HAP TOTAL						***1.200***	***4.566***									***12.564***				
MERCURY TOTAL (exempt)								***6.9E-4***	***2.8E-3***											
MERCURY TOTAL (non-exempt)										***1.3E-5***	***5.4E-5***						***5.4E-5***			
TAP TOTAL (HAP-TAP addressed by NSPS/NESHAP)												***1.150***	***4.353***							
TAP TOTAL (For EL Evaluation)														***6.928***	***26.109***			***93.573***		

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Model Scenario W3 T-RACT Emissions

Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**HAP/TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
106-99-0	1,3-Butadiene	8.4E-07	3.7E-06	0	0	0	0	8.4E-07	3.7E-06	Y	Y
91-57-6	2-Methylnaphthalene	1.1E-06	4.6E-06	0	0	0	0	1.1E-06	4.6E-06	Y	N
56-49-5	3-Methylchloranthrene	7.8E-08	3.4E-07	0	0	0	0	7.8E-08	3.4E-07	Y	Y
57-97-6	7,12-Dimethylbenz(a)anthracene	7.6E-07	3.0E-06	0	0	0	0	7.6E-07	3.0E-06	Y	N
83-32-9	Acenaphthene	5.7E-06	7.1E-06	0	0	0	0	5.7E-06	7.1E-06	Y	N
208-96-8	Acenaphthylene	1.1E-05	1.4E-05	0	0	0	0	1.1E-05	1.4E-05	Y	N
75-07-0	Acetaldehyde	2.5E-05	1.1E-04	0	0	0	0	2.5E-05	1.1E-04	Y	Y
107-02-8	Acrolein	1.6E-05	2.0E-05	0	0	0	0	1.6E-05	2.0E-05	Y	Y
120-12-7	Anthracene	1.7E-06	2.4E-06	0	0	0	0	1.7E-06	2.4E-06	Y	N
7440-36-0	Antimony	0	0	5.7E-04	2.5E-03	1.3E-02	5.8E-02	1.4E-02	6.1E-02	Y	Y
7440-38-2	Arsenic	8.7E-06	3.8E-05	4.5E-03	2.0E-02	0.23	1.02	0.24	1.04	Y	Y
56-55-3	Benz(a)anthracene	3.1E-07	1.4E-06	0	0	0	0	3.1E-07	1.4E-06	Y	Y
71-43-2	Benzene	3.6E-04	1.6E-03	7.0E-03	3.1E-02	0	0	7.4E-03	3.2E-02	Y	Y
50-32-8	Benzo(a)pyrene	1.4E-07	6.1E-07	0	0	0	0	1.4E-07	6.1E-07	Y	Y
205-99-2	Benzo(b)fluoranthene	4.4E-07	1.9E-06	0	0	0	0	4.4E-07	1.9E-06	Y	Y
191-24-2	Benzo(g,h,i)perylene	7.5E-07	1.1E-06	0	0	0	0	7.5E-07	1.1E-06	Y	N
207-08-9	Benzo(k)fluoranthene	1.5E-07	6.6E-07	0	0	0	0	1.5E-07	6.6E-07	Y	Y
7440-41-7	Beryllium	5.2E-07	2.3E-06	4.3E-04	1.9E-03	1.9E-03	8.1E-03	2.3E-03	1.0E-02	Y	Y
92-52-4	Biphenyl	0	0	4.4E-05	1.9E-04	0	0	4.4E-05	1.9E-04	Y	Y
7440-43-9	Cadmium	4.8E-05	2.1E-04	4.1E-04	1.8E-03	2.9E-04	1.3E-03	7.5E-04	3.3E-03	Y	Y
75-15-0	Carbon Disulfide	0	0	1.4E-02	6.3E-02	0	0	1.4E-02	6.3E-02	Y	Y
7440-47-3	Chromium	6.6E-05	2.7E-04	6.1E-04	2.5E-03	5.2E-03	2.3E-02	5.9E-03	2.6E-02	Y	Y
18540-29-9	Cr (VI)	0	0	3.4E-07	1.5E-06	0	0	3.4E-07	1.5E-06	Y	Y
218-01-9	Chrysene	5.8E-07	2.5E-06	0	0	0	0	5.8E-07	2.5E-06	Y	Y
7440-48-4	Cobalt	4.0E-06	1.6E-05	4.7E-04	2.0E-03	2.3E-03	1.0E-02	2.8E-03	1.2E-02	Y	Y
592-01-8	Cyanide	0	0	0.45	1.99	0	0	0.45	1.99	Y	Y
53-70-3	Dibenzo(a,h)anthracene	1.8E-07	7.7E-07	0	0	0	0	1.8E-07	7.7E-07	Y	Y
106-46-7	Dichlorobenzene	5.7E-05	2.3E-04	0	0	0	0	5.7E-05	2.3E-04	Y	Y
206-44-0	Fluoranthene	5.5E-06	7.0E-06	0	0	0	0	5.5E-06	7.0E-06	Y	N
86-73-7	Fluorene	1.7E-05	2.1E-05	0	0	0	0	1.7E-05	2.1E-05	Y	N
50-00-0	Formaldehyde	3.3E-03	1.5E-02	0	0	0	0	3.3E-03	1.5E-02	Y	Y
110-54-3	Hexane	8.5E-02	0.34	3.1E-02	0.14	0	0	0.12	0.48	Y	Y
7647-01-0	Hydrogen Chloride	0	0	0.99	3.67	0	0	0.99	**3.67**	Y	Y
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-07	9.6E-07	0	0	0	0	2.2E-07	9.6E-07	Y	Y
7439-92-1	Lead	0	0	4.8E-04	2.1E-03	4.6E-03	2.0E-02	5.1E-03	2.2E-02	Y	N
7439-96-5	Manganese	1.8E-05	7.2E-05	4.6E-03	1.7E-02	0.17	0.76	0.18	0.78	Y	Y
7439-97-6	Mercury	1.2E-05	5.0E-05	6.9E-04	2.9E-03	1.2E-03	5.1E-03	1.9E-03	8.0E-03	Y	N
91-20-3	Naphthalene	1.9E-04	3.1E-04	1.9E-03	8.5E-03	0	0	2.1E-03	8.8E-03	Y	Y
7440-02-0	Nickel	9.1E-05	4.0E-04	4.6E-04	2.0E-03	1.2E-03	5.1E-03	1.7E-03	7.5E-03	Y	Y
85-01-8	Phenanthrene	5.1E-05	6.3E-05	0	0	0	0	5.1E-05	6.3E-05	Y	N
108-95-2	Phenol	0	0	2.4E-04	1.1E-03	0	0	2.4E-04	1.1E-03	Y	Y
7723-14-0	Phosphorus	0	0	5.6E-03	2.3E-02	0.38	1.65	0.38	1.67	Y	Y
129-00-0	Pyrene	5.0E-06	6.6E-06	0	0	0	0	5.0E-06	6.6E-06	Y	N
7782-49-2	Selenium	1.1E-06	4.6E-06	4.1E-04	1.8E-03	2.3E-04	1.0E-03	6.4E-04	2.8E-03	Y	Y
108-88-3	Toluene	5.2E-04	1.1E-03	3.2E-02	0.14	0	0	3.2E-02	0.14	Y	Y
1330-20-7	Xylene	2.5E-04	3.0E-04	3.1E-02	0.14	0	0	3.2E-02	0.14	Y	Y
Total HAP		9.0E-02	0.36	1.58	6.25	0.81	3.56	2.48	10.17		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

	0.2155	0.8650	8.3307	31.6474	61.0803	267.5316	69.6264	300.0439
TRUE	0.2155	0.8650	8.3307	31.6474	61.0803	267.5316	69.6264	300.0439
	chk	chk	chk-15	chk	chk	chk	chk-14	chk

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Hazardous Air Pollutants (HAP)/Toxic Air Pollutants (TAP) Emissions Summary - continued

		Emissions[1]									
		Fuel Combustion		Process/Prod/Leach		Mining		Total			
CAS	**Non-HAP TAP**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	HAP	TAP
7429-90-5	Aluminum	0	0	0.65	2.58	41.11	180.04	41.75	182.62	N	Y
7440-39-3	Barium	2.1E-04	8.4E-04	6.6E-03	2.7E-02	0.46	2.03	0.47	2.06	N	Y
1317-65-3	Calcium Carbonate	0	0	2.24	8.12	8.11	35.50	10.35	43.63	N	Y
1305-78-8	Calcium Oxide	0	0	0.70	0.95	0	0	0.70	0.95	N	Y
7440-50-8	Copper	4.0E-05	1.6E-04	4.9E-04	2.1E-03	2.9E-03	1.3E-02	3.4E-03	1.5E-02	N	Y
110-82-7	Cyclohexane	0	0	1.0E-03	4.6E-03	0	0	1.0E-03	4.6E-03	N	Y
7783-06-4	Hydrogen Sulfide	0	0	0.90	3.94	0	0	0.90	3.94	N	Y
7439-89-6	Iron	0	0	0.21	0.81	10.54	46.15	10.75	46.96	N	Y
7439-98-7	Molybdenum	5.2E-05	2.1E-04	4.2E-04	1.8E-03	5.8E-04	2.5E-03	1.0E-03	4.6E-03	N	Y
109-66-0	Pentane	0.12	0.50	0	0	0	0	0.12	0.50	N	Y
7440-22-4	Silver	0	0	4.1E-04	1.8E-03	2.9E-04	1.3E-03	7.0E-04	3.1E-03	N	Y
7664-93-9	Sulfuric Acid	0	0	2.03	8.89	0	0	2.03	8.89	N	Y
7440-28-0	Thallium	0	0	5.2E-04	2.2E-03	5.8E-03	2.5E-02	6.3E-03	2.8E-02	N	Y
7440-61-1	Uranium	0	0	5.2E-04	2.2E-03	5.8E-03	2.5E-02	6.3E-03	2.8E-02	N	Y
7440-62-2	Vanadium	1.1E-04	4.4E-04	7.3E-04	3.0E-03	1.6E-02	7.1E-02	1.7E-02	7.4E-02	N	Y
25551-13-7	Trimethyl benzene	0	0	1.1E-02	4.8E-02	0	0	1.1E-02	4.8E-02	N	Y
7440-33-7	Tungsten	0	0	5.2E-04	2.2E-03	5.8E-03	2.5E-02	6.3E-03	2.8E-02	N	Y
7440-66-6	Zinc	1.4E-03	5.5E-03	8.0E-04	3.3E-03	2.0E-02	8.9E-02	2.2E-02	9.8E-02	N	Y
Total Non-HAP TAP		0.13	0.50	6.75	25.40	60.27	263.98	67.15	289.88		

[1] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

Conversions

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

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PROPANE COMBUSTION

Source Data

Source ID	Description	MMBtu/day	MMBtu/yr
Lime Process Heating			
LKC	PFR Shaft Lime Kiln Combustion	529.0	163,935
Ore Process Heating			
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	17.0	510
CKB	Carbon Regeneration Kiln (Burners)	54.1	19,754
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	2.4	876
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	120.0	43,800
Subtotal		193.5	64,940
HVAC			
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	96.0	35,040
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	96.0	35,040
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	96.0	35,040
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	6.0	2,190
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	12.0	4,380
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	48.0	17,520
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	72.0	26,280
Subtotal		438.0	159,870

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PROPANE COMBUSTION - CONTINUED

HAP/TAP Emission Factors and Emissions

				O.Heat_pph	O.Heat_tpy	L.Heat_pph	L.Heat_tpy	HVAC_pph	HVAC_tpy	lb/hr	ton/yr		
				Emissions(1)									
		Emission Factor(2)		Ore Proc Heat		Lime Proc Heat		HVAC		Total			
CAS	Pollutant	lb/MMscf	lb/MMBtu(3)	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	TAP	A/C
91-57-6	2-Methylnaphthalene	2.4E-05	2.35E-8	1.9E-07	7.6E-07	5.2E-07	1.9E-06	4.3E-07	1.9E-06	1.1E-06	4.6E-06	N	
56-49-5	3-Methylchloranthrene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
57-97-6	7,12-Dimethylbenz(a)ant	< 1.6E-05	1.57E-8	1.3E-07	5.1E-07	3.5E-07	1.3E-06	2.9E-07	1.3E-06	7.6E-07	3.0E-06	N	
83-32-9	Acenaphthene	< 1.8E-06	1.76E-9	1.4E-08	5.7E-08	3.9E-08	1.4E-07	3.2E-08	1.4E-07	8.5E-08	3.4E-07	N	
208-96-8	Acenaphthylene	< 1.8E-06	1.76E-9	1.4E-08	5.7E-08	3.9E-08	1.4E-07	3.2E-08	1.4E-07	8.5E-08	3.4E-07	N	
120-12-7	Anthracene	< 2.4E-06	2.35E-9	1.9E-08	7.6E-08	5.2E-08	1.9E-07	4.3E-08	1.9E-07	1.1E-07	4.6E-07	N	
7440-38-2	Arsenic	2.0E-04	1.96E-7	1.5E-06	6.4E-06	3.7E-06	1.6E-05	3.6E-06	1.6E-05	8.7E-06	3.8E-05	Y	C
56-55-3	Benz(a)anthracene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
71-43-2	Benzene	2.1E-03	2.06E-6	1.5E-05	6.7E-05	3.9E-05	1.7E-04	3.8E-05	1.6E-04	9.1E-05	4.0E-04	Y	C
50-32-8	Benzo(a)pyrene	< 1.2E-06	1.18E-9	8.7E-09	3.8E-08	2.2E-08	9.6E-08	2.1E-08	9.4E-08	5.2E-08	2.3E-07	Y	C
205-99-2	Benzo(b)fluoranthene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
191-24-2	Benzo(g,h,i)perylene	< 1.2E-06	1.18E-9	9.5E-09	3.8E-08	2.6E-08	9.6E-08	2.1E-08	9.4E-08	5.7E-08	2.3E-07	N	
207-08-9	Benzo(k)fluoranthene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
7440-41-7	Beryllium	< 1.2E-05	1.18E-8	8.7E-08	3.8E-07	2.2E-07	9.6E-07	2.1E-07	9.4E-07	5.2E-07	2.3E-06	Y	C
7440-43-9	Cadmium	1.1E-03	1.08E-6	8.0E-06	3.5E-05	2.0E-05	8.8E-05	2.0E-05	8.6E-05	4.8E-05	2.1E-04	Y	C
7440-47-3	Chromium	1.4E-03	1.37E-6	1.1E-05	4.5E-05	3.0E-05	1.1E-04	2.5E-05	1.1E-04	6.6E-05	2.7E-04	Y	A
218-01-9	Chrysene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
7440-48-4	Cobalt	8.4E-05	8.24E-8	6.6E-07	2.7E-06	1.8E-06	6.8E-06	1.5E-06	6.6E-06	4.0E-06	1.6E-05	Y	A
53-70-3	Dibenzo(a,h)anthracene	< 1.2E-06	1.18E-9	8.7E-09	3.8E-08	2.2E-08	9.6E-08	2.1E-08	9.4E-08	5.2E-08	2.3E-07	Y	C
106-46-7	Dichlorobenzene	1.2E-03	1.18E-6	9.5E-06	3.8E-05	2.6E-05	9.6E-05	2.1E-05	9.4E-05	5.7E-05	2.3E-04	Y	A
206-44-0	Fluoranthene	3.0E-06	2.94E-9	2.4E-08	9.5E-08	6.5E-08	2.4E-07	5.4E-08	2.4E-07	1.4E-07	5.7E-07	N	
86-73-7	Fluorene	2.8E-06	2.75E-9	2.2E-08	8.9E-08	6.1E-08	2.3E-07	5.0E-08	2.2E-07	1.3E-07	5.3E-07	N	
50-00-0	Formaldehyde	7.5E-02	7.35E-5	5.5E-04	2.4E-03	1.4E-03	6.0E-03	1.3E-03	5.9E-03	3.3E-03	1.4E-02	Y	C
110-54-3	Hexane	1.8E+00	1.76E-3	1.4E-02	5.7E-02	3.9E-02	1.4E-01	3.2E-02	1.4E-01	8.5E-02	3.4E-01	Y	A
193-39-5	Indeno(1,2,3-cd)pyrene	< 1.8E-06	1.76E-9	1.3E-08	5.7E-08	3.3E-08	1.4E-07	3.2E-08	1.4E-07	7.8E-08	3.4E-07	Y	C
7439-96-5	Manganese	3.8E-04	3.73E-7	3.0E-06	1.2E-05	8.2E-06	3.1E-05	6.8E-06	3.0E-05	1.8E-05	7.2E-05	Y	A
7439-97-6	Mercury	2.6E-04	2.55E-7	2.1E-06	8.3E-06	5.6E-06	2.1E-05	4.7E-06	2.0E-05	1.2E-05	5.0E-05	N	
91-20-3	Naphthalene	6.1E-04	5.98E-7	4.8E-06	1.9E-05	1.3E-05	4.9E-05	1.1E-05	4.8E-05	2.9E-05	1.2E-04	Y	A
7440-02-0	Nickel	2.1E-03	2.06E-6	1.5E-05	6.7E-05	3.9E-05	1.7E-04	3.8E-05	1.6E-04	9.1E-05	4.0E-04	Y	C
85-01-8	Phenanthrene	1.7E-05	1.67E-8	1.3E-07	5.4E-07	3.7E-07	1.4E-06	3.0E-07	1.3E-06	8.1E-07	3.2E-06	N	
129-00-0	Pyrene	5.0E-06	4.90E-9	4.0E-08	1.6E-07	1.1E-07	4.0E-07	8.9E-08	3.9E-07	2.4E-07	9.5E-07	N	
7782-49-2	Selenium	< 2.4E-05	2.35E-8	1.9E-07	7.6E-07	5.2E-07	1.9E-06	4.3E-07	1.9E-06	1.1E-06	4.6E-06	Y	A
108-88-3	Toluene	3.4E-03	3.33E-6	2.7E-05	1.1E-04	7.3E-05	2.7E-04	6.1E-05	2.7E-04	1.6E-04	6.5E-04	Y	A
109-66-0	Pentane	2.6E+00	2.55E-3	2.1E-02	8.3E-02	5.6E-02	2.1E-01	4.7E-02	2.0E-01	1.2E-01	5.0E-01	Y	A
7440-39-3	Barium	4.4E-03	4.31E-6	3.5E-05	1.4E-04	9.5E-05	3.5E-04	7.9E-05	3.4E-04	2.1E-04	8.4E-04	Y	A
7440-50-8	Copper	8.5E-04	8.33E-7	6.7E-06	2.7E-05	1.8E-05	6.8E-05	1.5E-05	6.7E-05	4.0E-05	1.6E-04	Y	A
7439-98-7	Molybdenum	1.1E-03	1.08E-6	8.7E-06	3.5E-05	2.4E-05	8.8E-05	2.0E-05	8.6E-05	5.2E-05	2.1E-04	Y	A
7440-62-2	Vanadium	2.3E-03	2.25E-6	1.8E-05	7.3E-05	5.0E-05	1.8E-04	4.1E-05	1.8E-04	1.1E-04	4.4E-04	Y	A
7440-66-6	Zinc	2.9E-02	2.84E-5	2.3E-04	9.2E-04	6.3E-04	2.3E-03	5.2E-04	2.3E-03	1.4E-03	5.5E-03	Y	A
Total				3.6E-02	1.4E-01	9.8E-02	3.6E-01	8.1E-02	3.5E-01	2.1E-01	8.6E-01		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *AP-42, Table 1.4-3 & 1.4-4 (7/98) Natural Gas Combustion* 1.0766 1.0766

(3) *Natural Gas Higher Heating Value* 1,020 *MMBtu/MMscf* chk

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DIESEL COMBUSTION

Source Data

		Power Rating		Operation	Operation	Fuel Consumption[(1) & (2)]	
Source ID	Description	kW	hp	hr/day	hr/yr	MMBtu/day	MMBtu/yr
EDG1	Camp Emergency Generator	1,000	1,341	1	100	9.39	938.70
EDG2	Plant Emergency Generator #1	1,000	1,341	1	100	9.39	938.7
EDG3	Plant Emergency Generator #2	1,000	1,341	1	100	9.39	938.7
EDFP	Mill Fire Pump	200	268	1	100	1.88	187.7
Total						30.0	3,003.8

(1) *Based on brake specific fuel consumption for diesel generators* 7,000 *Btu/hp-hr* *AP-42 Tbl 3.3-1*

(2) *Heat Content of* 0.137 *MMBtu/gal* *1E+6 Btu/MMBtu* *1.341 hp/kW*

HAP/TAP Emission Factors and Emissions

		Factor (lb/MMBtu)		Emissions (≤600 hp)		Emissions (>600 hp)		Total Emissions[(1)]			
								lb/hr	ton/yr		
	Pollutant	≤600 hp[(2)]	>600hp[(3)]	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	TAP	A/C
106-99-0	1,3-Butadiene	< 3.9E-05		8.4E-07	3.7E-06	0.0E+00	0.0E+00	8.4E-07	3.7E-06	Y	C
83-32-9	Acenaphthene	< 1.4E-06	4.7E-06	1.1E-07	1.3E-07	5.5E-06	6.6E-06	5.6E-06	6.7E-06	N	
208-96-8	Acenaphthylene	< 5.1E-06	9.2E-06	4.0E-07	4.7E-07	1.1E-05	1.3E-05	1.1E-05	1.3E-05	N	
75-07-0	Acetaldehyde	7.7E-04	2.5E-05	1.6E-05	7.2E-05	8.1E-06	3.5E-05	2.5E-05	1.1E-04	Y	C
107-02-8	Acrolein	< 9.3E-05	7.9E-06	7.2E-06	8.7E-06	9.2E-06	1.1E-05	1.6E-05	2.0E-05	Y	A
120-12-7	Anthracene	1.9E-06	1.2E-06	1.5E-07	1.8E-07	1.4E-06	1.7E-06	1.6E-06	1.9E-06	N	
56-55-3	Benz(a)anthracene	1.7E-06	6.2E-07	3.6E-08	1.6E-07	2.0E-07	8.8E-07	2.4E-07	1.0E-06	Y	C
71-43-2	Benzene	9.3E-04	7.8E-04	2.0E-05	8.8E-05	2.5E-04	1.1E-03	2.7E-04	1.2E-03	Y	C
50-32-8	Benzo(a)pyrene	< 1.9E-07	< 2.6E-07	4.0E-09	1.8E-08	8.3E-08	3.6E-07	8.7E-08	3.8E-07	Y	C
205-99-2	Benzo(b)fluoranthene	< 9.9E-08	< 1.1E-06	2.1E-09	9.3E-09	3.6E-07	1.6E-06	3.6E-07	1.6E-06	Y	C
191-24-2	Benzo(g,h,i)perylene	< 4.9E-07	< 5.6E-07	3.8E-08	4.6E-08	6.5E-07	7.8E-07	6.9E-07	8.3E-07	N	
207-08-9	Benzo(k)fluoranthene	< 1.6E-07	< 2.2E-07	3.3E-09	1.5E-08	7.0E-08	3.1E-07	7.3E-08	3.2E-07	Y	C
218-01-9	Chrysene	3.5E-07	1.5E-06	7.6E-09	3.3E-08	4.9E-07	2.2E-06	5.0E-07	2.2E-06	Y	C
53-70-3	Dibenzo(a,h)anthracene	< 5.8E-07	< 3.5E-07	1.2E-08	5.5E-08	1.1E-07	4.9E-07	1.2E-07	5.4E-07	Y	C
206-44-0	Fluoranthene	7.6E-06	4.0E-06	6.0E-07	7.1E-07	4.7E-06	5.7E-06	5.3E-06	6.4E-06	N	
86-73-7	Fluorene	2.9E-05	1.3E-05	2.3E-06	2.7E-06	1.5E-05	1.8E-05	1.7E-05	2.1E-05	N	
50-00-0	Formaldehyde	1.2E-03	7.9E-05	2.5E-05	1.1E-04	2.5E-05	1.1E-04	5.1E-05	2.2E-04	Y	C
193-39-5	Indeno(1,2,3-cd)pyrene	< 3.8E-07	< 4.1E-07	8.0E-09	3.5E-08	1.3E-07	5.8E-07	1.4E-07	6.2E-07	Y	C
91-20-3	Naphthalene	8.5E-05	1.3E-04	6.6E-06	8.0E-06	1.5E-04	1.8E-04	1.6E-04	1.9E-04	Y	A
85-01-8	Phenanthrene	2.9E-05	4.1E-05	2.3E-06	2.8E-06	4.8E-05	5.7E-05	5.0E-05	6.0E-05	N	
129-00-0	Pyrene	4.8E-06	3.7E-06	3.7E-07	4.5E-07	4.4E-06	5.2E-06	4.7E-06	5.7E-06	N	
108-88-3	Toluene	4.1E-04	2.8E-04	3.2E-05	3.8E-05	3.3E-04	4.0E-04	3.6E-04	4.3E-04	Y	A
1330-20-7	Xylene	2.9E-04	1.9E-04	2.2E-05	2.7E-05	2.3E-04	2.7E-04	2.5E-04	3.0E-04	Y	A
Total				1.4E-04	3.6E-04	1.1E-03	2.2E-03	1.2E-03	2.6E-03		
								chk	chk		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

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

(3) *AP-42, Tabs. 3.4-3 & 3.4-4, 10/96, large diesel engines (> 600 hp)*

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ORE PROCESSING

Source Data

Source ID	Description	PM Emissions lb/day	PM Emissions ton/yr
OC1	Loader Transfer of Ore to Grizzly	3.500	0.639
OC2	Grizzly to Apron Feeder	3.500	0.639
OC3	Apron Feeder to Dribble Conveyor	3.500	0.639
OC4	Apron Feeder to Vibrating Grizzly	3.500	0.639
OC5	Dribble Conveyor to Vibrating Grizzly	3.500	0.639
OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	3.500	0.639
OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	30.000	5.475
OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	3.500	0.639
OC9	Stockpile Transfers to Reclaim Conveyors	16.560	3.022
OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	16.560	3.022
OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	16.560	3.022
OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge C	33.120	6.044
OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	3.864	0.705
Total		141.164	25.762

HAP/TAP Emission Factors and Emissions

CAS No.	Pollutant	Concentration ppm[2]	Emissions[1] lb/hr	Emissions[1] ton/yr	TAP	A/C
7440-38-2	Arsenic	667	3.9E-03	1.7E-02	Y	C
7440-41-7	Beryllium	3.2	1.9E-05	8.2E-05	Y	C
7440-43-9	Cadmium	0.50	2.9E-06	1.3E-05	Y	C
7440-48-4	Cobalt	4	2.4E-05	1.0E-04	Y	A
7440-47-3	Chromium	9	5.3E-05	2.3E-04	Y	A
7439-97-6	Mercury [3]	0.96	5.6E-06	2.5E-05	N	
7439-96-5	Manganese	299	1.8E-03	7.7E-03	Y	A
7440-02-0	Nickel	2	1.2E-05	5.2E-05	Y	C
7439-92-1	Lead	8	4.7E-05	2.1E-04	N	
7440-36-0	Antimony	23	1.4E-04	5.9E-04	Y	A
7723-14-0	Phosphorus	650	3.8E-03	1.7E-02	Y	A
7782-49-2	Selenium [4]	0.40	2.4E-06	1.0E-05	Y	A
7440-22-4	Silver	0.50	2.9E-06	1.3E-05	Y	A
7429-90-5	Aluminum	71,000	4.2E-01	1.8E+00	Y	A
7440-39-3	Barium	800	4.7E-03	2.1E-02	Y	A
1317-65-3	Calcium Carbonate	14,000	8.2E-02	3.6E-01	Y	A
7440-50-8	Copper	5	2.9E-05	1.3E-04	Y	A
7439-89-6	Iron [4]	18,200	1.1E-01	4.7E-01	Y	A
7439-98-7	Molybdenum	1	5.9E-06	2.6E-05	Y	A
7440-28-0	Thallium	10	5.9E-05	2.6E-04	Y	A
7440-61-1	Uranium	10	5.9E-05	2.6E-04	Y	A
7440-62-2	Vanadium	28	1.6E-04	7.2E-04	Y	A
7440-33-7	Tungsten	10	5.9E-05	2.6E-04	Y	A
7440-66-6	Zinc	35	2.1E-04	9.0E-04	Y	A
Total			6.2E-01	2.7E+00		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*
(2) *(Midas Gold 2017c)* *Median concentration of 55,000 SGP samples.*
(3) *(Midas Gold 2018e)* *Median ore concentration of 151,000 SGP samples; resource block model.*
(4) *(Midas Gold 2020)* *Median concentration of 56,000 SGP samples for Fe and 1,500 SGP samples for Se.*
1E+6 parts/ppm

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ORE CONCETRATION AND REFINING

Source Data

Source ID	Description	Subpart 7E Allowable Limit lb/yr[1]	Oper. hr/yr	% of Subpart 7E for Controlled Systems %		Controlled Hg Emissions lb/hr	ton/yr	lb/yr
AC	Autoclave	213.4	8,760	(2)		0.000023	0.00010	0.20
EW,MR,MF,CKD	Refinery Sources (C. Kiln, EW, Retort, Furn	16.8		20%	(3)	0.000384	0.00168	3.36
7439-97-6 Mercury	Total	230.2				0.000407	0.00178	3.56

(1) *Subpart 7E Limit - Ore Pretreatment Processes* *(CFR 2018b)*

84 lb / *~~MMton~~*	*2,540,400 ~~ton~~* / *yr*	*~~MMton~~* / *1.0E+6 ~~ton~~*	=	*213.4 lb* / *yr*

(1) *Subpart 7E Limit - Carbon Processes with Mercury Retorts*

0.8 lb / *~~ton~~*	*21 ~~ton~~* / *yr*	=	*16.8 lb* / *yr*

(2) *Controlled SysCAD modeled emissions from Autoclave:* *0.0105 g/hr* *2.3E-05 lb/hr* *0.20 lb/yr* *(M3 2019)*

(3) *Based on similar source (but with much higher ore Hg content) Hg reporting levels provided below:*

Goldstrike Refinery (2015 & 2016 Hg Reports) *(NDEP 2015a) (NDEP 2016)*

28.79 lb / *yr*	*yr* / *251.00 ton*	=	*0.11 lb* / *MMton*	*ton* / *0.8 lb*	=	*14.3%*

Twin Creeks Refinery (2015 & 2016 Hg Reports) *(NDEP 2015a) (NDEP 2016)*

31.27 lb / *yr*	*yr* / *142.77 ton*	=	*0.22 lb* / *MMton*	*ton* / *0.8 lb*	=	*27.4%*

HAP/TAP Emission Factors and Emission

CAS No.	Pollutant	Emission Factor[1]	Autoclave lb/hr (AC_pph)	Autoclave ton/yr (AC_tpy)	Refinery lb/hr (Refin_pph)	Refinery ton/yr (Refin_tpy)	Total Emissions lb/hr	Total Emissions ton/yr	TAP	A/C
7440-38-2	Arsenic	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	C
7440-41-7	Beryllium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	C
7440-43-9	Cadmium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	C
7440-48-4	Cobalt	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-47-3	Chromium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7439-97-6	Mercury	see above	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	N	
7439-96-5	Manganese	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-02-0	Nickel	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	C
7439-92-1	Lead	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	N	
7440-36-0	Antimony	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7723-14-0	Phosphorus	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7782-49-2	Selenium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-22-4	Silver	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7429-90-5	Aluminum	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-39-3	Barium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
1317-65-3	Calcium Carbonate	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-50-8	Copper	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7439-89-6	Iron	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7439-98-7	Molybdenum	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-28-0	Thallium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-61-1	Uranium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-62-2	Vanadium	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-33-7	Tungsten	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
7440-66-6	Zinc	same as Hg	2.3E-05	1.0E-04	3.8E-04	1.7E-03	4.1E-04	1.8E-03	Y	A
Total			5.5E-04	2.4E-03	9.2E-03	4.0E-02	9.8E-03	4.3E-02		

(1) *Hg is the most difficult metal to control due to it existing in both particulate and gaseous form. Therefore, all other metals are conservatively estimated to be equal to or less than the Hg emissions.* 0.0525 0.0525 chk

7664-93-9	Sulfuric Acid	Autoclave	2.03	8.89			2.03	8.89
7783-06-4	Hydrogen Sulfic	Autoclave	0.90	3.94			0.90	3.94
592-01-8	Cyanide	Point Sources - S EW Cells			0.0012	0.0053	0.00	0.01
Total			2.93	12.84	0.01	0.05	2.94	12.88

ORE CONCETRATION AND REFINING - CONTINUED

Source Data

		Throughput		Operation	
Source ID	Description	ton/day	ton/yr	hr/day	hr/yr
AC	Autoclave	6,960	2,540,400	24	8,760

Autoclave HAP/TAP Emission Factors and Emission lb/hr ton/yr

				Emissions[1]	
CAS No.	Pollutant	Emission Factor		lb/hr	ton/yr
7664-93-9	Sulfuric Acid	0.007	lb/ton[2]	2.03	8.89
7783-06-4	Hydrogen Sulfide	0.9	lb/hr[3]	0.90	3.94

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *H2SO4 is based on Acidic Autoclave test data (APT 2010)*

(3) *H2S is based on Acidic Autoclave test data (APT 2013)*

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LEACHING OPERATION

Cyanide (HCN) Source Data, Emission Factors, and Emissions

lb/hr ton/yr

Source II	Description	Dia. ft[1]	pH[1]	Free CN- g/m3[1]	T C[1]	pKa	a0	H	kG[2] m/s	Fa*Fw	g/s	lb/hr	ton/yr
TSF	*Fugitive Sources*												
TSF	Tailings Maint. Pond	76	7.75	1	3.74	9.803	0.9912	0.0025	1.89E-05	0.641	1.27E-05	0.0001	0.0004
MILLTA	CN Detox Tank 1	40	8.5	25	25	9.250	0.8490	0.0055	0.000311	0.688	0.002891	0.0229	0.101
MILLTA	CN Detox Tank 2	40	8.5	25	25	9.250	0.8490	0.0055	0.000311	0.688	0.002891	0.0229	0.101
MILLTA	CIP Leach Tank 1	52	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.668	0.001435	0.0114	0.050
MILLTA	CIP Leach Tank 2	52	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.668	0.001435	0.0114	0.050
MILLTA	CIP Leach Tank 3	52	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.668	0.001435	0.0114	0.050
MILLTA	CIP Leach Tank 4	52	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.668	0.001435	0.0114	0.050
MILLTA	CIL Tank 1	54	10.25	125	30	9.120	0.0690	0.0065	0.000311	0.666	0.002485	0.0197	0.086
MILLTA	CIL Tank 2	54	10.25	125	30	9.120	0.0690	0.0065	0.000311	0.666	0.002485	0.0197	0.086
MILLTA	CIL Tank 3	54	10.25	125	30	9.120	0.0690	0.0065	0.000311	0.666	0.002485	0.0197	0.086
MILLTA	CIL Tank 4	54	10.25	125	30	9.120	0.0690	0.0065	0.000311	0.666	0.002485	0.0197	0.086
MILLTA	CIL Tank 5	54	10.25	125	30	9.120	0.0690	0.0065	0.000311	0.666	0.002485	0.0197	0.086
MILLTA	CIL Tank 6	54	10.25	125	30	9.120	0.0690	0.0065	0.000311	0.666	0.002485	0.0197	0.086
MILLTA	CIP Tank 1	20	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.742	0.000236	0.0019	0.008
MILLTA	CIP Tank 2	20	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.742	0.000236	0.0019	0.008
MILLTA	CIP Tank 3	20	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.742	0.000236	0.0019	0.008
MILLTA	CIP Tank 4	20	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.742	0.000236	0.0019	0.008
MILLTA	CIP Tank 5	20	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.742	0.000236	0.0019	0.008
MILLTA	CIP Tank 6	20	10.25	125	52.5	8.535	0.0189	0.0148	0.000311	0.742	0.000236	0.0019	0.008
		Acres[1]											
TSF	Tails, Aqueous Surface	110.222	7.75	1	3.74	9.803	0.9912	0.0025	1.89E-05	0.421	0.008845	0.0702	0.307
TSF	Tails, Wet Sediment	110.222							5.31E-08	0.421	0.009961	0.0791	0.346
TSF	Tails, Dry Sediment	110.222							2.33E-08	1	0.010375	0.0823	0.361
		330.666											
592-01-8	Cyanide Fugitive Sources - Subtotal											0.4527	1.983
75-15-0	Carbon Disulfide											0.01446	0.06332
	Point Sources												
EW	EW Cells	[3]										0.0006	0.003
EW	Preg/Barren Tanks	[3]										0.0006	0.003
592-01-8	Cyanide Point Sources - Subtotal											0.0012	0.0053
Total												0.454	1.988

[1] *(Midas Gold 2016)(M3 2017c)(M3 2017d)*
[2] *The emission factors and caculation methodology are from the EPA directed HCN study: (Card, T. 2009)(EPA 2009)(Schmidt 2010)*
[3] *(APT 2009)*

Carbon Disulfide Emissions from Xanthate Decomposition

lb/hr ton/yr

CAS No.	Pollutant	Xanthate[1] ton/yr	Molar Decomp.[2]	CS_2 MW Ratio	Temperature Adj. Factor[3]	Emissions lb/hr	Emissions ton/yr
75-15-0	Carbon Disulfide	1,700	0.99%	0.376	1%	0.0145	0.063

	MW	
Xanthate (PAX)	202.37	$C6H11KOS_2$
Carbon disulfide	76.139	CS_2

[1] *(Midas Gold 2016) p. 12-11*
[2] *(Air Sciences 2020) molar decomposition of xanthate in solution to CS2 gas*
[3] *(Air Sciences 2020) based on the comparison of CS2 generation at 25C and 70C*

Conversions

8,760	hr/yr	453.5929	g/lb
2,000	lb/ton	3.28084	ft/m
4,046.86	m2/acre	3,600	s/hr

Wind adjustment factor Fw 1

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LIME PRODUCTION

Source Data

Source ID	Description	Throughput ton/day	Throughput ton/yr	PM Emissions lb/day	PM Emissions ton/yr
LS1	Limestone transfer to Primary Crusher Hopper			3.39	0.48
LS2	Primary Crushing and Associated Transfers In and Out			6.10	0.86
LS3	Primary Screening and Associated Transfers In and Out			28.25	3.97
LS4	Secondary Crushing and Associated Transfers In and Out			6.10	0.86
LS5	Secondary Screening and Associated Transfers In and Out			28.25	3.97
LS6	Limestone transfer to Ball Mill Feed Bin			3.39	0.48
LS7	Limestone transfer to Ball Mill Feed Conveyor			3.39	0.48
LS8	Ball Mill Feed transfer to Ball Mill			3.39	0.48
LSBM	Limestone Ball Mill			45.65	6.42
LS9	Limestone transfer to Kiln Feed Bin			0.80	0.12
LS10	Limestone transfer to Lime Kiln Feed Conveyor			0.80	0.12
LS11	Fines Screening and Associated Transfers In and Out			6.68	1.03
Subtotal LS1-11				136.18	19.28
LS12	Kiln Feed transfer to PFR Shaft Lime Kiln			0.80	0.12
LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	169	52,377	21.97	3.40
Subtotal LS12,LK				22.77	3.53
Total				158.95	22.80

HAP/TAP Emission Factors and Emissions

CAS No.	Pollutant	Concentration ppm[2]	LS1-11,LSBM lb/hr (LS_pph)	LS1-11,LSBM ton/yr (LS_tpy)	LS12 lb/hr (LS12_pph)	LS12 ton/yr (LS12_tpy)	Lime Kiln lb/hr (LK_pph)	Lime Kiln ton/yr (LK_tpy)	Emissions[1] lb/hr	Emissions[1] ton/yr	TAP	A/C
7440-38-2	Arsenic	23	1.01E-04	4.43E-04	6.51E-07	2.85E-06	1.79E-05	7.83E-05	1.20E-04	5.24E-04	Y	C
7440-41-7	Beryllium	0.8	3.52E-06	1.54E-05	2.27E-08	9.92E-08	6.22E-07	2.72E-06	4.17E-06	1.82E-05	Y	C
7440-43-9	Cadmium	0.25	1.10E-06	4.82E-06	7.08E-09	3.10E-08	1.94E-07	8.51E-07	1.30E-06	5.70E-06	Y	C
7440-48-4	Cobalt	4	2.27E-05	7.71E-05	1.34E-07	4.96E-07	3.66E-06	1.36E-05	2.65E-05	9.12E-05	Y	A
7440-47-3	Chromium	15	8.51E-05	2.89E-04	5.01E-07	1.86E-06	1.37E-05	5.11E-05	9.93E-05	3.42E-04	Y	A
7439-97-6	Mercury [3]	0.02	1.13E-07	3.86E-07	6.68E-10	2.48E-09	2.82E-04	1.05E-03	2.82E-04	1.05E-03	N	
7439-96-5	Manganese	236.5	1.34E-03	4.56E-03	7.89E-06	2.93E-05	2.16E-04	8.05E-04	1.57E-03	5.39E-03	Y	A
7440-02-0	Nickel	5	2.20E-05	9.64E-05	1.42E-07	6.20E-07	3.89E-06	1.70E-05	2.60E-05	1.14E-04	Y	C
7439-92-1	Lead	3	1.70E-05	5.78E-05	1.00E-07	3.72E-07	2.75E-06	1.02E-05	1.99E-05	6.84E-05	N	
7440-36-0	Antimony	2.5	1.42E-05	4.82E-05	8.34E-08	3.10E-07	2.29E-06	8.51E-06	1.66E-05	5.70E-05	Y	A
7723-14-0	Phosphorus	130	7.38E-04	2.51E-03	4.34E-06	1.61E-05	1.19E-04	4.43E-04	8.61E-04	2.96E-03	Y	A
7440-22-4	Silver	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Y	A
7429-90-5	Aluminum	22600	1.28E-01	4.36E-01	7.54E-04	2.80E-03	2.07E-02	7.69E-02	1.50E-01	5.15E-01	Y	A
7440-39-3	Barium	145	8.23E-04	2.79E-03	4.84E-06	1.80E-05	1.33E-04	4.94E-04	9.60E-04	3.31E-03	Y	A
1317-65-3	Calcium Carbonate	274500	1.56E+00	5.29E+00	9.16E-03	3.40E-02	2.51E-01	9.35E-01	1.82E+00	6.26E+00	Y	A
7440-50-8	Copper	5	2.84E-05	9.64E-05	1.67E-07	6.20E-07	4.58E-06	1.70E-05	3.31E-05	1.14E-04	Y	A
7439-89-6	Iron	10350	5.87E-02	1.99E-01	3.45E-04	1.28E-03	9.47E-03	3.52E-02	6.85E-02	2.36E-01	Y	A
7439-98-7	Molybdenum	0.5	2.84E-06	9.64E-06	1.67E-08	6.20E-08	4.58E-07	1.70E-06	3.31E-06	1.14E-05	Y	A
7440-28-0	Thallium	5	2.84E-05	9.64E-05	1.67E-07	6.20E-07	4.58E-06	1.70E-05	3.31E-05	1.14E-04	Y	A
7440-61-1	Uranium	5	2.84E-05	9.64E-05	1.67E-07	6.20E-07	4.58E-06	1.70E-05	3.31E-05	1.14E-04	Y	A
7440-62-2	Vanadium	15.5	8.79E-05	2.99E-04	5.17E-07	1.92E-06	1.42E-05	5.28E-05	1.03E-04	3.53E-04	Y	A
7440-33-7	Tungsten	5	2.84E-05	9.64E-05	1.67E-07	6.20E-07	4.58E-06	1.70E-05	3.31E-05	1.14E-04	Y	A
7440-66-6	Zinc	18	1.02E-04	3.47E-04	6.01E-07	2.23E-06	1.65E-05	6.13E-05	1.19E-04	4.10E-04	Y	A
Subtotal			1.75E+00	5.94E+00	1.03E-02	3.82E-02	2.82E-01	1.05E+00	2.04E+00	7.03E+00	9.0667	9.0667
7647-01-0	Hydrogen Chloride	0.14 lb/ton product[4]					0.99	3.67	0.99	3.67		chk

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *(M3 2018) Median concentrations of SGP limestone material. Metals with medians below the detection limit (DL) are set to 1/2DL.*

(3) *Hg emissions from the Lime Kiln are conservatively estimated assuming 100% volatilization of all Hg in the limestone*

(4) *(EPA 1999b)*

1E+6 parts/ppm

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LIME PRODUCTION - CONTINUED

Source Data

Source ID	Description	PM Emissions lb/day	ton/yr
LS1L	Mill Lime Silo #1 Loading	0.248	0.002
LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	1.200	0.011
MillS2L	Mill Lime Silo #2 Loading	0.248	0.002
MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	1.200	0.011
ACS1L	AC Lime Silo #1 Loading	0.990	0.009
ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	2.304	0.042
ACS2L	AC Lime Silo #2 Loading	0.990	0.009
ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	2.304	0.042
ACS3L	AC Lime Silo #3 Loading	0.990	0.009
ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	2.304	0.042
ACS4L	AC Lime Silo #4 Loading	0.495	0.004
ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	2.304	0.021
Subtotal - Mill & AC Lime Silos		15.576	0.203
LCR	Lime Mill Crushing and associated transfers In and Out	6.828	1.058
LSL	Pebble Lime Silo Loading via Bucket Elevator	0.149	0.023
LSU	Pebble Lime Silo discharge to Lime Slaker	0.015	0.002
Subtotal - Lime Mfg		6.991	1.083
Total		22.567	1.286

HAP/TAP Emission Factors and Emissions

CAS No.	Pollutant	Concentration ppm[2]	Mill and AC lb/hr	Mill and AC ton/yr	Lime Mfg lb/hr	Lime Mfg ton/yr	Emissions[1] lb/hr	Emissions[1] ton/yr	TAP	A/C
7440-38-2	Arsenic	23	1.06E-06	4.66E-06	5.69E-06	2.49E-05	6.75E-06	2.96E-05	Y	C
7440-41-7	Beryllium	0.8	3.70E-08	1.62E-07	1.98E-07	8.67E-07	2.35E-07	1.03E-06	Y	C
7440-43-9	Cadmium	0.25	1.16E-08	5.07E-08	6.18E-08	2.71E-07	7.34E-08	3.22E-07	Y	C
7440-48-4	Cobalt	4	2.60E-06	8.11E-07	1.17E-06	4.33E-06	3.76E-06	5.14E-06	Y	A
7440-47-3	Chromium	15	9.74E-06	3.04E-06	4.37E-06	1.63E-05	1.41E-05	1.93E-05	Y	A
7439-97-6	Mercury	0.02	1.30E-08	4.05E-09	5.83E-09	2.17E-08	1.88E-08	2.57E-08	N	
7439-96-5	Manganese	236.5	1.53E-04	4.79E-05	6.89E-05	2.56E-04	2.22E-04	3.04E-04	Y	A
7440-02-0	Nickel	5	2.31E-07	1.01E-06	1.24E-06	5.42E-06	1.47E-06	6.43E-06	Y	C
7439-92-1	Lead	3	1.95E-06	6.08E-07	8.74E-07	3.25E-06	2.82E-06	3.86E-06	N	
7440-36-0	Antimony	2.5	1.62E-06	5.07E-07	7.28E-07	2.71E-06	2.35E-06	3.22E-06	Y	A
7723-14-0	Phosphorus	130	8.44E-05	2.63E-05	3.79E-05	1.41E-04	1.22E-04	1.67E-04	Y	A
7440-22-4	Silver	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Y	A
7429-90-5	Aluminum	22,600	1.47E-02	4.58E-03	6.58E-03	2.45E-02	2.13E-02	2.91E-02	Y	A
7440-39-3	Barium	145	9.41E-05	2.94E-05	4.22E-05	1.57E-04	1.36E-04	1.86E-04	Y	A
1305-78-8	Calcium Oxide	740,000 (3)	4.80E-01	1.50E-01	2.16E-01	8.02E-01	6.96E-01	9.52E-01	Y	A
7440-50-8	Copper	5	3.25E-06	1.01E-06	1.46E-06	5.42E-06	4.70E-06	6.43E-06	Y	A
7439-89-6	Iron	10350	6.72E-03	2.10E-03	3.01E-03	1.12E-02	9.73E-03	1.33E-02	Y	A
7439-98-7	Molybdenum	0.5	3.25E-07	1.01E-07	1.46E-07	5.42E-07	4.70E-07	6.43E-07	Y	A
7440-28-0	Thallium	5	3.25E-06	1.01E-06	1.46E-06	5.42E-06	4.70E-06	6.43E-06	Y	A
7440-61-1	Uranium	5	3.25E-06	1.01E-06	1.46E-06	5.42E-06	4.70E-06	6.43E-06	Y	A
7440-62-2	Vanadium	15.5	1.01E-05	3.14E-06	4.52E-06	1.68E-05	1.46E-05	1.99E-05	Y	A
7440-33-7	Tungsten	5	3.25E-06	1.01E-06	1.46E-06	5.42E-06	4.70E-06	6.43E-06	Y	A
7440-66-6	Zinc	18	1.17E-05	3.65E-06	5.24E-06	1.95E-05	1.69E-05	2.31E-05	Y	A
Total			5.02E-01	1.57E-01	2.25E-01	8.38E-01	7.27E-01	9.95E-01		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *See LIME PRODUCTION, page 10*

(3) *(NLA 2007) 40% to 74% CaO in lime*

1E+6 parts/ppm

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AGGREGATE PRODUCTION

Source Data

	description	PM_ppd	PM_tpy
		PM Emissions	
Source ID	Description	lb/day	ton/yr
PCSP1	Portable Crushing and Screening Plant 1 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conve	15.00	2.74
PCSP2	Portable Crushing and Screening Plant 2 (2 crushers (primary and secondary), 2 screens (primary and secondary), and 5 conve	15.00	2.74
Total		30.00	5.48

HAP/TAP Emission Factors and Emissions

			lb/hr	ton/yr		
		Concentration	Emissions[1]			
CAS No.	Pollutant	ppm[2]	lb/hr	ton/yr	TAP	A/C
7440-38-2	Arsenic	23	2.88E-05	1.26E-04	Y	C
7440-41-7	Beryllium	0.8	1.00E-06	4.38E-06	Y	C
7440-43-9	Cadmium	0.25	3.13E-07	1.37E-06	Y	C
7440-48-4	Cobalt	4	5.00E-06	2.19E-05	Y	A
7440-47-3	Chromium	15	1.88E-05	8.21E-05	Y	A
7439-97-6	Mercury	0.02	2.50E-08	1.10E-07	N	
7439-96-5	Manganese	236.5	2.96E-04	1.29E-03	Y	A
7440-02-0	Nickel	5	6.25E-06	2.74E-05	Y	C
7439-92-1	Lead	3	3.75E-06	1.64E-05	N	
7440-36-0	Antimony	2.5	3.13E-06	1.37E-05	Y	A
7723-14-0	Phosphorus	130	1.63E-04	7.12E-04	Y	A
7440-22-4	Silver	0	0.00E+00	0.00E+00	Y	A
7429-90-5	Aluminum	22600	2.83E-02	1.24E-01	Y	A
7440-39-3	Barium	145	1.81E-04	7.94E-04	Y	A
1317-65-3	Calcium Carbonate	274500	3.43E-01	1.50E+00	Y	A
7440-50-8	Copper	5	6.25E-06	2.74E-05	Y	A
7439-89-6	Iron	10350	1.29E-02	5.67E-02	Y	A
7439-98-7	Molybdenum	0.5	6.25E-07	2.74E-06	Y	A
7440-28-0	Thallium	5	6.25E-06	2.74E-05	Y	A
7440-61-1	Uranium	5	6.25E-06	2.74E-05	Y	A
7440-62-2	Vanadium	15.5	1.94E-05	8.49E-05	Y	A
7440-33-7	Tungsten	5	6.25E-06	2.74E-05	Y	A
7440-66-6	Zinc	18	2.25E-05	9.86E-05	Y	A
Total			3.85E-01	1.69E+00		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *See LIME PRODUCTION, page 10*

1E+6 parts/ppm

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CONCRETE PRODUCTION

Source Data

	description	TP_unit/day	TP_unit/yr
		Throughput	
Source ID	Description	ton/day	ton/yr
CS1L	Cement/Shotcrete Silo #1 Loading	164	60,000
CS1U	Cement/Shotcrete Silo #1 Unloading	164	60,000
CS2L	Cement/Shotcrete Silo #2 Loading	164	60,000
CS2U	Cement/Shotcrete Silo #2 Unloading	164	60,000
CM	Central Mixer Loading	164	60,000
	Subtotal Cement Silo Filling	658	240,000
	Subtotal Central Mix Batching	164	60,000

HAP/TAP Emission Factors and Emissions

				CF_pph	CF_tpy	CM_pph	CM_tpy	lb/hr	ton/yr		
		Silo Fill	Central Mixer	Cement Silo L/U		Central Mix Batching		Total Emissions[3]			
CAS No.	HAP/TAP	lb/ton[2]	lb/ton[3]	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	TAP	A/C
7440-38-2	Arsenic	4.24E-09	2.96E-07	1.16E-7	5.09E-7	2.03E-6	8.88E-6	2.14E-6	9.39E-6	Y	C
7440-41-7	Beryllium	4.86E-10		1.33E-8	5.83E-8	--	--	1.33E-8	5.83E-8	Y	C
7440-43-9	Cadmium		7.10E-10	--	--	4.86E-9	2.13E-8	4.86E-9	2.13E-8	Y	C
7440-47-3	Chromium	2.90E-08	1.27E-07	7.95E-7	3.48E-6	8.70E-7	3.81E-6	1.66E-6	7.29E-6	Y	A
18540-29-9	Cr (VI)	5.80E-09	2.70E-08	1.59E-7	6.96E-7	1.85E-7	8.11E-7	3.44E-7	1.51E-6	Y	C
7439-92-1	Lead	1.09E-08	3.66E-08	2.99E-7	1.31E-6	2.51E-7	1.10E-6	5.49E-7	2.41E-6	N	
7439-96-5	Manganese	1.17E-07	3.78E-06	3.21E-6	1.40E-5	2.59E-5	1.13E-4	2.91E-5	1.27E-4	Y	A
7440-02-0	Nickel	4.18E-08	2.48E-07	1.15E-6	5.02E-6	1.70E-6	7.44E-6	2.84E-6	1.25E-5	Y	C
7723-14-0	Phosphorus		1.20E-06	--	--	8.22E-6	3.60E-5	8.22E-6	3.60E-5	Y	A
Total				5.73E-6	2.51E-5	3.91E-5	1.71E-4	4.49E-5	1.97E-4		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *AP-42, Table 11.12-8, (06/06) Cement Silo Filing, Controlled.* 20% *Cr (VI), IDEQ email on 11/23/2020* 0.0002 0.0002

(3) *AP-42, Table 11.12-8, (06/06) Central Mix Batching, Controlled.* 21.29% *Cr (VI), IDEQ email on 11/23/2020* chk

Conversions

24 hr/day

CONCRETE PRODUCTION - CONTINUED

Source Data

	description	PM_ppd	PM_tpy
		PM Emissions	
Source ID	Description	lb/day	ton/yr
CAL	Aggregate Bin Loading	16.56	1.73
CAU	Aggregate Bin Unloading	16.56	1.73
Total		33.12	3.45

HAP/TAP Emission Factors and Emissions

			lb/hr	ton/yr		
		Concentration	Emissions(1)			
CAS No.	Pollutant	ppm(2)	lb/hr	ton/yr	TAP	A/C
7440-38-2	Arsenic	23	1.81E-05	7.94E-05	Y	C
7440-41-7	Beryllium	0.8	6.30E-07	2.76E-06	Y	C
7440-43-9	Cadmium	0.25	1.97E-07	8.63E-07	Y	C
7440-48-4	Cobalt	4	5.52E-06	1.38E-05	Y	A
7440-47-3	Chromium	15	2.07E-05	5.18E-05	Y	A
7439-97-6	Mercury	0.02	2.76E-08	6.90E-08	N	
7439-96-5	Manganese	236.5	3.26E-04	8.16E-04	Y	A
7440-02-0	Nickel	5	3.94E-06	1.73E-05	Y	C
7439-92-1	Lead	3	4.14E-06	1.04E-05	N	
7440-36-0	Antimony	2.5	3.45E-06	8.63E-06	Y	A
7723-14-0	Phosphorus	130	1.79E-04	4.49E-04	Y	A
7440-22-4	Silver	0	0.00E+00	0.00E+00	Y	A
7429-90-5	Aluminum	22600	3.12E-02	7.80E-02	Y	A
7440-39-3	Barium	145	2.00E-04	5.00E-04	Y	A
7440-50-8	Copper	5	6.90E-06	1.73E-05	Y	A
7439-89-6	Iron	10350	1.43E-02	3.57E-02	Y	A
7439-98-7	Molybdenum	0.5	6.90E-07	1.73E-06	Y	A
7440-28-0	Thallium	5	6.90E-06	1.73E-05	Y	A
7440-61-1	Uranium	5	6.90E-06	1.73E-05	Y	A
7440-62-2	Vanadium	15.5	2.14E-05	5.35E-05	Y	A
7440-33-7	Tungsten	5	6.90E-06	1.73E-05	Y	A
7440-66-6	Zinc	18	2.48E-05	6.21E-05	Y	A
Total			4.63E-02	1.16E-01		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *See LIME PRODUCTION, page 10*

1E+6 parts/ppm

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FUEL STORAGE - GASOLINE

Source Data

	description	VOC_ppd	VOC_tpy
		VOC Emissions	
Source ID	Description	lb/day	ton/yr
TG1	Mine Site Gasoline Tank #1	5.25	0.96
TG2	Mine Site Gasoline Tank #2	5.25	0.96
Total		10.49	1.91

HAP/TAP Emission Factors and Emissions

			lb/hr	ton/yr		
		Concentration	Emissions[1]			
CAS No.	Pollutant	wt. %[2]	lb/hr	ton/yr	TAP	A/C
71-43-2	Benzene	1.608%	7.03E-03	3.08E-02	Y	C
92-52-4	Biphenyl	0.010%	4.37E-05	1.91E-04	Y	A
110-82-7	Cyclohexane	0.240%	1.05E-03	4.60E-03	Y	A
110-54-3	Hexane	7.138%	3.12E-02	1.37E-01	Y	A
91-20-3	Naphthalene	0.444%	1.94E-03	8.50E-03	Y	A
108-95-2	Phenol	0.055%	2.40E-04	1.05E-03	Y	A
108-88-3	Toluene	7.212%	3.15E-02	1.38E-01	Y	A
25551-13-7	Trimethyl benzene	2.500%	1.09E-02	4.79E-02	Y	A
1330-20-7	Xylene	7.170%	3.13E-02	1.37E-01	Y	A
Total			1.15E-01	5.05E-01		

(1) *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

(2) *(EPA 1999a)*

MINING FUGITIVE EMISSIONS

Dust Emissions

Source Data **Model Scenario** **W3** **T-RACT Emissions**

Operating schedule 365 day/yr

Clean rock cap (CR >50% [1]

[1] (Perpetua 2021h) Percent of VMTs on haul roads capped with CR

Roads outside of the pits and DRSFs are capped with CR

Source ID	Description	PM Emissions lb/day	PM Emissions ton/yr
YPP	Yellow Pine Pit	--	--
HFP	Hangar Flats Pit	--	--
WEP	West End Pit	338.16	61.71
BT	Bradley Tailings	--	--
YPPBL	Yellow Pine Pit Blasting	--	--
HFPBL	Hangar Flats Pit Blasting	--	--
WEPBL	West End Pit Blasting	643.03	117.35
BTBL	Bradley Tailings Blasting	--	--
STKP	PC Stockpile	--	--
FDRSF	Fiddle DRSF	--	--
HFDRSF	Hangar Flats DRSF	152.12	27.76
YPDRSF	Yellow Pine DRSF	--	--
WEDRSF	West End DRSF	--	--
HR000	Haul Roads	12,723.41	2,322.02
TSF	Tailing Storage Facility	--	--
ACCRD	Access Roads	38.10	6.95
UGEXP	Scout Portal	0.008	0.002
Total		13,894.82	2,535.81

TSF, ACCRD, UGEXP 38.11 6.95 chk 2535.81

CAS No.	HAP/TAP Emission Factors Pollutant	ORE ppm[1]	DR ppm[1]	CR ppm[3]	HRD ppm[4]	Borrow ppm[5]	AR ppm
7440-38-2	Arsenic	667	667	90	378.5	2.5	2.5
7440-41-7	Beryllium	3.2	3.2		3.2		3.2
7440-43-9	Cadmium	0.5	0.5		0.5		0.5
7440-48-4	Cobalt	4	4		4		4
7440-47-3	Chromium	9	9		9		9
7439-97-6	Mercury [2]	0.96	0.6		0.6		0.6
7439-96-5	Manganese	299	299		299		299
7440-02-0	Nickel	2	2		2		2
7439-92-1	Lead	8	8		8		8
7440-36-0	Antimony	23	23		23		23
7723-14-0	Phosphorus	650	650		650		650
7782-49-2	Selenium	0.4	0.4		0.4		0.4
7440-22-4	Silver	0.5	0.5		0.5		0.5
7429-90-5	Aluminum	71000	71000		71000		71000
7440-39-3	Barium	800	800		800		800
1317-65-3	Calcium Carbonate	14000	14000		14000		14000
7440-50-8	Copper	5	5		5		5
7439-89-6	Iron	18200	18200		18200		18200
7439-98-7	Molybdenum	1	1		1		1
7440-28-0	Thallium	10	10		10		10
7440-61-1	Uranium	10	10		10		10
7440-62-2	Vanadium	28	28		28		28
7440-33-7	Tungsten	10	10		10		10
7440-66-6	Zinc	35	35		35		35

[1] *(Midas Gold 2017c) Median concentration of 55,000 SGP samples.* *1E+6 parts/ppm*

[2] *(Midas Gold 2018e) Median ore and development rock (DR) concentrations of 151,000 samples; resource block model.*

[3] *(Perpetua 2021g) Median concentration of 265 SGP samples.*

[4] *HRD: haul road - emissions calculated based on 50% of the total VMT occuring on CR*

[5] *(ALS 2018) Median concentration of 8 SGP samples.*

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MINING FUGITIVE EMISSIONS - CONTINUED **Model Scenario W3** DR **T-RACT Emissions**

HAP/TAP Emissions

Hourly [(1)]

		DR	DR	DR	DR	DR	DR	DR	DR	ORE	DR	DR	DR	DR	HRD	DR/AR	
		YPP_pph	HFP_pph	WEP_pph	BT_pph	YPPBL_pph	HFPBL_pph	WEPBL_ppl	BTBL_pph	STKP_pph	FDRSF_pph	HFDRSF_pph	YPDRSF_pph	WEDRSF_pph	HR000_pph	CCRD, UGE	lb/hr
		YPP	HFP	WEP	BT	YPPBL	HFPBL	WEPBL	BTBL	STKP	FDRSF	HFDRSF	YPDRSF	WEDRSF	HR000	TSF, ACCRD, UGEXP	Total
CAS No.	Pollutant	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr
7440-38-2	Arsenic	0	0	9.4E-3	0	0	0	0.018	0	0	0	4.2E-3	0	0	0.201	4.2E-6	0.232
7440-41-7	Beryllium	0	0	4.5E-5	0	0	0	8.6E-5	0	0	0	2.0E-5	0	0	1.7E-3	5.1E-6	1.9E-3
7440-43-9	Cadmium	0	0	7.0E-6	0	0	0	1.3E-5	0	0	0	3.2E-6	0	0	2.7E-4	7.9E-7	2.9E-4
7440-48-4	Cobalt	0	0	5.6E-5	0	0	0	1.1E-4	0	0	0	2.5E-5	0	0	2.1E-3	6.4E-6	2.3E-3
7440-47-3	Chromium	0	0	1.3E-4	0	0	0	2.4E-4	0	0	0	5.7E-5	0	0	4.8E-3	1.4E-5	5.2E-3
7439-97-6	Mercury	0	0	8.5E-6	0	0	0	1.6E-5	0	0	0	3.8E-6	0	0	3.2E-4	9.5E-7	3.5E-4
7439-96-5	Manganese	0	0	4.2E-3	0	0	0	8.0E-3	0	0	0	1.9E-3	0	0	0.159	4.7E-4	0.173
7440-02-0	Nickel	0	0	2.8E-5	0	0	0	5.4E-5	0	0	0	1.3E-5	0	0	1.1E-3	3.2E-6	1.2E-3
7439-92-1	Lead	0	0	1.1E-4	0	0	0	2.1E-4	0	0	0	5.1E-5	0	0	4.2E-3	1.3E-5	4.6E-3
7440-36-0	Antimony	0	0	3.2E-4	0	0	0	6.2E-4	0	0	0	1.5E-4	0	0	0.012	3.7E-5	0.013
7723-14-0	Phosphorus	0	0	9.2E-3	0	0	0	0.017	0	0	0	4.1E-3	0	0	0.345	1.0E-3	0.376
7782-49-2	Selenium	0	0	5.6E-6	0	0	0	1.1E-5	0	0	0	2.5E-6	0	0	2.1E-4	6.4E-7	2.3E-4
7440-22-4	Silver	0	0	7.0E-6	0	0	0	1.3E-5	0	0	0	3.2E-6	0	0	2.7E-4	7.9E-7	2.9E-4
7429-90-5	Aluminum	0	0	1.000	0	0	0	1.902	0	0	0	0.450	0	0	37.640	0.113	41.106
7440-39-3	Barium	0	0	0.011	0	0	0	0.021	0	0	0	5.1E-3	0	0	0.424	1.3E-3	0.463
1317-65-3	Calcium Ca	0	0	0.197	0	0	0	0.375	0	0	0	0.089	0	0	7.422	0.022	8.105
7440-50-8	Copper	0	0	7.0E-5	0	0	0	1.3E-4	0	0	0	3.2E-5	0	0	2.7E-3	7.9E-6	2.9E-3
7439-89-6	Iron	0	0	0.256	0	0	0	0.488	0	0	0	0.115	0	0	9.649	0.029	10.537
7439-98-7	Molybdenu	0	0	1.4E-5	0	0	0	2.7E-5	0	0	0	6.3E-6	0	0	5.3E-4	1.6E-6	5.8E-4
7440-28-0	Thallium	0	0	1.4E-4	0	0	0	2.7E-4	0	0	0	6.3E-5	0	0	5.3E-3	1.6E-5	5.8E-3
7440-61-1	Uranium	0	0	1.4E-4	0	0	0	2.7E-4	0	0	0	6.3E-5	0	0	5.3E-3	1.6E-5	5.8E-3
7440-62-2	Vanadium	0	0	3.9E-4	0	0	0	7.5E-4	0	0	0	1.8E-4	0	0	0.015	4.4E-5	0.016
7440-33-7	Tungsten	0	0	1.4E-4	0	0	0	2.7E-4	0	0	0	6.3E-5	0	0	5.3E-3	1.6E-5	5.8E-3
7440-66-6	Zinc	0	0	4.9E-4	0	0	0	9.4E-4	0	0	0	2.2E-4	0	0	0.019	5.6E-5	0.020
Total		0	0	1.490	0	0	0	2.834	0	0	0	0.670	0	0	55.918	0.167	61.079
															chk	61.0794	61.0794

[(1)] *Hourly emissions are based on annual throughput for the carcinogenic annual risk TAPs and daily throughput for the non-carcinogenic 24-hr TAPs.*

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MINING FUGITIVE EMISSIONS - CONTINUED **Model Scenario W3** DR **T-RACT Emissions**

HAP/TAP Emissions

Annual

		YPP_tpy	HFP_tpy	WEP_tpy	BT_tpy	YPPBL_tpy	HFPBL_tpy	WEPBL_tpy	BTBL_tpy	STKP_tpy	FDRSF_tpy	HFDRSF_tpy	YPDRSF_tpy	WEDRSF_tpy	HR000_tpy	CCRD, UGE	ton/yr
		DR	DR	DR	DR	DR	DR	DR	DR	ORE	DR	DR	DR	DR	HRD	DR/AR	
		YPP	HFP	WEP	BT	YPPBL	HFPBL	WEPBL	BTBL	STKP	FDRSF	HFDRSF	YPDRSF	WEDRSF	HR000	TSF, ACCRD, UGEXP	Total
CAS No.	Pollutant	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
7440-38-2	Arsenic	0	0	0.041	0	0	0	0.078	0	0	0	0.019	0	0	0.879	1.8E-5	1.017
7440-41-7	Beryllium	0	0	2.0E-4	0	0	0	3.8E-4	0	0	0	8.9E-5	0	0	7.4E-3	2.2E-5	8.1E-3
7440-43-9	Cadmium	0	0	3.1E-5	0	0	0	5.9E-5	0	0	0	1.4E-5	0	0	1.2E-3	3.5E-6	1.3E-3
7440-48-4	Cobalt	0	0	2.5E-4	0	0	0	4.7E-4	0	0	0	1.1E-4	0	0	9.3E-3	2.8E-5	0.010
7440-47-3	Chromium	0	0	5.6E-4	0	0	0	1.1E-3	0	0	0	2.5E-4	0	0	0.021	6.3E-5	0.023
7439-97-6	Mercury	0	0	3.7E-5	0	0	0	7.0E-5	0	0	0	1.7E-5	0	0	1.4E-3	4.2E-6	1.5E-3
7439-96-5	Manganese	0	0	0.018	0	0	0	0.035	0	0	0	8.3E-3	0	0	0.694	2.1E-3	0.758
7440-02-0	Nickel	0	0	1.2E-4	0	0	0	2.3E-4	0	0	0	5.6E-5	0	0	4.6E-3	1.4E-5	5.1E-3
7439-92-1	Lead	0	0	4.9E-4	0	0	0	9.4E-4	0	0	0	2.2E-4	0	0	0.019	5.6E-5	0.020
7440-36-0	Antimony	0	0	1.4E-3	0	0	0	2.7E-3	0	0	0	6.4E-4	0	0	0.053	1.6E-4	0.058
7723-14-0	Phosphorus	0	0	0.040	0	0	0	0.076	0	0	0	0.018	0	0	1.509	4.5E-3	1.648
7782-49-2	Selenium	0	0	2.5E-5	0	0	0	4.7E-5	0	0	0	1.1E-5	0	0	9.3E-4	2.8E-6	1.0E-3
7440-22-4	Silver	0	0	3.1E-5	0	0	0	5.9E-5	0	0	0	1.4E-5	0	0	1.2E-3	3.5E-6	1.3E-3
7429-90-5	Aluminum	0	0	4.382	0	0	0	8.332	0	0	0	1.971	0	0	165	0.494	180
7440-39-3	Barium	0	0	0.049	0	0	0	0.094	0	0	0	0.022	0	0	1.858	5.6E-3	2.029
1317-65-3	Calcium Ca	0	0	0.864	0	0	0	1.643	0	0	0	0.389	0	0	32.508	0.097	35.501
7440-50-8	Copper	0	0	3.1E-4	0	0	0	5.9E-4	0	0	0	1.4E-4	0	0	0.012	3.5E-5	0.013
7439-89-6	Iron	0	0	1.123	0	0	0	2.136	0	0	0	0.505	0	0	42.261	0.127	46.152
7439-98-7	Molybdenu	0	0	6.2E-5	0	0	0	1.2E-4	0	0	0	2.8E-5	0	0	2.3E-3	7.0E-6	2.5E-3
7440-28-0	Thallium	0	0	6.2E-4	0	0	0	1.2E-3	0	0	0	2.8E-4	0	0	0.023	7.0E-5	0.025
7440-61-1	Uranium	0	0	6.2E-4	0	0	0	1.2E-3	0	0	0	2.8E-4	0	0	0.023	7.0E-5	0.025
7440-62-2	Vanadium	0	0	1.7E-3	0	0	0	3.3E-3	0	0	0	7.8E-4	0	0	0.065	1.9E-4	0.071
7440-33-7	Tungsten	0	0	6.2E-4	0	0	0	1.2E-3	0	0	0	2.8E-4	0	0	0.023	7.0E-5	0.025
7440-66-6	Zinc	0	0	2.2E-3	0	0	0	4.1E-3	0	0	0	9.7E-4	0	0	0.081	2.4E-4	0.089
Total		0	0	6.527	0	0	0	12.412	0	0	0	2.936	0	0	245	0.731	268
															chk	267.5280	267.5280

MINING FUGITIVE EMISSIONS - CONTINUED

Mercury Evaporative Flux Emissions

Fugitive Mercury Flux and Emissions

CAS No.	Pollutant	Source	Area m²	Area ha	Hg Flux µg/m²-yr	Emissions[1] lb/hr	Emissions[1] ton/yr	Emissions[1] lb/yr
		Stockpiles	52,623	5.3	556	7.37E-6	3.2E-5	6.5E-2
		Rock Dumps	2,063,990	206.4	76.2	3.96E-5	1.7E-4	0.35
		Tailings	1,338,158	133.8	2,144	7.22E-4	3.2E-3	6.32
		Pits	1,504,919	150.5	132.3	5.01E-5	2.2E-4	0.44
7439-97-6	Mercury					8.2E-4	3.6E-3	7.17

(1) *Hourly emissions based on:* 8,760 *hours per year of operation*

Fugitive Mercury Emission Factors

Source	Twin Creeks (TC) Hg Flux (1) µg/m²-yr	Twin Creeks (TC) Hg (2) µg/g	Ore Hg Adjusted µg/m²/yr TC	Stibnite Hg Flux (3) µg/m²-yr	Stibnite Hg (4) µg/g
Stockpiles	5,609	33	556	556	0.96
Rock Dumps	768	3.5	76.2	76.2	0.60
Tailings	21,621	33	2,144	2,144	0.96
Pits	1,334	9.5	132	132.3	0.60

(1) *(Eckley 2010)* *Table 1: Hg flux µg/m² -yr*

(2) *(Eckley 2010)* *Table 1: Average Hg flux mg/g: " Stockpiles - high-grade stockpiles, Rock Dumps - waste rock dumps, Tailings - high-grade stockpiles as a surrogate; Pits - pit"*

(3) *(Eckley 2010)* *Figure 2: log(y) = m*log(x) + b*

y = Hg Flux (ng/m² -d)

x = material Hg concentration (µg/g)]

Slope =	*Solar*	*TC*
	Low	*0.59*
	Medium	*0.6*
	High	*0.77*
	Average	*0.65*

(4) *(Midas Gold 2018e)*

Sample Calculation: m = log (y1/y2) / log(x1/x2)

m=	0.65	unitless
y1=	5,609	µg/m²-yr
x1=	33	µg/m²-yr
x2=	0.96	µg/m²-yr
log(x1/x2)=	1.536243	unitless
log(y1/y2)=	1.003679	unitless
y1/y2=	10.08506	unitless
y2=	556.2	µg/m²-yr

Conversions

2,000	lb/ton
10,000	m2/ha
453.593	g/lb

TABLE A-W3. HAP/TAP Emissions and Exemptions

T-RACT Emissions

chk

						1	1	1	1	1	1	1	1	1	1	1	1
						MINING										**LEACHING**	
						Mining	***Model Scenario W3***									***CN Leach/PAX***	
						YPP,HFP,WEP,BT		YPPBL,HFPBL,WEPBL,BTBL		HR000		STKP, FDRSF, HFDRSF, YPDRSF, WEDRSF		TSF,ACCRD,UGEXP			
CAS	HAP/TAP	HAP	TAP			Pits		Blasting		Haul Roads		Stockpiles and DRFS		Tails, Access Road, Exploration		CN Leach and PAX	
	NSPS or NESHAP HAP/TAP -->			***Y***													
	Non-Carcinogenic Acute (A) or Carcinogenic (C) -->				**A/C**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
7440-38-2	Arsenic	Y	Y	Y	C	9.4E-3	0.041	0.018	0.078	0.201	0.879	4.2E-3	0.019	4.2E-6	1.8E-5		
7440-41-7	Beryllium	Y	Y	Y	C	4.5E-5	2.0E-4	8.6E-5	3.8E-4	1.7E-3	7.4E-3	2.0E-5	8.9E-5	5.1E-6	2.2E-5		
7440-43-9	Cadmium	Y	Y	Y	C	7.0E-6	3.1E-5	1.3E-5	5.9E-5	2.7E-4	1.2E-3	3.2E-6	1.4E-5	7.9E-7	3.5E-6		
50-00-0	Formaldehyde	Y	Y	Y	C												
7440-02-0	Nickel	Y	Y	Y	C	2.8E-5	1.2E-4	5.4E-5	2.3E-4	1.1E-3	4.6E-3	1.3E-5	5.6E-5	3.2E-6	1.4E-5		

TABLE A-W3. HAP/TAP Emissions and Exemptions

						0	0	0	0	1	1	1	1	0	0	1	1
T-RACT Emissions						**PROCESSING AND PRODUCTION**											
	chk					***Ore Processing***				***Ore Concentration and Refining***				***Process Heating***			
						OC1-13		PS		AC		EW,MR,MF,CKD		ACB, CKB, PV, HS		LKC	
CAS	HAP/TAP	HAP	TAP			Crushers & Xfers		Prill Silos		Autoclave		EW, Preg Tank, Retort, Furnace, Carbon Kiln		POX Boiler, C. Kiln Comb., Prop. Vap., Sol'n Heater		Lime Kiln Combustion	
	NSPS or NESHAP HAP/TAP -->			***Y***		***LL***	***LL***			***7E***	***7E***	***7E***	***7E***			***5A***	***5A***
	Non-Carcinogenic Acute (A) or Carcinogenic (C) -->				A/C	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
7440-38-2	Arsenic	Y	Y	Y	C	3.9E-3	0.017			2.3E-5	1.0E-4	3.8E-4	1.7E-3	1.5E-6	6.4E-6	3.7E-6	1.6E-5
7440-41-7	Beryllium	Y	Y	Y	C	1.9E-5	8.2E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3	8.7E-8	3.8E-7	2.2E-7	9.6E-7
7440-43-9	Cadmium	Y	Y	Y	C	2.9E-6	1.3E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3	8.0E-6	3.5E-5	2.0E-5	8.8E-5
50-00-0	Formaldehyde	Y	Y	Y	C									5.5E-4	2.4E-3	1.4E-3	6.0E-3
7440-02-0	Nickel	Y	Y	Y	C	1.2E-5	5.2E-5			2.3E-5	1.0E-4	3.8E-4	1.7E-3	1.5E-5	6.7E-5	3.9E-5	1.7E-4

TABLE A-W3. HAP/TAP Emissions and Exemptions

T-RACT Emissions

chk

						PROCESSING AND PRODUCTION - Continued													
						0	0	1	1	0	0	0	0	0	0	0	0	0	0
						Lime Production						*Aggregate Prod.*		*Concrete Production*					
						LS1-11,LSBM		LK,LS12,LCR,LS-L/U		LS1-L/U,MillS2-L/U,ACS1-4		PCSP1,PCSP2		CM		CS1L,CS1U,CS2L,CS2U		CA-L/U	
CAS	HAP/TAP	HAP	TAP			Limestone Crushers, Screens, Mill, Xfers		Lime Kiln, Kiln Feed, Lime Mill, Pebble Lime Silo		Lime Silos and Lime Mill Crushing		Portable Crushers, Screens, Xfers		Central Mixer		Cement Silo #1 and #2 L/U		Aggregate Bin	
	NSPS or NESHAP HAP/TAP -->			***Y***		***OOO***	***OOO***	***5A***	***5A***			***OOO***	***OOO***					***OOO***	***OOO***
	Non-Carcinogenic Acute (A) or Carcinogenic (C) -->				**A/C**	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
7440-38-2	Arsenic	Y	Y	Y	C	1.0E-4	4.4E-4	2.4E-5	1.1E-4	1.1E-6	4.7E-6	2.9E-5	1.3E-4	2.0E-6	8.9E-6	1.2E-7	5.1E-7	1.8E-5	7.9E-5
7440-41-7	Beryllium	Y	Y	Y	C	3.5E-6	1.5E-5	8.4E-7	3.7E-6	3.7E-8	1.6E-7	1.0E-6	4.4E-6			1.3E-8	5.8E-8	6.3E-7	2.8E-6
7440-43-9	Cadmium	Y	Y	Y	C	1.1E-6	4.8E-6	2.6E-7	1.2E-6	1.2E-8	5.1E-8	3.1E-7	1.4E-6	4.9E-9	2.1E-8			2.0E-7	8.6E-7
50-00-0	Formaldehyde	Y	Y	Y	C														
7440-02-0	Nickel	Y	Y	Y	C	2.2E-5	9.6E-5	5.3E-6	2.3E-5	2.3E-7	1.0E-6	6.3E-6	2.7E-5	1.7E-6	7.4E-6	1.1E-6	5.0E-6	3.9E-6	1.7E-5

TABLE A-W3. HAP/TAP Emissions and Exemptions

T-RACT Emissions

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						PROCESSING AND PRODUCTION - Continued						MINING and LEACHING - Totals									
						0	0	1	1	1	1			1	1	0	0				
						HVAC		*Emer. Power/Fire*		*Fuel Storage*		*HAP Total*		*Mercury Total*		*Mercury Total*		*TAP Total*		*TAP Total*	
						H1M,H2M,HM,HAC,HR,HA,HMO,HTS,HW		EDG1,EDG2,EDG3,EDFP		TG1,TG2				*Exempt*		*Non-Exempt*		*HAP-TAP addressed by NSPS/NESHAP*		*For EL Evaluation*	
CAS	HAP/TAP	HAP	TAP			Heaters		Emergency Generators and Fire Pump		Gasoline Fuel Tanks											
	NSPS or NESHAP HAP/TAP -->			*Y*				*4Z*	*4Z*	*6C*	*6C*										
	Non-Carcinogenic Acute (A) or Carcinogenic (C) -->				A/C	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
7440-38-2	Arsenic	Y	Y	Y	C	3.6E-6	1.6E-5					0.232	1.017							0.232	1.017
7440-41-7	Beryllium	Y	Y	Y	C	2.1E-7	9.4E-7					1.9E-3	8.1E-3							1.9E-3	8.1E-3
7440-43-9	Cadmium	Y	Y	Y	C	2.0E-5	8.6E-5					2.9E-4	1.3E-3							2.9E-4	1.3E-3
50-00-0	Formaldehyde	Y	Y	Y	C	1.3E-3	5.9E-3	5.1E-5	2.2E-4												
7440-02-0	Nickel	Y	Y	Y	C	3.8E-5	1.6E-4					1.2E-3	5.1E-3					0	0	1.2E-3	5.1E-3

TABLE A-W3. HAP/TAP Emissions and Exemptions

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T-RACT Emissions

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CAS	HAP/TAP	HAP	TAP	NSPS or NESHAP HAP/TAP --> Y	Non-Carcinogenic Acute (A) or Carcinogenic (C) --> A/C	PROCESSING AND PRODUCTION - Totals: HAP Total lb/hr	HAP Total ton/yr	Mercury Total Exempt lb/hr	Mercury Total Exempt ton/yr	Mercury Total Non-Exempt lb/hr	Mercury Total Non-Exempt ton/yr	TAP Total HAP-TAP addressed by NSPS/NESHAP lb/hr	TAP Total HAP-TAP addressed by NSPS/NESHAP ton/yr	TAP Total For EL Evaluation lb/hr	TAP Total For EL Evaluation ton/yr	ALL HAP ton/yr	ALL Hg Non-Exempt ton/yr	ALL TAP For EL Evaluation lb/hr	TAP EL: TAP Emission Screening Level (EL) Non-car lb/hr	TAP EL: TAP Emission Screening Level (EL) Carcin lb/hr
7440-38-2	Arsenic	Y	Y	Y	C	4.5E-3	0.020					4.5E-3	0.020	8.2E-6	3.6E-5	1.037		0.232	--	1.5E-6
7440-41-7	Beryllium	Y	Y	Y	C	4.3E-4	1.9E-3					4.3E-4	1.9E-3	3.5E-7	1.5E-6	0.010		1.9E-3	--	2.8E-5
7440-43-9	Cadmium	Y	Y	Y	C	4.6E-4	2.0E-3					4.3E-4	1.9E-3	2.8E-5	1.2E-4	3.3E-3		3.2E-4	--	3.7E-6
50-00-0	Formaldehyde	Y	Y	Y	C	3.3E-3	0.015					1.4E-3	6.2E-3	1.9E-3	8.3E-3	0.015		1.9E-3	--	5.1E-4
7440-02-0	Nickel	Y	Y	Y	C	5.5E-4	2.4E-3					4.9E-4	2.2E-3	5.6E-5	2.4E-4	7.5E-3		1.2E-3	--	2.7E-5

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES REVIEW MEMORANDUM

M E M O R A N D U M

DATE: January 6, 2022

TO: Kelli Wetzel, Permit Writer, Air Program

FROM: Pao Baylon, Modeling Review Analyst, Air Program
Through Kevin Schilling, Modeling Supervisor, Air Program

PROJECT: P-2019.0047 PROJ 62288, Permit for an Open-pit Gold Mine and On-site Ore Preparation and Gold Extraction Operation located in Valley County, Idaho.

SUBJECT: Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs) as it relates to air quality impact analyses.

Contents

Acronyms, Units, and Chemical Nomenclature

AAC	Acceptable Ambient Concentration of a non-carcinogenic TAP
AACC	Acceptable Ambient Concentration of a Carcinogenic TAP
acfm	Actual cubic feet per minute
ADJ_U*	AERMOD Adjusted Friction Velocity Model Option
AERMAP	The terrain data preprocessor for AERMOD
AERMET	The meteorological data preprocessor for AERMOD
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
Air Sciences	Air Sciences, Inc. (permittee's permitting and modeling consultant)
amsl	Above mean sea level
ANFO	Ammonium Nitrate Fuel Oil
Appendix W	40 CFR 51, Appendix W – Guideline on Air Quality Models
ASOS	Automated Surface Observing System
B_o	Bowen Ratio
BNF	Boise National Forest
BPIP	Building Profile Input Program
BRC	Below Regulatory Concern
BT	Bradley Tailings
BULKRN	Meteorological data processed using Bulk Richardson Method
CAPCOA	California Air Pollution Control Officers Association
CFR	Code of Federal Regulations
CMAQ	Community Multi-Scale Air Quality Modeling System
CO	Carbon Monoxide
CSIRO	Commonwealth Scientific and Industrial Research Organization
DEQ	Idaho Department of Environmental Quality
DR	Development Rock
DRSF	Development Rock Storage Facility
DV	Design Values
EF	Emission Factors
EFSFSR	East Fork of the South Fork of the Salmon River
EIS	Environmental Impact Statement
EL	Emissions Screening Level of a TAP
EPA	United States Environmental Protection Agency
FDRSF	Fiddle Development Rock Storage Facility
g/cm^3	Grams per Cubic Centimeter
GEP	Good Engineering Practice
H_2SO_4	Sulfuric Acid Gas
HAP	Hazardous Air Pollutant
HFDRSF	Hangar Flats Development Rock Storage Facility
HFP	Hangar Flats Pit
Hg	Mercury
hr	Hours
Idaho Air Rules	Rules for the Control of Air Pollution in Idaho, located in the Idaho Administrative Procedures Act 58.01.01

in	Inches
ISCST3	Industrial Source Complex Short Term 3 dispersion model
K	Kelvin
km	Kilometers
lb/hr	Pounds per hour
lb/yr	Pounds per year
LOM	Life of Mine
m	Meters
m/sec	Meters per second
MBACT	Mercury Best Available Control Technology
MERPs	Modeled Emission Rates for Precursors
mg/m^3	Milligrams per Cubic Meter
MM	Million
MMBtu	Million British Thermal Units
mph	Miles per hour
NAAQS	National Ambient Air Quality Standards
NAD83	North American Datum of 1983
NED	National Elevation Dataset
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NON-BULKRN	Meteorological data processed without Bulk Richardson Method
NOx	Oxides of Nitrogen
NSPS	New Source Performance Standards
NSR	New Source Review
NW AIRQUEST	Northwest International Air Quality Environmental Science and Technology Consortium
NWS	National Weather Service
O_3	Ozone
OLM	Ozone Limiting Method
Pb	Lead
PM_{10}	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 10 micrometers
$PM_{2.5}$	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 2.5 micrometers
PNF	Payette National Forest
ppb	parts per billion
ppm	parts per million
PRI	Perpetua Resources Idaho, Inc. (permittee)
PRIME	Plume Rise Model Enhancement
PRO	Perpetua Resources Idaho, Inc. Plan of Restoration and Operations
PSD	Prevention of Significant Deterioration
PTC	Permit to Construct
PTE	Potential to Emit
PVMRM	Plume Volume Molar Ratio Method
r	Albedo

scfm	Standard cubic feet per minute
SED	Segment Emission Denominator
SGP	Stibnite Gold Project
SIL	Significant Impact Level
SO_2	Sulfur Dioxide
STKP	Crusher Stockpile
TAP	Toxic Air Pollutant
ton/day	Tons per Day
ton/year	Tons per Year
TSF	Tailings Storage Facility
TSP	Total Suspended Particulate
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds
WBAN	Weather-Bureau-Army-Navy
WEDRSF	West End Development Rock Storage Facility
WEP	West End Pit
YPDRSF	Yellow Pine Development Rock Storage Facility
YPP	Yellow Pine Pit
z_o	Surface Roughness Length
ºF	Degrees Fahrenheit
$\mu g/m^3$	Micrograms per cubic meter of air
µm	Microns

1.0 Summary

Perpetua Resources Idaho, Inc. (PRI) submitted a Permit to Construct (PTC) application to construct and operate the Stibnite Gold Project (SGP) in Valley County, Idaho. The SGP will consist of conventional open-pit mining operations and onsite ore preparation and gold extraction processes. The potential air emissions from the SGP are less than the applicable major source thresholds for both criteria and hazardous air pollutants (HAP), and therefore, the facility is designated as a minor source for Title V and New Source Review (NSR) requirements, and an area source for National Emission Standards for Hazardous Air Pollutants (NESHAP) applicability. Project-specific air quality analyses involving atmospheric dispersion modeling of estimated emissions associated with the facility were submitted to DEQ to demonstrate that applicable emissions do not result in violation of a National Ambient Air Quality Standard (NAAQS) or Toxic Air Pollutant (TAP) increment as required by the Idaho Administrative Procedures Act 58.01.01.203.02 and 203.03 (Idaho Air Rules Section 203.02 and 203.03). This memorandum provides a summary of the applicability assessment for analyses and air impact analyses used to demonstrate compliance with applicable NAAQS and TAP increments, as required by Idaho Air Rules Section 203.02 and 203.03.

Air Sciences, Inc. (Air Sciences), on behalf of PRI, prepared the PTC application and performed ambient air impact analyses for this project. DEQ review of submitted data and DEQ analyses summarized by this memorandum addressed only the rules, policies, methods, and data pertaining to the air impact analyses used to demonstrate that estimated emissions associated with operation of the facility will not cause or significantly contribute to a violation of any applicable air quality standard. This review did not address/evaluate compliance with other rules or analyses not pertaining to the air impact analyses. Evaluation of emission estimates was the responsibility of the DEQ permit writer and is addressed in the main body of the DEQ Statement of Basis, and emission calculation methods were not evaluated in this modeling review memorandum.

DEQ reevaluated source-specific TAP regulatory applicability for the project after the February/March 2021 public comment period in response to expressed concerns regarding sources excluded as per *Idaho Air Rules* Section 210.20 (excluding sources that are "covered" or "addressed" by a federal rule). Air Sciences made substantial refinements in assessed operational scenarios and emission calculations, and they also worked with DEQ on a refined TAPs regulatory approach. Air Sciences addressed this issue separately from the NAAQS compliance demonstration presented in the main body of the PTC application and submitted the *Stibnite Gold Project Permit to Construct Application TAP Addendum* (*TAP Addendum*). Since all the refinements reduced calculated allowable particulate emissions from sources, the NAAQS compliance demonstration did not require revision for permit issuance. Impacts from revised sources would obviously be lower and still demonstrate compliance with NAAQS. DEQ's review of the *TAP Addendum* is discussed in the *TAPs Addendum Modeling Review Attachment* (*Modeling Review Attachment*) to this memorandum.

Table 1 presents key assumptions and results to be considered in the development of the permit. Idaho Air Rules require air impact analyses be conducted in accordance with methods outlined in 40 Code of Federal Regulations (CFR) 51, Appendix W *Guideline on Air Quality Models* (*Appendix W*). *Appendix W* requires that air quality impacts be assessed using atmospheric dispersion models with emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

The submitted information and analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data (review of emission estimates was addressed by the DEQ permit writer); 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that estimated potential/allowable emissions are at a level defined as below regulatory concern (BRC) and do not require a NAAQS compliance demonstration; b) that predicted pollutant concentrations from emissions associated with the project as modeled were below Significant Impact Levels (SILs) or other applicable regulatory thresholds; or c) that predicted pollutant concentrations from emissions associated with the project, when appropriately combined with co-contributing sources and background concentrations, were below applicable NAAQS at ambient air locations where and when the project has a significant impact; 5) showed that TAP emission increases associated with the project will not result in increased ambient air impacts exceeding allowable TAP increments. This conclusion assumes that conditions in Table 1 are representative of facility design capacity or operations as limited by a federally enforceable permit condition. The DEQ permit writer should use Table 1 and other information presented in this memorandum to generate appropriate permit provisions/restrictions to assure emissions do not exceed applicable regulatory thresholds requiring further analyses and to assure the requirements of *Appendix W* are met regarding emissions representative of design capacity or permit allowable rates.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES.

Criteria/Assumption/Result	Explanation/Consideration
General Emission Rates. Emission rates used in the air impact analyses must represent maximum potential emissions as given by design capacity, inherently limited by the nature of the process or configuration of the facility, or as limited by the issued permit for the specific pollutant and averaging period.	Compliance has not been demonstrated for emission rates greater than those used in the air impact analyses.
Air Impact Analyses for Criteria Pollutant Emissions. Stibnite Gold Project (SGP) facility-wide maximum potential to emit are greater than the respective Level I thresholds for all criteria pollutants and averaging periods except for Lead. Therefore, modeling is triggered for applicable averaging periods for $PM_{2.5}$[a], PM_{10}[b], CO[c], NOx[d], and SO_2[e]. Modeling was not required for Lead.	Project-specific air impact analyses demonstrating compliance with NAAQS, as required by Idaho Air Rules Section 203.02, are required for pollutant increases above Below Regulatory Concern (BRC) thresholds, or for pollutants having an emissions increase that is greater than Level I modeling applicability thresholds (where the BRC exclusion cannot be used). DEQ modeling applicability thresholds were revised in July 2021. Revised thresholds were not used because the permit application was submitted prior to the revision.
Air Impact Analyses for TAP Emissions. TAP analyses were reworked after the February/March 2021 public comment period and submitted to DEQ in the *TAP Addendum*. DEQ's review of the *TAP Addendum* is discussed in the *Modeling Review Attachment* to this memorandum. SGP final facility-wide potential Toxic Air Pollutant (TAP) emissions exceed the respective screening emission levels (ELs) for aluminum, arsenic, barium, beryllium, cadmium, calcium carbonate, calcium oxide, cyanide, formaldehyde, iron, manganese, nickel, phosphorus, sulfuric acid, thallium, and vanadium. Therefore, air dispersion modeling was required for these 16 TAPs. TAPs also classified as Hazardous Air Pollutants (HAPs) emitted from sources addressed by New Source Performance Standards (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAP) were not required to be evaluated for compliance with TAP increments in accordance with IDAPA 58.01.01.210.20.	A TAP increment compliance demonstration would be required for any TAPs with emissions above ELs. IDAPA 58.01.01.210.20 states that if TAP emissions from a specific source are addressed by NSPS or NESHAP, then a TAP impact analysis is not required for that TAP from that specific source.
Significant Impact Level Analysis Not Conducted. A Significant Impact Level (SIL) analysis was not conducted for the SGP facility.	Based on the magnitude of the facility-wide emissions and preliminary modeling analyses, it was determined that the impacts from the SGP emissions exceeded the SIL for most criteria pollutants. Therefore, SIL analyses were considered redundant and not performed for the project.
Multiple Modeling Scenarios. To evaluate the worst-case air impacts from the SGP facility, a total of 14 scenarios were modeled. These scenarios represent the hauling of material, which can be either ore or development rock (DR), from four	Conventional open-pit methods will be used to extract ore and DR from four possible origins (Yellow Pine Pit [YPP], Hangar Flats Pit [HFP], West End Pit [WEP], and Bradley Tailings [BT]). Ore and DR will be hauled to five possible

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES.	
Criteria/Assumption/Result	**Explanation/Consideration**
possible origins (three pits and a tailings facility) to five possible destinations (ore will be hauled to the crushing area while DR will be hauled to one of four development rock storage facilities [DRSF]). Modeled design values listed in this modeling memo represent the worst-case modeling scenario for every modeled pollutant and averaging period.	destinations (Stockpile [STKP], Yellow Pine DRSF [YPDRSF], Hangar Flats DRSF [HFDRSF], West End DRSF [WEDRSF], and Fiddle DRSF [FDRSF]). Only 14 of the 20 possible scenarios were modeled. Six scenarios were not feasible because the timing of the activity within the sequence of mine operations makes the scenarios logistically impossible. Modeled results listed in this memo represent worst-case modeling scenarios.
Modeling of Material Origin and Destination. Each material origin location (YPP, HFP, WEP, and BT) was modeled as an AREA source. Ore destination (STKP) was modeled as a VOLUME source. Each DR destination (YPDRSF, HFDRSF, WEDRSF, and FDRSF) was modeled as a VOLUME source.	Each material origin location comprised appropriate emissions from drilling, material loading, dozing, and surface exploration. Ore destination comprised ore unloading emissions. Each DR destination comprised appropriate emissions from DR unloading, dozing, and wind erosion. For the four AREA and five VOLUME sources, the dimensions were developed by reasonably fitting an equal-area rectangle within the actual footprint of each fugitive source. For the pit and DRSF fugitive activity locations, the release height was based on the haul truck height. The applicable initial lateral dispersion for each VOLUME source was calculated from the respective shorter dimension and EPA-specified methods. The applicable initial vertical dispersion for each AREA and VOLUME source was calculated from the respective vertical dimension and EPA-specified methods.
Modeling of Haul Roads. A representative haul road network for hauling material from inside the pit to various destinations was developed for each of the 14 modeling scenarios.	The haul road network was divided into 22 sections. Each section was further divided into multiple segments with a length equal to twice the adjusted haul road width. Each of the segments was characterized as an individual VOLUME source in the model. Material hauling emissions associated with each origin-destination route were assigned to each segment along the route based on estimated total emissions along the route and traffic distribution along each section.
Modeling of Blasting Emissions. Blasting emissions were represented by a VOLUME source inside a pit (YPPBL, HFPBL, and WEPBL). Blasting is not expected to occur in BT but was modeled (BTBL) in order to streamline the permitting process.	The blasting physical parameters were developed from dimensions based on blast area used in the emission calculation. The blasting release height was the midpoint of the blasting height. The initial lateral and vertical dispersion dimensions for blasting were calculated per methods specified in the AERMOD User's Guide.
Modeling of Burntlog Route Access Road. The access road portion within the operations boundary was characterized by a series of LINE sources laid along the actual route.	Emissions associated with the portion of the Burntlog Route mine access road that is within project boundary (from the south gate to the process area) are included in the SGP analyses. These include dust emissions generated from travel of maintenance equipment, light-duty pickup trucks and buses used for employee, visitor, and contractor transportation, and heavy-duty trucks used for cargo (including fuel, consumables, machine parts, ore processing supplies, ore concentrate, etc.) and services (including food supplies, trash, recyclables, etc.) transportation. Release parameters for the LINE sources were based on an estimated average vehicle height. The access road emissions were evenly distributed along the road by dividing the total access road emissions by its total area.
Control of Fugitive Dust from Roadways. Fugitive particulate emissions from roadways were assumed to be controlled above 93%, which is an aggressive level of control.	The high level of emission control was needed to demonstrate compliance with NAAQS. Compliance is not demonstrated for emissions greater than those associated with above 93% control.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES.	
Criteria/Assumption/Result	**Explanation/Consideration**
NOx Chemistry and NO_2/NOx In-Stack Ratios. Ozone Limiting Method (OLM), a Tier 3 NO_2 screening method, was used to estimate the 1-hour and annual NO_2 impacts. The following NO_2/NOx In-Stack Ratios (ISR) were used in the modeling analyses: Blasting: 0.036 Diesel engines: 0.11 Propane heaters: 0.10	The OLM method requires an input of NO_2/NOx ISRs for each modeled source. The NO_2/NOx ratio for blasting was based on blasting plume measurements provided in published literature. The NO_2/NOx ratio for stationary diesel combustion sources was based on heavy-duty diesel trucks in the California Air Pollution Control Officers Association (CAPCOA) Guidance Document. This NO_2/NOx ratio (11 percent) is conservatively higher than the diesel combustion NO_2/NOx ratio provided in the EPA ISR database: 6 percent average, 9.8 percent maximum. The CAPCOA document and the EPA ISR database do not provide an NO_2/NOx ratio for propane boilers. The CAPCOA-recommended NO_2/NOx ratio for natural gas boilers was selected for the propane boilers. The natural gas boilers NO_2/NOx ratio is considered appropriate for the propane boilers because both are gaseous fuels with relatively similar combustion characteristics and are expected to have similar NO_2/NOx ratios. DEQ performed a sensitivity analysis using Tier 2 (Ambient Ratio Method 2), a more conservative NO_2 screening method, and found that the facility is safely below the 1-hour and annual NO_2 NAAQS.
Alternate Meteorological Data Processed Using Cloud Cover. An alternative meteorological dataset was processed without using the Bulk Richardson (BULKRN) method. This alternate processing (NON-BULKRN) used upper air data from Boise airport, supplemented with the cloud-cover data collected at the National Weather Service station in McCall, Idaho.	Meteorological data processing with and without BULKRN are considered acceptable regulatory options by EPA. The NON-BULKRN meteorological data yielded lower modeled design values than the meteorological data processed using the BULKRN method.
Ambient Air Boundary. PRI will legally control the SGP, an active industrial site where mining activities will occur, such as heavy equipment operation. Most areas of the mine will require strict safety protocols and controlled access. PRI has established an operations boundary to identify the area where public access will be excluded. Public access inside the operations boundary will be restricted for the life of the mine by physical barriers at points of potential access, including the current Stibnite Road point of entry and proposed site access via the Burntlog Route, as well as natural features of the landscape that prevent access.	Ambient air is defined in Section 006 of the Idaho Air Rules as "that portion of the atmosphere, external to buildings, to which the general public has access." Receptors must be placed at any portion of the atmosphere that is considered ambient air.
Onsite Background $PM_{2.5}$ and PM_{10} Concentrations. The following background $PM_{2.5}$ and PM_{10} concentrations were measured at SGP in 2014 and used in the cumulative NAAQS impact analysis: Annual $PM_{2.5}$: 3.5 µg/m^3 (weighted average of quarterly means) 24-hour $PM_{2.5}$: 15.0 µg/m^3 (98th percentile/8th high) 24-hour PM_{10}: 37.0 µg/m^3 (highest 1st high)	PRI developed an onsite monitoring program to collect site-specific meteorological parameters and determine ambient particulate matter ($PM_{2.5}$ and PM_{10}) concentrations at its Stibnite monitoring station. $PM_{2.5}$ and PM_{10} background concentrations were based on calendar year 2014 instead of the complete dataset (November 2013 through June 2015). For 24-hour PM_{10}, the design value is the *second-highest* 24-hour average concentration in a given year. However, the background value that was used in the modeling analyses represents the *first-highest* 24-hour average concentration measured in 2014. Therefore, using a larger background concentration adds a layer of conservatism to the calculated total impact for 24-hour PM_{10}.
NW AIRQUEST Background CO, NO_2, and SO_2 Concentrations. The following background concentrations for CO, NO_2, and SO_2 were used in the cumulative NAAQS impact analysis: 1-hour CO: 1,740 µg/m^3 8-hour CO: 1,110 µg/m^3	Gaseous pollutant background concentrations were determined using the Northwest International Air Quality Environmental Science and Technology Consortium (NW AIRQUEST) online tool. The NW AIRQUEST tool uses regional scale modeling of pollutants in Washington, Oregon, and Idaho, with model results adjusted according to

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES.	
Criteria/Assumption/Result	**Explanation/Consideration**
1-hour NO_2: 4.3 µg/m^3 Annual NO_2: 0.9 µg/m^3 1-hour SO_2: 12.3 µg/m^3 3-hour SO_2: 16.8 µg/m^3	available monitoring data.
Medium-Traffic Background Concentrations. To provide additional information regarding the relative contribution of traffic emissions, background concentrations were obtained from NW AIRQUEST for the road section between mile markers 143 and 144 on Highway 55 passing through the town of McCall.	The McCall location is approximately 38 miles west of the SGP. The annual average daily traffic count for this road section is over 10,000 vehicles per day. Although the background concentrations at McCall are not representative of the rural SGP area, they provide additional information regarding the relative contribution of traffic emissions.
Weight-of-Evidence Analyses for 24-hour PM_{10}. PM_{10} modeling with meteorological dataset processed using the site-specific BULKRN method shows up to five hotspot receptors for Scenario W5 (the highest PM_{10} modeling scenario) that exceed NAAQS. All modeled violations occur during winter when the average snow depth and average precipitation at the project site are 21-68 inches and 6.0 inches, respectively. Therefore, fugitive road dust emissions during high-modeled impact hours could be overestimated. PM_{10} modeling simulation was based on a mining production rate of 180,000 ton/day of development rock (65,700,000 ton/year, which is more conservative than the expected peak production rate of 42,692,000 ton/year). To investigate the effect of a lower modeled mining production rate on design value concentrations, DEQ performed a modeling simulation where mining production rate was assumed to be 120,000 ton/day instead of 180,000 ton/day, but everything else was held constant. Maximum modeled concentration, when summed with the background concentration, is lower than the 24-hour PM_{10} NAAQS thereby demonstrating NAAQS compliance. DEQ's weight-of-evidence analyses conclude that, considering all the collective conservative layers of the modeling analyses, including the use of meteorological data processed by two different methods, there is a satisfactory level of confidence that operation of the project as described in the application will not cause or contribute to a violation of NAAQS.	Meteorological data processing with and without BULKRN are considered acceptable by EPA, with the BULKRN method utilizing more of the onsite collected meteorological parameters. However, the BULKRN-processed meteorological data yielded higher modeled design value impacts for the SGP facility than the meteorological data processed without the BULKRN method. DEQ's supplemental analyses suggest that when emissions are more-closely representative of typical daily mining production rates for a high-production period (everything else held constant), the SGP facility is able to demonstrate compliance with 24-hour PM_{10} NAAQS at those few receptors showing a potential violation when using meteorological data processed with the BULKRN method. PRI later determined that the WEDRSF will not be constructed. This change eliminated Scenario W5 as a potential operating scenario. DEQ reanalyzed PM_{10} impacts to account for the refinements, and results are presented in the *Modeling Review Attachment* to this memorandum.

[a.] Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
[b.] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
[c.] Carbon monoxide.
[d.] Nitrogen oxides.
[e.] Sulfur dioxide.

Summary of Submittals and Actions

May 30, 2019 — Modeling protocol was submitted to DEQ by Brown and Caldwell on behalf of the applicant.

June 27, 2019 — Conditional modeling protocol approval was provided to Brown and Caldwell by DEQ.

August 21, 2019 — Regulatory start date. PTC application and modeling report were prepared by Air Sciences on behalf of the applicant.

September 19, 2019 — Application deemed incomplete by DEQ.

October 4, 2019 — DEQ received a preliminary response and supplemental information from the

	applicant.
October 15, 2019	DEQ met with the applicant to review and discuss the preliminary response.
October 22, 2019	DEQ determined that the application remained incomplete while the applicant prepared a response to remaining items previously identified, and included a summary of recommendations provided at the meeting.
November 8, 2019	DEQ requested additional information from the applicant via e-mail, relating to items previously identified.
November 21, 2019	Applicant requested extension until November 27, 2019 to respond to incompleteness.
November 27, 2019	DEQ received supplemental information from the applicant, including a revised application with updated emission inventories and modeling analyses.
December 24, 2019	DEQ determined that the application was incomplete.
January 8, 2020	Applicant requested extension until February 7, 2020 to respond to incompleteness.
February 5, 2020	DEQ received supplemental information from the applicant, including a revised application with updated emission inventories and modeling analyses.
March 6, 2020	DEQ determined that the application was incomplete.
April 2, 2020	Applicant requested extension until April 15, 2020 to respond to incompleteness.
April 15, 2020	DEQ received supplemental information from the applicant, including updated modeling analyses.
May 15, 2020	DEQ determined that the application was complete.
June 24, 2020	DEQ received the final updated application.
July 14, 2020	DEQ made available the draft permit and statement of basis for applicant review.
July 31, 2020	DEQ made available an updated draft statement of basis for applicant review.
August 3 and 13, 2020	DEQ received comments from the applicant on the draft permit and statement of basis.
September 10 – October 12, 2020	DEQ provided a public comment period on the proposed action.
October 12, 2020	DEQ received a request to extend the public comment period.
October 13 – November 11, 2020	DEQ extended the public comment period.

November 20, 2020	DEQ requested additional information from the applicant to address substantive public comments received, including missing HAP and TAP emission estimates.
December 18, 2020	DEQ received supplemental information from the applicant, including a HAP/TAP addendum, updated HAP and TAP emission estimates, and updated TAP modeling analyses.
January 28, 2021	DEQ received updated modeling files with corrections for formaldehyde and sulfuric acid, and an updated figure showing TAP modeled impacts.
February 18, 2021-March 19, 2021	DEQ provided a public comment period on the proposed action as updated to address the HAP and TAP addendum and updates.
February 23, 2021	DEQ received notification from the applicant of a facility name change from Midas Gold Idaho, Inc. to Perpetua Resources Idaho, Inc.
March 3, 2021	DEQ provided an information meeting during the public comment period.
September 14, 2021	DEQ received a TAP modeling protocol for revisions to the TAP analyses.
October 6, 2021	DEQ received the *TAP Addendum*, revising TAP analyses for the project.

2.0 Background Information

This section provides background information applicable to the project and the site proposed for the facility. It also provides a brief description of the applicable air impact analyses requirements for the project.

2.1 Project Description

The SGP will require the construction of significant infrastructure, including a power transmission line, a primary mine site access road, onsite haul roads, an ore processing facility, onsite workspaces, employee housing and recreation, water storage and distribution facilities, and sewage disposal facilities.

The SGP will include three years of pre-mining development and construction activities, followed by an operating mine life of approximately 12 years. Mining will occur in three open pits: Yellow Pine Pit (YPP), Hangar Flats Pit (HFP), and West End Pit (WEP). The general sequence of mining will be the YPP deposit, followed by the HFP and WEP deposits. Legacy tailings from the Meadow Creek valley (Bradley Tailings [BT]) also will be reclaimed and reprocessed during the initial project schedule. Surface exploration drilling will continue within the pits and the Scout Prospect decline (underground exploration) throughout the mine operation period. Restoration and reclamation of other legacy mining features will occur prior to mining, throughout the life of the mine, and as part of the mine closure.

Conventional open-pit methods including drilling, blasting, excavating, and hauling will be used to extract ore and waste rock, termed development rock (DR). Hydraulic shovels and front-end loaders will be used to load ore and DR into haul trucks. DR will be used for construction, restoration, and backfilling, or hauled to the dedicated development rock storage facilities (DRSF). Approximately 340 million tons of DR will be handled over the life of the mine. Ore will be hauled to the primary crusher area, where it will be fed directly into the crusher dump pocket or stockpiled. The ore crushing plant will be designed to operate at a maximum rate of 25,000 tons per day (ton/day). Approximately 100 million tons of ore will be mined from the three pits over the life of the project.

The metal-recovery process from ore will include conventional crushing and grinding, followed by froth-flotation circuits that will generate separate gold-silver and antimony-silver concentrates. The antimony-silver concentrate will be shipped offsite for refining, whereas additional onsite processing of the gold-silver concentrate will include pressure oxidation, carbon-in-leach circuits, and refining processes to recover gold and minor amounts of silver. The finely ground leftover ore material from the mineral-recovery process, termed tailings, will be neutralized, thickened, and transported via a pipeline to the tailings storage facility (TSF).

Lime used in the ore processing will either be purchased or manufactured onsite from limestone available at the site. In addition, certain construction and maintenance activities during operations may require sized aggregate. To allow for the operational flexibility to produce construction aggregate onsite, the application included two portable crushing and screening plants.

The following air pollutants are expected from operations at the SGP facility:

- Criteria air pollutants: carbon monoxide (CO), oxides of nitrogen (NOx), particulate matter less than 2.5 microns (μm) and 10 μm ($PM_{2.5}$ and PM_{10}), sulfur dioxide (SO_2), lead (Pb), and ozone (O_3) precursor volatile organic compounds (VOC)
- Hazardous air pollutants (HAP), including mercury (Hg)
- Other non-HAP toxic air pollutants (TAP)
- Greenhouse gases

Based on the uncontrolled potential to emit (PTE) and controlled PTE, the SGP facility will be a "synthetic minor" source of PM, PM_{10}, $PM_{2.5}$, and HAP emissions for new source review (NSR) and Title V (Tier I) permitting purposes. The uncontrolled PTE for the remaining criteria pollutants (SO_2, NOx, CO, VOC) confirm that the SGP facility will be a natural minor source for these emissions. Facility classification is reviewed by the permit writer. Detailed calculations and explanations are provided in the DEQ Statement of Basis.

The PTC addresses all air pollutant-emitting activities associated with the facility.

2.2 Facility Location and Area Classification

The SGP is located in the Stibnite-Yellow Pine Mining District in Valley County, central Idaho (Northing: 4,973,751 meters [m]; Easting: 632,038 m; UTM Zone 11), approximately 100 miles northeast of Boise, 38 miles east of McCall, and approximately 10 miles east of Yellow Pine. A facility location map for the SGP is presented in Figure 1. This figure also shows the proposed Burntlog Route (access road) that will provide a year-round safe access to the site. The SGP site layout is presented in Figure 2.

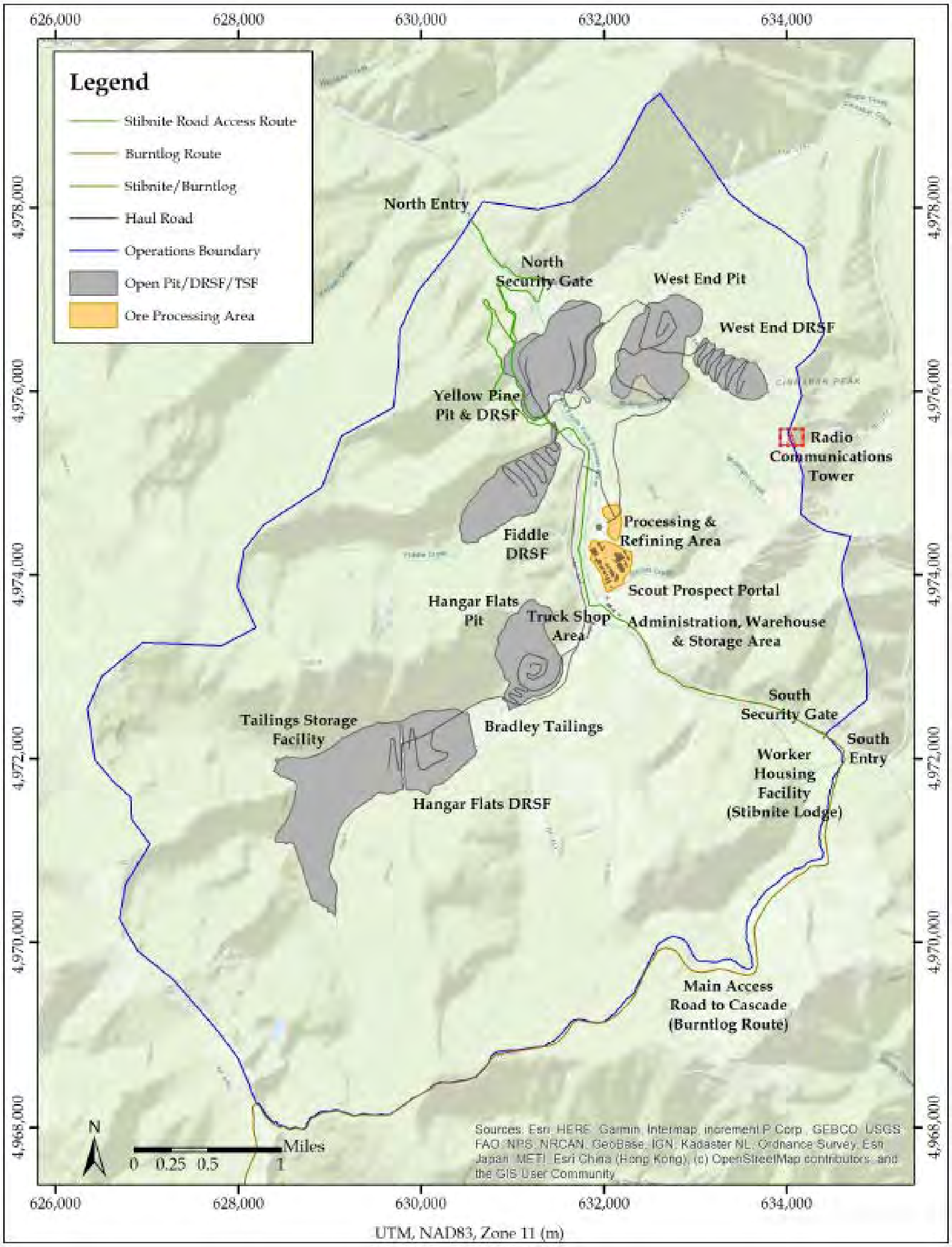
The Stibnite-Yellow Pine Mining District is characterized by historic mining activities and unpatented (federal land) and patented (private land) mining claims that include deposits of gold, silver, tungsten, and antimony. The district lies in both Boise National Forest (BNF) and Payette National Forest (PNF), but is administered by the PNF's Krassel Ranger District (Perpetua Resources Idaho 2017a). The project area terrain is characterized by narrow valleys 6,000 to 6,600 feet above mean sea level (amsl), surrounded by steep mountains ranging over 8,500 feet amsl. The main drainage basin in the project area is the East Fork of the South Fork of the Salmon River (EFSFSR).

The EFSFSR joins Johnson Creek 16 miles downstream, near the village of Yellow Pine. The project area is encompassed by the watersheds of EFSFSR tributaries, including Sugar Creek, Meadow Creek, Johnson Creek, Riordan Creek, Burntlog Creek, Midnight Creek, and Trout Creek. Primary commercial activity in the area comprises mineral exploration, mining, logging, and dispersed recreation.

This area is designated as an attainment or unclassifiable area for SO_2, NO_2, CO, Lead, O_3, PM_{10}, and $PM_{2.5}$. The area is not classified as non-attainment for any criteria pollutants.

Figure 1. SGP FACILITY LOCATION MAP.

Figure 2. SGP SITE LAYOUT AND STIBNITE ROAD ACCESS ROUTE.



2.3 Air Impact Analyses Required for All Permits to Construct

Idaho Air Rules Sections 203.02 and 203.03:

> *No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:*

02. NAAQS. The stationary source or modification would not cause or significantly contribute to a violation of any ambient air quality standard.

03. Toxic Air Pollutants. *Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Atmospheric dispersion modeling, using computerized simulations, is used to demonstrate compliance with both NAAQS and TAPs. Idaho Air Rules Section 202.02 states:

02. Estimates of Ambient Concentrations*. All estimates of ambient concentrations shall be based on the applicable air quality models, data bases, and other requirements specified in 40 CFR 51 Appendix W (Guideline on Air Quality Models).*

2.4 Significant Impact Level and Cumulative NAAQS Impact Analyses

If specific criteria pollutant emission increases associated with the proposed permitting project cannot qualify for a BRC exemption as per Idaho Air Rules Section 221, then the permit cannot be issued unless the application demonstrates that applicable emission increases will not cause or significantly contribute to a violation of NAAQS, as required by Idaho Air Rules Section 203.02.

The first phase of a NAAQS compliance demonstration is to evaluate whether the proposed facility/project could have a significant impact to ambient air. Section 3.1.1 of this memorandum describes the applicability evaluation of Idaho Air Rules Section 203.02. The Significant Impact Level (SIL) analysis for a new facility or proposed modification to a facility involves modeling estimated criteria air pollutant emissions from the facility or modification to determine the potential impacts to ambient air. Air impact analyses are required by Idaho Air Rules to be conducted in accordance with methods outlined in *Appendix W*. *Appendix W* requires that facilities be modeled using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

A facility or modification is considered to have a significant impact on air quality if maximum modeled impacts to ambient air exceed the established SIL listed in Idaho Air Rules Section 006 (referred to as a “significant contribution” in Idaho Air Rules) or as incorporated by reference as per Idaho Air Rules Section 107.03.b. Table 2 lists the applicable SILs.

Table 2. APPLICABLE REGULATORY LIMITS.

Pollutant	Averaging Period	Significant Impact Levels[a] (μg/m³)[b]	Regulatory Limit [c] (μg/m³)	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	0.2	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 μg/m³)	75 ppb[p] (196 μg/m³)	Mean of maximum 4th highest[q]
	3-hour	25	1,300[m]	Maximum 2nd highest[n]
Nitrogen Dioxide (NO_2)	1-hour	4 ppb (7.5 μg/m³)	100 ppb[s] (188 μg/m³)	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 1[st] highest[n]
Ozone (O_3)	8-hour	40 TPY VOC[v]	70 ppb[w]	Not typically modeled

a. Idaho Air Rules Section 006 (definition for significant contribution) or as incorporated by reference as per Idaho Air Rules Section 107.03.b.
b. Micrograms per cubic meter.
c. Incorporated into Idaho Air Rules by reference, as per Idaho Air Rules 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.

If modeled maximum pollutant impacts to ambient air from the emission sources associated with a new facility or modification exceed the SILs, then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with NAAQS and Idaho Air Rules Section 203.02.

A cumulative NAAQS impact analysis for attainment area pollutants involves assessing ambient impacts (typically the design values consistent with the form of the standard) from potential/allowable emissions resulting from the project and emissions from any nearby co-contributing sources (including existing emissions from the facility that are unrelated to the project), and then adding a DEQ-approved background concentration value to the modeled result that is appropriate for the criteria pollutant/averaging-period at the facility location and the area of significant impact. The resulting pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. Table 2 also specifies the modeled design value that must be used for comparison to the NAAQS. NAAQS compliance is evaluated on a receptor-by-receptor basis for the modeling domain.

If the cumulative NAAQS impact analysis indicates an exceedance of NAAQS, a culpability analysis can determine if this exceedance is due to emissions from the proposed project. The permit may not be issued if the proposed project has a significant contribution (exceeding the SIL) to the modeled violation. If project-specific impacts are below the SIL, then the project does not have a significant contribution to the specific violations.

Compliance with Idaho Air Rules Section 203.02 is generally demonstrated if: a) applicable specific criteria pollutant emission increases are at a level defined as BRC, using the criteria established by DEQ regulatory interpretation (DEQ 2014); or b) all modeled impacts of the SIL analysis are below the applicable SIL or other level determined to be inconsequential to NAAQS compliance; or c) modeled design values of the cumulative NAAQS impact analysis (modeling all emissions from the facility and co-contributing sources, and adding a background concentration) are less than applicable NAAQS at receptors where impacts from the proposed facility/modification exceeded the SIL or other identified level of consequence; or d) if the cumulative NAAQS analysis showed NAAQS violations, the impact of proposed facility/modification to any modeled violation was inconsequential (typically assumed to be less than the established SIL) for that specific receptor and for the specific modeled time when the violation occurred.

2.5 Toxic Air Pollutant Analyses

Emissions of toxic substances are generally addressed by Idaho Air Rules Section 161:

> *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.*

Permitting requirements for toxic air pollutants (TAPs) from new or modified sources are specifically addressed by Idaho Air Rules Section 203.03 and require the applicant to demonstrate to the satisfaction of DEQ the following:

> *Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Per Section 210, if the total project-wide emission increase of any TAP associated with a new source or modification exceeds screening emission levels (ELs) of Idaho Air Rules Section 585 or 586, then the ambient impact of the emission increase must be estimated. If ambient impacts are less than applicable Acceptable Ambient Concentrations (AACs) for non-carcinogens of Idaho Air Rules Section 585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) of Idaho Air Rules Section 586, then compliance with TAP requirements has been demonstrated.

TAPs also classified as HAPs emitted from sources addressed by New Source Performance Standards (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAP) were not required to be evaluated for compliance with TAP increments in accordance with IDAPA 58.01.01.210.20 (Subsection 210.20). The DEQ permit writer evaluates the applicability of specific TAPs to the Subsection 210.20 exclusion. Guidance and clarification of Subsection 210.20 source exemptions are included in the DEQ Statement of Basis.

IDAPA 58.01.01.215 sets requirements for mercury emissions. For this standard, fugitive emissions and sources in a source category subject to 40 CFR 63 are exempt. The DEQ permit writer evaluates the applicability of mercury emissions to the exemption criteria. Details are provided in the DEQ Statement of Basis. Adjusted mercury emissions from non-fugitive and non-NESHAP-addressed sources were below the level (25 pounds per year) at which Mercury Best Available Control Technology (MBACT) review is required.

3.0 Analytical Methods and Data

This section describes the methods and data used in the analyses to demonstrate compliance with applicable air quality impact requirements. The DEQ Statement of Basis provides a discussion of the methods and data used to estimate criteria and TAP emission rates.

Air Sciences made substantial refinements in assessed operational scenarios, TAP emission calculations, and modeled TAP impacts in response to issues identified after the February/March 2021 public comment period. Air Sciences addressed these issues separately from the NAAQS compliance demonstration presented in the main body of the PTC application and submitted the revised analyses in the *TAP Addendum*. DEQ's review of the *TAP Addendum* is described in the *Modeling Review Attachment* to this memorandum. Since all the refinements resulted in reduced calculated allowable particulate emissions from sources, the previous NAAQS compliance demonstration (described in the main body of this *Modeling Review Memorandum*) did not require revision for permit issuance and remains unaltered. However, DEQ reanalyzed PM_{10} impacts to account for the largest refinements, and results are presented in the *Modeling Review Attachment*.

3.1 Emission Source Data

Emissions of criteria pollutants and TAPs resulting from operation of the SGP facility were estimated by Air Sciences for various applicable averaging periods. The calculation of potential emissions is the responsibility of the DEQ permit writer, and the representativeness and accuracy of emission estimates is not addressed in this modeling memorandum. DEQ air impact analysts are responsible for assuring that potential emission rates provided in the emission inventory are properly used in the model. The rates listed must represent the maximum allowable rate as averaged over the specified period.

Emission rates used in the impact modeling applicability analyses and any modeling analyses, as listed in this memorandum, should be reviewed by the DEQ permit writer and compared with those in the final emission inventory. All modeled criteria air pollutant and TAP emission rates must be equal to or greater than the facility's potential emissions calculated in the PTC emission inventory or proposed permit allowable emission rates.

Emissions from unpaved roads were calculated based on a control efficiency of 90% from chemical application and 33% from watering (combined control efficiency above 93%). Emission controls and emission calculations are not reviewed in this modeling memorandum. However, it is critical for NAAQS compliance that this high level of control be achieved.

Activity-specific (e.g., drilling, blasting, material crushing and conveying, refining, and other ancillary sources) emissions were estimated based on maximum activity rates, coupled with applicable emission estimation techniques. Maximum emissions were calculated on a short-term (hourly and daily) and long-term (annual) basis for ore processing and mining operations, as discussed below.

The ore-processing rate will range from 20,000 ton/day to 25,000 ton/day at full production. Therefore, maximum potential daily ore processing emissions were based on the maximum design rate of 25,000 ton/day. Maximum potential annual emissions were based on potential daily emissions multiplied by 365 days per year.

Emissions from mining operations (drilling, blasting, material extraction and movement, mobile mine machinery use, and other ancillary sources) vary for each year of the life of the mine (LOM). However, for the modeling analyses, the mining operation potential emissions were estimated using conservatively high maximum activity rates provided in Table 3.

Table 3. MINING ACTIVITY RATES FOR POTENTIAL EMISSION CALCULATIONS.			
Activity	**Maximum Rate**		**Comments**
Drilling	600	holes per blast	--
Blasting	2	blasts per day	--
	1	blast per hour	--
Material extraction and hauling	180,000	tons per day	Ore or DR
Onsite dozing	144	hours per day	6 dozers operating continuously
Onsite grading	72	hours per day	3 graders operating continuously
Onsite water trucking	48	hours per day	2 trucks operating continuously

The potential hourly emission rates for ore processing and mining operation activities were calculated by dividing the daily rate by the 24 hour-per-day operation schedule, and annual rates were calculated by multiplying maximum daily emissions with 365 days per year. This is conservative because the mine is expected to operate for only 355 days per year.

The maximum mine production rate is approximately 42.7 million (MM) tons per year (ton/yr); however, a maximum daily production rate of 180,000 ton/day used for potential emission calculations results in a conservatively higher production rate of approximately 65.7 MMton/yr, approximately 50 percent higher than the projected production rate.

PRI will employ newer model year mining and maintenance machines (excavators, shovels, haul trucks, dozers, graders, portable light plants, etc.) that are expected to meet or exceed applicable regulatory emission standards. Non-road mobile equipment engines are exempt from permitting requirements; therefore, the tailpipe emissions resulting from fuel combustion in the non-road mobile equipment are not quantified for the SGP facility. Background concentrations from McCall, 38 miles west of the SGP, were used in the cumulative NAAQS impact analyses (Section 4.1.2) to conservatively account for the impact contribution of traffic emissions.

The approximately 38-mile long Burntlog Route mine access road will be outside the project ambient air boundary and open to the public. Traffic emissions on public roads generally are considered to be part of background concentrations. Therefore, emissions on the Burntlog Route mine access road that are outside of the project boundary are not included in the SGP analyses. However, the emissions associated with the portion of the Burntlog Route mine access road that is within project boundary (from the south gate to the process area) are included in the SGP analyses. These include dust emissions generated from travel of maintenance equipment, light-duty pickup trucks and buses used for employee, visitor, and contractor transportation, and heavy-duty trucks used for cargo (including fuel, consumables, machine parts, ore processing supplies, ore concentrate, etc.) and services (including food supplies, trash, recyclables, etc.) transportation.

3.1.1 Criteria Pollutant Modeling Applicability and Modeled Emission Rates

If project-specific emission increases for criteria pollutants would qualify for a BRC permit exemption as per Idaho Air Rules Section 221 if it were not for potential emissions of one or more pollutants exceeding the BRC threshold of 10 percent of emissions defined by Idaho Air Rules as significant, then a NAAQS compliance demonstration may not be required for those pollutants with emissions below BRC levels. DEQ's regulatory interpretation policy of exemption provisions of Idaho Air Rules is that: "*A DEQ NAAQS compliance assertion will not be made by the DEQ modeling group for specific criteria* *pollutants having a project emissions increase below BRC levels, provided the proposed project would have qualified for a Category I Exemption for BRC emissions quantities except for the emissions of another criteria pollutant*" (DEQ 2014). The interpretation policy also states that the exemption criteria of uncontrolled potential to emit (PTE) not to exceed 100 ton/year (Idaho Air Rules Section 220.01.a.i) is not applicable when evaluating whether a NAAQS impact analysis is required. A permit will be issued limiting PTE below 100 ton/year, thereby negating the need to maintain calculated uncontrolled PTE under 100 ton/year. The BRC exemption cannot be used to exempt a project from a pollutant-specific NAAQS compliance demonstration in most cases where a PTC is required for the action regardless of emission quantities, such as the modification of an existing emission or throughput limit.

A NAAQS compliance demonstration must be performed for pollutant increases that would not qualify for the BRC exemption from the requirement to demonstrate compliance with NAAQS.

Site-specific air impact modeling analyses may not be necessary for some pollutants, even where such emissions do not qualify for the BRC exemption. DEQ has developed modeling applicability thresholds, below which a site-specific modeling analysis is not required. DEQ generic air impact modeling analyses that were used to develop the modeling thresholds provide a conservative SIL analysis for projects with emissions below identified threshold levels. Project-specific modeling applicability thresholds are provided in the *Idaho Air Modeling Guideline* (DEQ 2013). These thresholds were based on assuring an ambient impact of less than the established SIL for specific pollutants and averaging periods. DEQ revised modeling applicability thresholds in 2021 as described in the revised DEQ *Air Modeling Guideline* (DEQ 2021). Modeling applicability for the SGP facility was not revised because the application was submitted prior to revision of the thresholds.

If total project-specific emission rate increases of a pollutant are below Level I Modeling Applicability Thresholds, then project-specific air impact analyses are not necessary for permitting. Use of Level II Modeling Applicability Thresholds is conditional, requiring DEQ approval. DEQ approval is based on dispersion-affecting characteristics of the emission sources such as stack height, stack gas exit velocity, stack gas temperature, distance from sources to ambient air, presence of elevated terrain, and potential exposure to sensitive public receptors.

For the SGP analyses, several modeling scenarios were considered to evaluate the worst-case air impacts from the SGP facility. The different modeling scenarios are discussed in Section 3.1.3. Table 4 provides a comparison between facility-wide maximum PTE for the highest-emitting scenario (W3) and modeling applicability thresholds. The short-term and long-term PTE emissions are equal to the sum of process and ancillary emissions and mining fugitive emissions. It is important to note that the process and ancillary source emissions remain the same for each modeling scenario discussed in Section 3.1.3.

Table 4. SITE-SPECIFIC CRITERIA POLLUTANT MODELING APPLICABILITY.

Source Category	**Carbon Monoxide (CO)**	**Nitrogen Oxides (NOx)**		**$PM_{2.5}$[a]**		**PM_{10}[b]**	**Sulfur Dioxide (SO_2)**		**Lead (Pb)**
	lb/hr[c]	**ton/yr[d]**	**lb/hr**	**ton/yr**	**lb/hr**	**lb/hr**	**ton/yr**	**lb/hr**	**lb/month[e]**
Process and ancillary	33.5	37.9	55.4	36.4	13.4	21.7	6.5	1.88	0.0437
Mining fugitive	1,742.0	17.1	46.8	98.9	22.5	224.7	0.03	0.09	--
Total	1,775.5	55.0	102.2	135.3	35.9	246.4	6.5	1.97	0.0437
Level I threshold	15.0	1.2	0.2	0.35	0.054	0.22	1.2	0.21	14.0
Modeling	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

required									

[a.] Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
[b.] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometer.
[c.] Pounds per hour.
[d.] Tons per year.
[e.] Pounds per month.

As indicated in Table 4, the SGP facility-wide maximum PTE are greater than the respective Level I thresholds for all criteria pollutants and averaging periods except for Pb. Therefore, modeling is triggered for applicable averaging periods for CO, NOx, $PM_{2.5}$, PM_{10}, and SO_2. Modeling is not required for Pb. The use of Level II modeling thresholds was not approved by DEQ for this project.

Tables 5-7 list criteria pollutant emission rates used in the cumulative NAAQS impact analyses for the worst-case modeling scenarios. Significant Impact Level (SIL) analyses were not performed. Based on the magnitude of the facility-wide emissions and preliminary modeling analyses, it was determined that the impacts from the SGP emissions exceeded the SIL for most criteria pollutants. Therefore, SIL analyses were considered redundant and not performed for this report. Table 5 lists the source-specific modeled emission rates for 24-hour and annual $PM_{2.5}$ and 24-hour PM_{10} (worst-case modeling scenario: W5). Modeling scenario W5 was later removed as an allowable operational scenario as described in the submitted *TAP Addendum* and the *Modeling Review Attachment* to this memorandum. Air Sciences did not adjust the existing PM_{10} and $PM_{2.5}$ analyses for the removal of scenario W5 because NAAQS compliance was already confidently demonstrated with W5 included. Table 6 lists the source-specific modeled emission rates for 1-hour and 8-hour CO and annual NO_2 (worst-case modeling scenario: W1). Table 7 lists the source-specific modeled emission rates for 1-hour NO_2 and 1-hour and 3-hour SO_2 (worst-case modeling scenario: B1). Modeling scenarios are discussed in Section 3.1.3. For 1-, 3-, and 8-hour averaging times, hourly emission rates provided in pounds per hour were used. For 24-hour averaging time, daily emission rates provided in pounds per day were used. For the annual averaging time, annual emission rates provided in tons per year were used. All modeled emission rates in Tables 5-7 are listed in units of pounds per hour (lb/hr). The total modeled input emission rates (highest emission scenario) are listed in Table 8.

Table 5. MODELED 24-HOUR PM_{10}, 24-HOUR $PM_{2.5}$, AND ANNUAL $PM_{2.5}$ EMISSION RATES FOR CUMULATIVE NAAQS IMPACT ANALYSES (WORST-CASE MODELING SCENARIO, W5).

Type of Source	Source ID	Description	24-hour PM_{10} (lb/hr)[a]	24-hour $PM_{2.5}$ (lb/hr)	Annual $PM_{2.5}$ (lb/hr)
Point Sources	LS1L	Mill Lime Silo #1 Loading	3.54E-03	5.21E-04	2.50E-05
	MILLS2L	Mill Lime Silo #2 Loading	3.54E-03	5.21E-04	2.50E-05
	SB1	Sb Dryer (2.72 MMBtu/hr Propane-Fired)	2.08E-02	2.08E-02	2.08E-02
	SB2	Sb Bagging	1.18E-01	1.18E-01	1.18E-01
	AC	Autoclave	5.08E+00	5.08E+00	5.08E+00
	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	5.42E-03	5.42E-03	4.45E-04
	ACS1L	AC Lime Silo #1 Loading	1.42E-02	2.08E-03	9.99E-05
	ACS2L	AC Lime Silo #2 Loading	1.42E-02	2.08E-03	9.99E-05
	ACS3L	AC Lime Silo #3 Loading	1.42E-02	2.08E-03	9.99E-05
	ACS4L	AC Lime Silo #4 Loading	7.08E-03	1.04E-03	4.99E-05
	CKD	Carbon Regeneration (Drum)	4.20E-01	4.20E-01	4.20E-01
	CKB	Carbon Regeneration (Kiln)	1.73E-02	1.73E-02	1.73E-02
	EW	Electrowinning Cells and Pregnant Solution Tank	7.00E-02	7.00E-02	7.00E-02
	MR	Mercury Retort	1.00E-02	1.00E-02	1.42E-03
	MF	Induction Melting Furnace	1.42E+00	1.42E+00	2.02E-01
	EDG1	Camp Emergency Generator (Mfr. Yr.	1.84E-02	1.84E-02	5.03E-03

Table 5. MODELED 24-HOUR PM_{10}, 24-HOUR $PM_{2.5}$, AND ANNUAL $PM_{2.5}$ EMISSION RATES FOR CUMULATIVE NAAQS IMPACT ANALYSES (WORST-CASE MODELING SCENARIO, W5).					
Type of Source	**Source ID**	**Description**	**24-hour PM_{10} (lb/hr)[a]**	**24-hour $PM_{2.5}$ (lb/hr)**	**Annual $PM_{2.5}$ (lb/hr)**
		>2007; diesel)			
	EDG2	Plant Emergency Generator #1 (Mfr. Yr. >2007; diesel)	1.84E-02	1.84E-02	5.03E-03
	EDG3	Plant Emergency Generator #2 (Mfr. Yr. >2007; diesel)	1.84E-02	1.84E-02	5.03E-03
	EDFP	Mill Fire Pump (Mfr. Yr. >2009; diesel)	3.67E-03	3.67E-03	1.01E-03
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7.65E-04	7.65E-04	7.65E-04
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	3.83E-02	3.83E-02	3.83E-02
	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	3.06E-02	3.06E-02	3.06E-02
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	3.06E-02	3.06E-02	3.06E-02
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	3.06E-02	3.06E-02	3.06E-02
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	1.91E-03	1.91E-03	1.91E-03
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	1.91E-03	1.91E-03	1.91E-03
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	1.91E-03	1.91E-03	1.91E-03
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	3.83E-03	3.83E-03	3.83E-03
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	1.53E-02	1.53E-02	1.53E-02
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	2.30E-02	2.30E-02	2.30E-02
	PSL	Prill Silos Loading (2 x 100 ton)	5.83E-02	8.83E-03	8.83E-04
	CS1L	Cement/Shotcrete Silo #1 Loading	1.13E-03	1.67E-04	3.42E-04
	CS2L	Cement/Shotcrete Silo #2 Loading	1.13E-03	1.67E-04	3.42E-04
	LS6	Limestone transfer to Ball Mill Feed Bin	5.18E-02	8.00E-03	6.17E-03
	LSBM	Limestone Ball Mill	1.60E+00	5.70E-01	4.39E-01
	LS9	Limestone transfer to Kiln Feed Bin	1.22E-02	1.89E-03	1.60E-03
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	9.15E-01	9.15E-01	7.77E-01
	LKC	PFR Shaft Lime Kiln Combustion	1.69E-01	1.69E-01	1.43E-01
	LCR	Lime Mill Crushing and associated transfers In and Out	2.39E-01	8.52E-02	7.23E-02
	LSL	Pebble Lime Silo Loading via Bucket Elevator	6.20E-03	6.20E-03	5.26E-03
Area Sources	WEP	West End Pit	3.69E+01	3.32E+00	3.32E+00
	UGEXP	Underground Exploration	1.66E-04	2.51E-05	2.51E-05
Line Sources	AR01	Access Road within Operations Boundary	7.02E-02	7.02E-03	7.03E-03
	AR02	Access Road within Operations Boundary	5.39E-02	5.40E-03	5.41E-03
	AR03	Access Road within Operations Boundary	1.36E-01	1.36E-02	1.37E-02
	AR04	Access Road within Operations Boundary	1.31E-01	1.31E-02	1.31E-02
Volume Sources	WEPBL	West End Pit Blasting	1.39E+01	8.04E-01	8.04E-01
	WEDRSF	West End Pit Development Rock Storage Facility	2.38E+00	1.26E+00	1.26E+00
	OC1	Loader Transfer of Ore to Grizzly	4.79E-02	1.35E-02	1.35E-02
	OC2	Grizzly to Apron Feeder	4.79E-02	1.35E-02	1.35E-02

Table 5. MODELED 24-HOUR PM_{10}, 24-HOUR $PM_{2.5}$, AND ANNUAL $PM_{2.5}$ EMISSION RATES FOR CUMULATIVE NAAQS IMPACT ANALYSES (WORST-CASE MODELING SCENARIO, W5).					
Type of Source	**Source ID**	**Description**	**24-hour PM_{10} (lb/hr)[a]**	**24-hour $PM_{2.5}$ (lb/hr)**	**Annual $PM_{2.5}$ (lb/hr)**
	OC3	Apron Feeder to Dribble Conveyor	4.79E-02	1.35E-02	1.35E-02
	OC4	Apron Feeder to Vibrating Grizzly	4.79E-02	1.35E-02	1.35E-02
	OC5	Dribble Conveyor to Vibrating Grizzly	4.79E-02	1.35E-02	1.35E-02
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	4.79E-02	1.35E-02	1.35E-02
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	5.63E-01	1.04E-01	1.04E-01
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	4.79E-02	1.35E-02	1.35E-02
	OC9	Stockpile Transfers to Reclaim Conveyors	2.53E-01	3.91E-02	3.91E-02
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	2.53E-01	3.91E-02	3.91E-02
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	2.53E-01	3.91E-02	3.91E-02
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	6.21E-01	1.15E-01	1.15E-01
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	5.29E-02	1.50E-02	1.50E-02
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	2.92E-02	4.37E-03	2.10E-04
	MILLS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	2.92E-02	4.37E-03	2.10E-04
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5.60E-02	8.00E-03	7.99E-04
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5.60E-02	8.00E-03	7.99E-04
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5.60E-02	8.00E-03	7.99E-04
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5.60E-02	8.00E-03	4.00E-04
	PSU	Prill Silos Unloading (2 x 100 ton)	5.83E-02	8.83E-03	8.83E-04
	CS1U	Cement/Shotcrete Silo #1 Unloading	9.33E-03	1.33E-03	2.74E-03
	CS2U	Cement/Shotcrete Silo #2 Unloading	9.33E-03	1.33E-03	2.74E-03
	CAL	Aggregate Bin Loading	3.30E-01	5.00E-02	2.85E-02
	CAU	Aggregate Bin Unloading	3.30E-01	5.00E-02	2.85E-02
	CM	Central Mixer Loading	1.83E-02	2.67E-03	5.48E-03
	PCSP1	Portable Crushing and Screening Plant 1	2.33E-01	3.04E-02	3.04E-02
	PCSP2	Portable Crushing and Screening Plant 2	2.33E-01	3.04E-02	3.04E-02
	LS1	Limestone transfer to Primary Crusher Hopper	5.18E-02	8.00E-03	6.17E-03
	LS2	Primary Crushing and Associated Transfers In and Out	1.13E-01	1.69E-02	1.31E-02
	LS3	Primary Screening and Associated Transfers In and Out	4.10E-01	6.21E-02	4.79E-02
	LS4	Secondary Crushing and Associated Transfers In and Out	1.13E-01	1.69E-02	1.31E-02
	LS5	Secondary Screening and Associated Transfers In and Out	4.10E-01	6.21E-02	4.79E-02
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5.18E-02	8.00E-03	6.17E-03
	LS8	Ball Mill Feed transfer to Ball Mill	5.18E-02	8.00E-03	6.17E-03
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	1.22E-02	1.89E-03	1.60E-03
	LS11	Fines Screening and Associated Transfers In and Out	9.68E-02	1.47E-02	1.25E-02

Table 5. MODELED 24-HOUR PM_{10}, 24-HOUR $PM_{2.5}$, AND ANNUAL $PM_{2.5}$ EMISSION RATES FOR CUMULATIVE NAAQS IMPACT ANALYSES (WORST-CASE MODELING SCENARIO, W5).					
Type of Source	**Source ID**	**Description**	**24-hour PM_{10} (lb/hr)[a]**	**24-hour $PM_{2.5}$ (lb/hr)**	**Annual $PM_{2.5}$ (lb/hr)**
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	1.22E-02	1.89E-03	1.60E-03
	LSU	Pebble Lime Silo discharge to Lime Slaker	6.20E-04	6.20E-04	5.26E-04
	HRT001-HRT072	Haul Road[b]	9.09E-01	9.10E-02	9.11E-02
	HRN001-HRN022	Haul Road[b]	9.09E-01	9.10E-02	9.11E-02

a. Pounds per hour.
b. The Haul Road was represented in the model as a series of volume sources. The emission rates listed in this table represent each individual volume source.

Table 6. MODELED 1-HOUR CO, 8-HOUR CO, and ANNUAL NO_2 EMISSION RATES FOR CUMULATIVE NAAQS IMPACT ANALYSES (WORST-CASE MODELING SCENARIO, W1).				
Type of Source	**Source ID**	**Description**	**1-hour, 8-hour CO (lb/hr)[a]**	**Annual NO_2 (lb/hr)**
Point Sources	SB1	Sb Dryer (2.72 MMBtu/hr Propane-Fired)	2.23E-01	3.86E-01
	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	1.39E+00	8.27E-03
	CKD	Carbon Regeneration (Drum)	1.20E-01	1.20E-02
	CKB	Carbon Regeneration (Kiln)	1.85E-01	3.20E-01
	EDG1	Camp Emergency Generator (Mfr. Yr. >2007; diesel)	7.72E+00	1.61E-01
	EDG2	Plant Emergency Generator #1 (Mfr. Yr. >2007; diesel)	7.72E+00	1.61E-01
	EDG3	Plant Emergency Generator #2 (Mfr. Yr. >2007; diesel)	7.72E+00	1.61E-01
	EDFP	Mill Fire Pump (Mfr. Yr. >2009; diesel)	1.54E+00	2.01E-02
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	8.20E-03	1.42E-02
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	4.10E-01	7.10E-01
	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	3.28E-01	5.68E-01
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	3.28E-01	5.68E-01
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	3.28E-01	5.68E-01
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	2.05E-02	3.55E-02
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	2.05E-02	3.55E-02
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	2.05E-02	3.55E-02
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	4.10E-02	7.10E-02
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	1.64E-01	2.84E-01
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	2.46E-01	4.26E-01
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	3.17E+00	1.44E+00

	LKC	PFR Shaft Lime Kiln Combustion	1.81E+00	2.66E+00
Volume Source	WEPBL	West End Pit Blasting	1.74E+03	3.90E+00

a. Pounds per hour.

Table 7. MODELED 1-HOUR NO_2, 1-HOUR SO_2, AND 3-HOUR SO_2 EMISSION RATES FOR CUMULATIVE NAAQS IMPACT ANALYSES (WORST-CASE MODELING SCENARIO, B1).

Type of Source	Source ID	Description	1-hour NO_2 (lb/hr)[a]	1-hour, 3-hour SO_2 (lb/hr)
Point Sources	SB1	Sb Dryer (2.72 MMBtu/hr Propane-Fired)	3.86E-01	4.73E-02
	AC	Autoclave	0.00E+00	6.53E-01
	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	2.42E+00	2.95E-01
	CKD	Carbon Regeneration (Drum)	1.20E-02	0.00E+00
	CKB	Carbon Regeneration (Kiln)	3.20E-01	3.92E-02
	EDG1	Camp Emergency Generator (Mfr. Yr. >2007; diesel)	0.00E+00	1.45E-02
	EDG2	Plant Emergency Generator #1 (Mfr. Yr. >2007; diesel)	0.00E+00	1.45E-02
	EDG3	Plant Emergency Generator #2 (Mfr. Yr. >2007; diesel)	0.00E+00	1.45E-02
	EDFP	Mill Fire Pump (Mfr. Yr. >2009; diesel)	0.00E+00	2.90E-03
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	1.42E-02	1.74E-03
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7.10E-01	8.69E-02
	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	5.68E-01	6.95E-02
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	5.68E-01	6.95E-02
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	5.68E-01	6.95E-02
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	3.55E-02	4.34E-03
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	3.55E-02	4.34E-03
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	3.55E-02	4.34E-03
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	7.10E-02	8.69E-03
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	2.84E-01	3.48E-02
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	4.26E-01	5.21E-02
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	1.69E+00	8.45E-03
	LKC	PFR Shaft Lime Kiln Combustion	3.13E+00	3.83E-01
Volume Source	BTBL	Bradley Tailings Blasting	4.68E+01	9.36E-02

a. Pounds per hour.

Table 8. CRITERIA POLLUTANT TOTAL MODELED EMISSION RATES (WORST-CASE MODELING SCENARIOS).

Pollutant	Averaging Time	Emissions[a]

CO	8 hours	1,775.50	lb/hr
	1 hour	1,775.50	lb/hr
NO_2	1 year	54.93	ton/yr
	1 hour	58.07	lb/hr
$PM_{2.5}$	1 year	135.23	ton/yr
	24 hours	781.69	lb/day
PM_{10}	24 hours	5,768.93	lb/day
SO_2	3 hours	1.97	lb/hr
	1 hour	1.97	lb/hr

a. Combined process, ancillary, and fugitive emissions modeled. Fugitive emissions vary by pit scenario. Maximum pit scenario emissions are shown.

Ozone (O_3) differs from other criteria pollutants in that it is not typically emitted directly into the atmosphere. O_3 is formed in the atmosphere through reactions of VOCs, NOx, and sunlight. Atmospheric dispersion models used in stationary source air permitting analyses cannot be used to estimate O_3 impacts resulting from VOC and NOx emissions from an industrial facility. O_3 concentrations resulting from area-wide emissions are predicted by using more complex airshed models such as the Community Multi-Scale Air Quality (CMAQ) modeling system. Use of the CMAQ model is very resource-intensive and DEQ asserts that performing a CMAQ analysis for a particular permit application is not typically a reasonable or necessary requirement for air quality permitting.

Addressing secondary formation of O_3 within the context of permitting a new stationary source has been somewhat addressed in EPA regulation and policy. As stated in a letter from Gina McCarthy of EPA to Robert Ukeiley, acting on behalf of the Sierra Club (letter from Gina McCarthy, Assistant Administrator, United States Environmental Protection Agency, to Robert Ukeiley, January 4, 2012):

> *. . . footnote 1 to sections 51.166(I)(5)(I) of the EPA's regulations says the following: "No de minimis air quality level is provided for ozone. However, any net emission increase of 100 tons per year or more of volatile organic compounds or nitrogen oxides subject to PSD would be required to perform an ambient impact analysis, including the gathering of air quality data."*
>
> *"The EPA believes it unlikely a source emitting below these levels would contribute to such a violation of the 8-hour ozone NAAQS, but consultation with an EPA Regional Office should still be conducted in accordance with section 5.2.1.c. of Appendix W when reviewing an application for sources with emissions of these ozone precursors below 100 TPY."*

DEQ determined it was not appropriate or necessary to require a quantitative source-specific O_3 impact analysis because allowable emission estimates of VOCs and NOx are below the 100 tons/year threshold.

3.1.2 TAPs Modeling Applicability and Modeled Emission Rates

Source-specific applicability for TAP analyses and calculated TAP emission rates were reworked by Air Sciences and presented in the *TAP Addendum*, submitted in October 2021. DEQ's review of the *TAP Addendum* is presented in the *Modeling Review Attachment* of this memorandum.

3.1.3 Modeling Scenarios

As discussed in Section 2.1, conventional open-pit methods will be used to extract ore and DR from three pits: YPP, HFP, and WEP, and legacy tailings from BT. Ore will be hauled to the crushing area, and the DR will be moved to four DRSF: Yellow Pine (YPDRSF), Hangar Flats (HFDRSF), West End (WEDRSF), and Fiddle (FDRSF). The SGP site layout provided later in Figure 4 shows these locations.

PRI plans for an up to three-year construction schedule to build mine site facilities and infrastructure, as well as the power transmission line, followed by 12 years of mining operations (i.e., LOM Years 1 through 12). Depending on the mine design and operating schedule, mining activity rates will vary temporally and spatially during the 12 years of mine production and operation. For example, ore production varies from approximately 6.8 MMton in LOM Year 1 (67% in YPP, 26% in WEP, and 7% in BT) to 9 MMton in LOM 3 (78% in YPP, 10% in BT, 7% in WEP, and 5% in HFP). Similarly, DR production varies from approximately 4.8 MMton in LOM Year 12 (100% in WEP) to 34 MMton in each of LOM Years 4 through 9, with varying distribution among the four DRSF for each LOM Year. The total material (ore and DR) production varies from approximately 12.5 MMton in LOM Year 12 to 42.7 MMton in LOM Year 4.

Similar to the material production, the distribution and hauling of DR to the four destinations (YPDRSF, HFDRSF, WEDRSF, FDRSF) also will vary for each LOM year. Depending on the material origin (pits and BT) and destination (crushing area and DRSF), material hauling distances also will vary for each LOM year.

Therefore, depending on material production rates and origin, DR destination, and hauling distances, mining emissions will vary spatially and temporally throughout the mine life. For permitting purposes, PRI used a maximum production rate of 180,000 tons of material (ore and/or DR) per day, for an annual production rate of 65.7 MMton/yr. This annual production rate is more than 50% higher than the estimated maximum total material production rate of 42.7 MMton/yr.

In order to allow PRI with operation flexibility and to capture variability in material origin and destination in the air quality analyses, several pit scenarios were developed for the SGP air quality analyses. Each pit scenario uses the maximum production rate of 180,000 ton/day in a single pit and uses a single material destination. Each pit has a dedicated ore scenario that assumes all material produced is ore and is hauled to the crusher area; and depending on mine design multiple DR destination scenarios each assuming all material produced is DR and is transported to a single DRSF. For example, most of the DR from HFP will be moved to HFDRSF and during LOM Years 2 through 10, but a fraction of this rock will be moved to FDRSF during LOM Years 3 and 8, and a fraction to YPDRSF during LOM Year 9. Therefore, in order to evaluate all hauling scenarios originating from HFP, the following four (one for ore hauling, three for DR hauling) HFP scenarios were modeled:

1. HFP Scenario 1 – 180,000 ton/day of ore produced and hauled to the crusher area
2. HFP Scenario 2 – 180,000 ton/day of DR produced and hauled to the FDRSF
3. HFP Scenario 3 – 180,000 ton/day of DR produced and hauled to the HFDRSF
4. HFP Scenario 4 – 180,000 ton/day of DR produced and hauled to the YPDRSF

Overall, 14 scenarios were modeled for $PM_{2.5}$ and PM_{10} analyses to cover all possible origin and destination combinations. Each modeling scenario included processing and ancillary source potential emissions. The multiple scenarios modeled for $PM_{2.5}$ and PM_{10} analyses are presented in Table 9. This table also shows the six origin/destination options that are not applicable to the SGP Project as denoted by “0 ton/day.” These six scenarios are not feasible because the timing of the activity within the sequence of mine operations makes the scenarios logistically impossible. Also, Scenario W5 was eliminated after the February/March 2021 public comment period, as presented in the *TAP Addendum*.

Table 9. MODELING SCENARIOS FOR $PM_{2.5}$ AND PM_{10} ANALYSES.									
Pit Scenario	**Pit/Origin (ton/day)**				**Ore Destination (ton/day)**	**DR Destination (ton/day)**			
	YPP	**HFP**	**WEP**	**BT**	**STKP**	**FDRSF**	**HFDRSF**	**YPDRSF**	**WEDRSF**
Y1	180,000	--	--	--	180,000	--	--	--	--
Y2	180,000	--	--	--	--	180,000	--	--	--
Y3	180,000	--	--	--	--	--	180,000	--	--
Y4	0	--	--	--	--	--	--	0	--
Y5	0	--	--	--	--	--	--	--	0
H1	--	180,000	--	--	180,000	--	--	--	--
H2	--	180,000	--	--	--	180,000	--	--	--
H3	--	180,000	--	--	--	--	180,000	--	--
H4	--	180,000	--	--	--	--	--	180,000	--
H5	--	0	--	--	--	--	--	--	0
W1	--	--	180,000	--	180,000	--	--	--	--
W2	--	--	180,000	--	--	180,000	--	--	--
W3	--	--	180,000	--	--	--	180,000	--	--
W4	--	--	180,000	--	--	--	--	180,000	--
W5	--	--	180,000	--	--	--	--	--	180,000
B1	--	--	--	180,000	180,000	--	--	--	--
B2	--	--	--	180,000	--	--	180,000	--	--
B3	--	--	--	0	--	0	--	--	--
B4	--	--	--	0	--	--	--	0	--
B5	--	--	--	0	--	--	--	--	0

Scenario Y4 is not applicable because the YPDRSF and the YPP are in the same area; therefore, the pit cannot be backfilled with development rock until after mining of the pit is completed. Scenarios Y5 and H5 are not applicable because the WEDRSF will only be utilized by the WEP because of its proximity; it is only accessible from the WEP. Scenarios B3, B4 and B5 are not applicable because the development rock from the BT will only be hauled to the HFDRSF because of its proximity. All other development rock storage facilities are significantly farther away from BT.

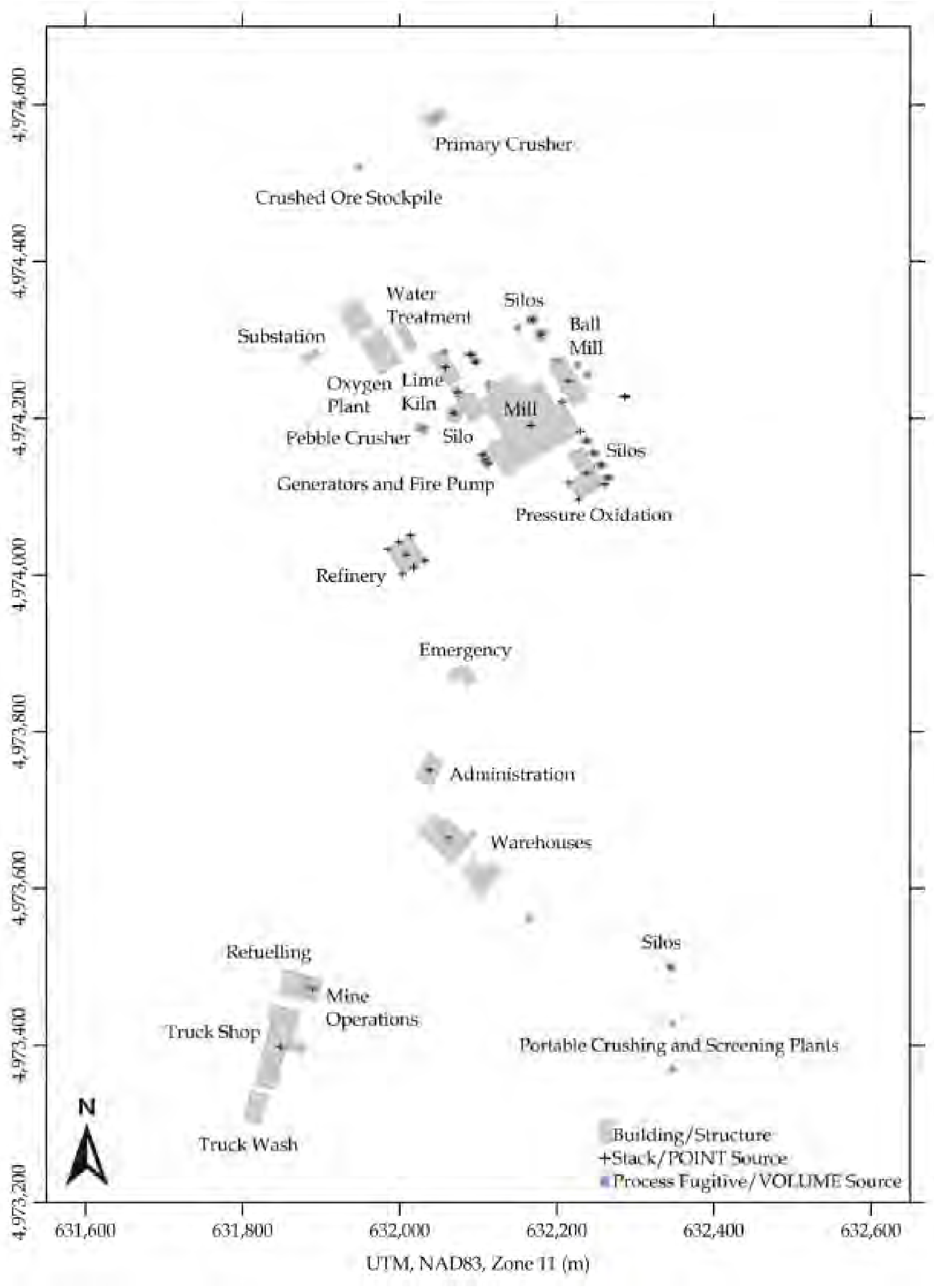
The fugitive CO, NO_2, and SO_2 emissions are limited to pits only, and they do not vary by ore and/or DR hauling and destinations. Therefore, for these pollutants, one scenario for each pit, including processing and ancillary source potential emissions, was modeled, i.e., scenarios Y1, H1, W1, and B1.

The TAP emissions are limited to processing and ancillary sources, so a single scenario was modeled for each applicable TAP analysis.

3.1.4 Processing, Refining, and Ancillary Sources

The processing, refining, and ancillary sources with exhaust stacks, such as baghouse-equipped sources, generators, process and building heaters, autoclave, retort, smelting furnace, carbon kiln, lime kiln, etc., were modeled as POINT sources. The process sources without exhaust stacks, such as material transfers, ore screening and crushing, etc., were modeled as VOLUME sources. A plot plan showing the processing and refining area buildings and sources is provided in Figure 3. Process and ancillary source model input parameters are provided later in Tables 13 and 14.

Figure 3. PROCESSING AND REFINING AREA BUILDING AND SOURCE LAYOUT.



3.1.5 Fugitive Sources: Blasting, Material Origin and Destination, and Underground Exploration Emissions

Blasting emissions were represented by a VOLUME source located inside a pit. Each material origin location (YPP, HFP, WEP, BT) was modeled as an AREA source and comprised appropriate emissions from drilling, material loading, dozing, and surface exploration. Ore destination (crusher area) was modeled as a VOLUME source and comprised ore unloading emissions. Each DR destination (FDRSF, HFDRSF, YPDRSF, WEDRSF) was modeled as a VOLUME source comprising appropriate emissions from DR unloading, dozing, and wind erosion. Emissions from underground core sampling drilling (UGEXP) in the Scout prospect decline were represented by an AREA source characterized by the portal opening dimensions.

Model input physical characteristics for blasting and possible material origin and destination locations, and Scout portal are presented in Table 10. This table also shows the source type and associated dimensions for each of the modeled fugitive source/location. The VOLUME source dimensions for blasting provided in Table 10 were based on an estimated blast area. For the remaining AREA and VOLUME sources listed in Table 10, the dimensions were developed by reasonably fitting an equal-area rectangle within the actual footprint of each fugitive source. Blasting is not expected to occur in BT. However, blasting emissions were modeled in BT (BTBL) in order to streamline the permitting process.

Table 10. MODELED FUGITIVE ACTIVITY LOCATIONS.

Model ID	Activity Location	Type	Lateral Dimensions (m)	Emission Sources
YPP	Yellow Pine Pit	AREA	882 × 882	Drilling, loading, dozing, surface exploration
HFP	Hangar Flats Pit	AREA	491 × 491	Drilling, loading, dozing, surface exploration
WEP	West End Pit	AREA	376 × 376	Drilling, loading, dozing, surface exploration
BT	Bradley Tailings	AREA	820 × 420	Loading, dozing, wind erosion
YPPBL	Yellow Pine Pit (Blasting)	VOLUME	87 × 87	Blasting
HFPBL	Hangar Flats Pit (Blasting)	VOLUME	87 × 87	Blasting
WEPBL	West End Pit (Blasting)	VOLUME	87 × 87	Blasting
BTBL	Bradley Tailings (Blasting)	VOLUME	87 × 87	Blasting
STKP	PC Stockpile	VOLUME	229 × 229	Unloading, dozing, wind erosion
FDRSF	Fiddle DRSF	VOLUME	775 × 775	Unloading, dozing, wind erosion
HFDRSF	Hangar Flats DRSF	VOLUME	752 × 752	Unloading, dozing, wind erosion
YPDRSF	Yellow Pine DRSF	VOLUME	784 × 784	Unloading, dozing, wind erosion
WEDRSF	West End DRSF	VOLUME	533 × 533	Unloading, dozing, wind erosion
UGEXP	Scout Portal	AREA	4.9 × 4.9	Sample core drilling

The model input physical parameters for blasting, material origin and destination locations, and Scout portal are provided in Table 11.

Table 11. MODEL INPUT PARAMETERS FOR FUGITIVE ACTIVITY LOCATIONS.

Model ID	Base Elevation (m)	Release Height (m)	Initial Lateral Dispersion (m)	Initial Vertical Dispersion (m)
YPP	1,832.4	4.7	N/A	4.4
HFP	1,993.3	4.7	N/A	4.4
WEP	2,191.8	4.7	N/A	4.4
BT	2,011.7	4.7	N/A	4.4
YPPBL	1,717.2	15.0	20.2	7.0
HFPBL	1,890.6	15.0	20.2	7.0
WEPBL	1,994.0	15.0	20.2	7.0

BTBL	2,011.7	15.0	20.2	7.0
STKP	1,979.8	4.7	53.3	4.4
FDRSF	2,115.2	4.7	180.2	4.4
HFDRSF	2,079.8	4.7	174.8	4.4
YPDRSF	1,904.1	4.7	182.2	4.4
WEDRSF	2,376.5	4.7	124.1	4.4
UGEXP	2,018.0	0	N/A	0

The blasting physical parameters were developed from dimensions (provided in Table 10) based on blast area used in the emission calculation. The blasting release height is the midpoint of the blasting height (30 m).

The initial lateral and vertical dispersion dimensions for blasting were calculated per methods specified in (EPA 2018c) for a volume source not on or adjacent to a building, as:

$$Initial\ Lateral\ Dispesion = \frac{Width\ (87\ m)}{4.3}$$

$$Initial\ Vertical\ Dispesion = \frac{Height\ (30\ m)}{4.3}$$

For the pit and DRSF fugitive activity locations listed in Table 10, i.e., YPP, HFP, WEP, BT, FDRSF, HFDRSF, and WEDRSF, the release height was based on the haul truck height (weighted based on model-specific usage) and calculated using the recommendations provided in the Haul Road Workgroup Report (EPA 2012), as:

$$Release\ Height = \frac{Plume\ Top\ (Weighted\ Truck\ Height \times 1.7)}{2}$$

The applicable initial lateral dispersion for each VOLUME source was calculated from the respective shorter dimension and EPA-specified methods (EPA 2018c) (EPA 2016) as follows:

$$Initial\ Lateral\ Dispesion = \frac{Short\ Lateral\ Dimension}{2.15}$$

The applicable initial vertical dispersion for each AREA and VOLUME source was calculated from the respective vertical dimension and EPA-specified methods (EPA 2018c) (EPA 2016) as follows:

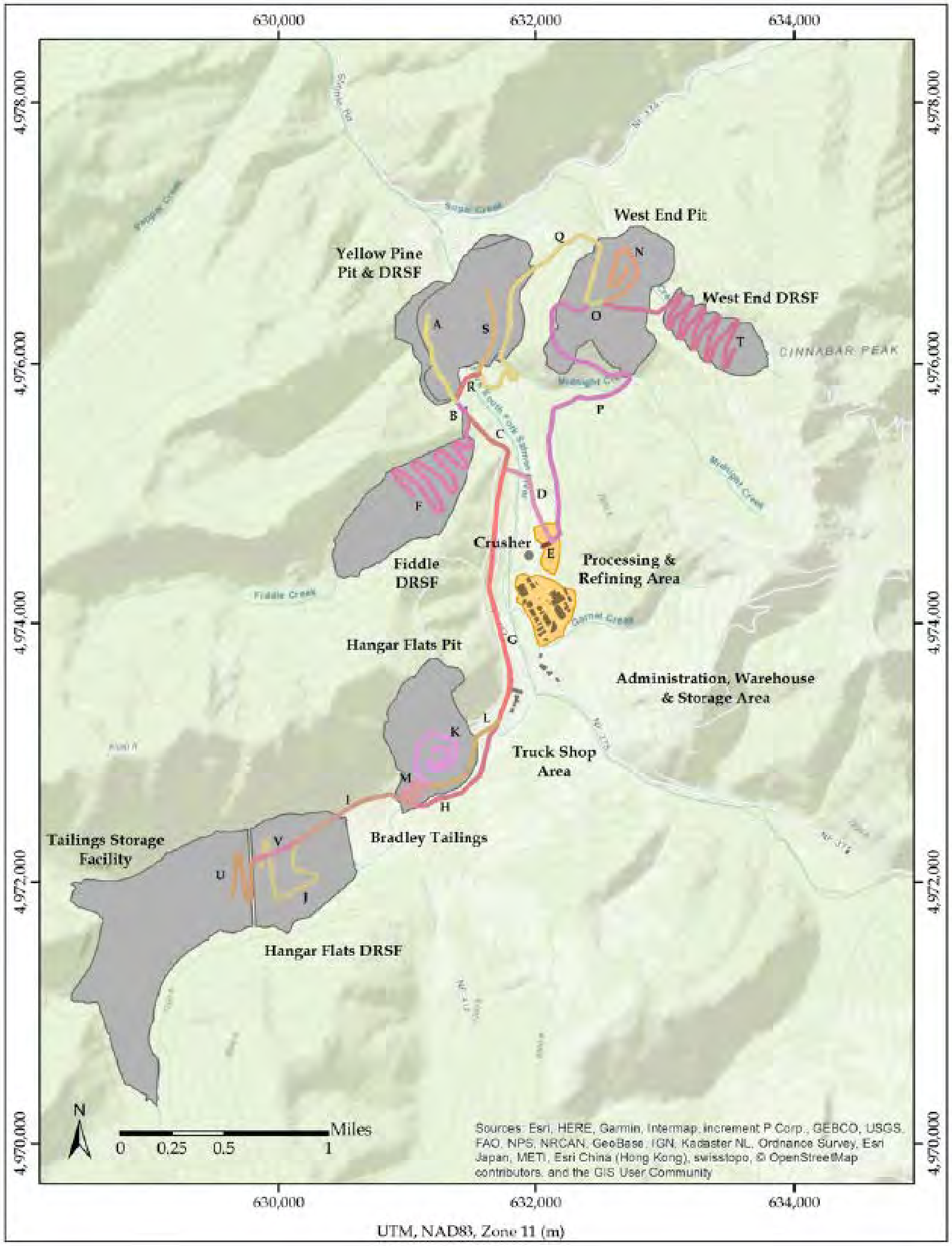
$$Initial\ Vertical\ Dispersion = \frac{Plume\ Top\ (Weighted\ Truck\ Height \times 1.7)}{2.15}$$

Scout portal was modeled as a surface-based AREA source with zero release height.

3.1.6 Fugitive Sources: Haul Roads

A representative haul road network for hauling material from inside the pit (or origin) to various destinations was developed for each pit scenario provided in Table 9. The haul road network is presented in Figure 4.

Figure 4. HAUL ROAD NETWORK AND SECTIONS.



As shown in Figure 4, the haul road network was divided into 22 sections, A through V. Each section was further divided into multiple segments with a length equal to twice the adjusted haul road width of 32.5 m (26 m road width plus 6 m (EPA 2012)). Each of the segments was characterized as an individual VOLUME source in the model, with a release height of 4.75 m (weighted-average truck height times 1.7, divided by 2 (EPA 2012)), an initial lateral dispersion of 15.1 m (adjusted road width divided by 2.15 (EPA 2012)), and an initial vertical dispersion of 4.42 m (weighted-average top-of-plume height divided by 2.15 (EPA 2012)). Material hauling emissions associated with each origin-destination route were assigned to each segment along the route based on estimated total emissions along the route and traffic distribution along each section, as provided in Table 12 for the four HFP scenarios.

Table 12. HAUL ROAD EMISSION DISTRIBUTION GRID FOR HFP SCENARIOS.					
Pit Scenario		**H1**	**H2**	**H3**	**H4**
Route: Origin-Destination		**HFP-STKP**	**HFP-FDRSF**	**HFP-HFDRSF**	**HFP-YPDRSF**
Segment Emission Denominator		96	148	87	115
Section	**No. of Segments**	**Traffic Distribution per Route**			
A	37	--	--	--	--
B	3	--	--	--	1
C	11	--	1	--	1
D	14	1	--	--	--
E	2	--	--	--	--
F	55	--	1	--	--
G	38	1	1	--	1
H	20	--	--	--	--
I	20	--	--	1	--
J	27	--	--	1	--
K	28	1	1	1	1
L	16	1	1	--	1
M	12	--	--	1	--
N	22	--	--	--	--
O	2	--	--	--	--
P	57	--	--	--	--
Q	49	--	--	--	--
R	6	--	--	--	1
S	13	--	--	--	1
T	72	--	--	--	--
U	19	--	--	--	--
V	7	--	--	--	--

The top row in Table 12 shows the pit scenarios, and the next two rows show hauling route and the associated segment emission denominator (SED) used to distribute segment emissions along each route. The remainder of Table 12 presents the number of segments for each road section (shown in Figure 4) and the associated traffic distribution factor for each route. The emission distribution for each applicable segment is illustrated in the following example.

For route: HFP–STKP (Hangar Flats pit to crusher stockpile), Figure 4 shows that material from HFP will be hauled to the crusher area following the route along Sections K, L, G, and D. All (100%) of the ore from HFP will travel on each of these sections; therefore, each of these sections has a traffic distribution factor of 1.0 for this route.

The SED for each route is the sum-product of the number of segments and traffic distribution for the applicable sections. The SED for the HFP–STKP route is calculated as:

$$SED_{(HFP-STKP)} = (28 \times 1) + (16 \times 1) + (38 \times 1) + (14 \times 1) = 96$$

Emissions for each section-segment were estimated by dividing the total emissions along the route by its SED and multiplying by the section distribution factor. For example, the emission rate for each of the 28 segments along Section K was calculated as:

$$Emission\ Rate - Section\ K_{(Segments\ 1-28)} = \frac{Total\ Emissions_{(HFP-STKP)}}{96} \times 1$$

3.1.7 Fugitive Sources: Burntlog Route Access Road

The access road portion within the operations boundary was characterized by a series of LINE sources laid along the actual route. Emissions associated along this access road include dust emissions generated from travel of maintenance equipment, light-duty pickup trucks and buses used for employee, visitor, and contractor transportation, and heavy-duty trucks used for cargo and services transportation. These sources were assigned a release height of 3 m and an initial vertical dispersion of 2.8 m. These release parameters were based on an estimated average vehicle height of 3.5 m, which is representative of an overall approximation of anticipated vehicle heights (grader – 3.7 m, heavy-duty truck – 3.6 m, and pickup truck – 3.2 m) and the AREA source parameterization recommendations provided in the Haul Road Workgroup Report (EPA 2012). The AERMOD emission input units for AREA source are grams per meter square. The access road emissions were evenly distributed along the road by dividing the total access road emissions by its total area, i.e., the Burntlog Route section within the operations boundary (2,950 m) multiplied by the road width (6.1 m).

3.1.8 Emission Release Parameters

Table 13 lists the emission release parameters, including stack height, exhaust temperature, exhaust velocity, and stack diameter for SGP's process and ancillary point sources in metric units (English units are in parentheses). Table 14 lists the emission release parameters for SGP's process and ancillary volume sources in metric units (English units are in parentheses). Emission release parameters were based on information provided in the application. Justification for emission release parameters is summarized in the next section.

Table 13. PROCESS AND ANCILLARY POINT SOURCE EMISSION RELEASE PARAMETERS IN METRIC UNITS (ENGLISH UNITS IN PARENTHESES).

Release Point	Description	UTM[a] Coordinates		Stack Height in m (ft)[c]	Stack Exhaust Temp. in K (°F)[d]	Stack Exhaust Velocity in m/sec (fps)[e]	Stack Diameter in m (ft)	Orient. Of Release[f]
		Easting-X in m[b]	Northing-Y in m					
LS1L	Mill Lime Silo #1 Loading	632,095	4,974,272	13.3 (43.7)	0.0 (-459.7)	18.1 (59.4)	0.15 (0.49)	D
MillS2L	Mill Lime Silo #2 Loading	632,090	4,974,282	13.3 (43.7)	0.0 (-459.7)	18.1 (59.4)	0.15 (0.49)	D
SB1	Sb Dryer (2.72 MMBtu/hr Propane-Fired)	632,231	4,974,183	45.7 (150.0)	455.4 (360.0)	6.9 (22.8)	0.30 (0.98)	D
SB2	Sb Bagging	632,208	4,974,221	45.7 (150.0)	0.0 (-459.7)	6.5 (21.2)	0.30 (0.98)	D
AC	Autoclave	632,229	4,974,096	23.5 (77.0)	364.3 (196.1)	7.4 (24.3)	1.52 (4.99)	D
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	632,261	4,974,116	23.5 (77.0)	455.4 (360.0)	10.8 (35.6)	0.61 (2.00)	D
ACS1L	AC Lime Silo #1 Loading	632,267	4,974,124	17.4 (57.2)	0.0 (-459.7)	16.1 (52.8)	0.23 (0.75)	D
ACS2L	AC Lime Silo #2 Loading	632,257	4,974,140	17.4 (57.2)	0.0 (-459.7)	16.1 (52.8)	0.23 (0.75)	D
ACS3L	AC Lime Silo #3 Loading	632,248	4,974,156	17.4 (57.2)	0.0 (-459.7)	16.1 (52.8)	0.23 (0.75)	D
ACS4L	AC Lime Silo #4 Loading	632,238	4,974,171	14.5 (47.5)	0.0 (-459.7)	16.1 (52.8)	0.23 (0.75)	D
CKD	Carbon	632,013	4,974,051	16.8	338.7	5.1	0.15	D

Table 13. PROCESS AND ANCILLARY POINT SOURCE EMISSION RELEASE PARAMETERS IN METRIC UNITS (ENGLISH UNITS IN PARENTHESES).								
Release Point	**Description**	**UTM[a] Coordinates**		**Stack Height in m (ft)[c]**	**Stack Exhaust Temp. in K (°F)[d]**	**Stack Exhaust Velocity in m/sec (fps)[e]**	**Stack Diameter in m (ft)**	**Orient. Of Release[f]**
		Easting-X in m[b]	**Northing-Y in m**					
	Regeneration Kiln (Drum)			(55.0)	(150.0)	(16.6)	(0.49)	
CKB	Carbon Regeneration Kiln (Burners)	631,998	4,974,042	14.0 (46.0)	455.4 (360.0)	5.8 (18.9)	0.30 (0.98)	D
EW	Electrowinning Cells and Pregnant Solution Tank	631,983	4,974,033	16.8 (55.0)	310.9 (100.0)	24.2 (79.4)	0.30 (0.98)	D
MR	Mercury Retort	632,003	4,974,001	16.8 (55.0)	338.7 (150.0)	1.5 (5.1)	0.09 (0.30)	D
MF	Induction Melting Furnace	632,032	4,974,019	16.8 (55.0)	338.7 (150.0)	21.5 (70.6)	0.38 (1.25)	D
EDG1	Camp Emergency Generator (Mfr. Yr. >2007; diesel)	634,274	4,972,050	2.1 (7.0)	866.5 (1,100.0)	29.7 (97.4)	0.46 (1.51)	D
EDG2	Plant Emergency Generator #1 (Mfr. Yr. >2007; diesel)	632,105	4,974,154	2.1 (7.0)	866.5 (1,100.0)	29.7 (97.4)	0.46 (1.51)	D
EDG3	Plant Emergency Generator #2 (Mfr. Yr. >2007; diesel)	632,109	4,974,148	2.1 (7.0)	866.5 (1,100.0)	29.7 (97.4)	0.46 (1.51)	D
EDFP	Mill Fire Pump (Mfr. Yr. >2009; diesel)	632,113	4,974,141	2.1 (7.0)	866.5 (1,100.0)	23.8 (78.0)	0.23 (0.75)	D
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	632,216	4,974,118	20.7 (68.0)	455.4 (360.0)	1.6 (5.2)	0.12 (0.39)	D
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	632,017	4,974,010	14.0 (46.0)	455.4 (360.0)	7.5 (24.8)	0.40 (1.31)	D
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	632,287	4,974,227	2.1 (7.0)	455.4 (360.0)	6.0 (19.8)	0.40 (1.31)	D
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	632,288	4,974,228	2.1 (7.0)	455.4 (360.0)	20.8 (68.3)	0.21 (0.69)	D
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	632,168	4,974,191	43.0 (141.0)	455.4 (360.0)	28.3 (92.9)	0.09 (0.30)	D
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	632,238	4,974,130	20.7 (68.0)	455.4 (360.0)	7.1 (23.3)	0.09 (0.30)	D
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	632,008	4,974,026	14.0 (46.0)	455.4 (360.0)	7.1 (23.3)	0.09 (0.30)	D
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	632,038	4,973,751	6.4 (21.0)	455.4 (360.0)	7.1 (23.3)	0.09 (0.30)	D

Table 13. PROCESS AND ANCILLARY POINT SOURCE EMISSION RELEASE PARAMETERS IN METRIC UNITS (ENGLISH UNITS IN PARENTHESES).								
Release Point	**Description**	**UTM[a] Coordinates**		**Stack Height in m (ft)[c]**	**Stack Exhaust Temp. in K (°F)[d]**	**Stack Exhaust Velocity in m/sec (fps)[e]**	**Stack Diameter in m (ft)**	**Orient. Of Release[f]**
		Easting-X in m[b]	**Northing-Y in m**					
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	631,889	4,973,472	12.5 (41.0)	455.4 (360.0)	1.3 (4.3)	0.21 (0.69)	D
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	631,848	4,973,398	12.5 (41.0)	455.4 (360.0)	5.2 (17.1)	0.21 (0.69)	D
HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	632,060	4,973,664	12.5 (41.0)	455.4 (360.0)	5.2 (17.1)	0.21 (0.69)	D
PSL	Prill Silos Loading (2 x 100 ton)	632,346	4,973,500	7.8 (25.5)	0.0 (-459.7)	18.1 (59.4)	0.15 (0.49)	D
CS1L	Cement/Shotcrete Silo #1 Loading	632,095	4,974,272	13.3 (43.7)	0.0 (-459.7)	24.1 (78.9)	0.15 (0.49)	D
CS2L	Cement/Shotcrete Silo #2 Loading	632,095	4,974,272	13.3 (43.7)	0.0 (-459.7)	24.1 (78.9)	0.15 (0.49)	D
LS6	Limestone transfer to Ball Mill Feed Bin	632,181	4,974,307	8.8 (29.0)	0.0 (-459.7)	0.001 (0.003)	0.30 (0.98)	D
LSBM	Limestone Ball Mill	632,215	4,974,248	21.3 (70.0)	0.0 (-459.7)	26.7 (87.5)	0.61 (2.00)	D
LS9	Limestone transfer to Kiln Feed Bin	632,169	4,974,325	8.8 (29.0)	0.0 (-459.7)	0.001 (0.003)	0.30 (0.98)	D
LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	632,057	4,974,265	45.7 (150.0)	449.8 (350.0)	26.4 (86.5)	0.61 (2.00)	D
LKC	PFR Shaft Lime Kiln Combustion	632,057	4,974,265	45.7 (150.0)	449.8 (350.0)	26.4 (86.5)	0.61 (2.00)	D
LCR	Lime Mill Crushing and associated transfers In and Out	632,073	4,974,233	15.2 (50.0)	0.0 (-459.7)	28.7 (94.3)	0.23 (0.75)	D
LSL	Pebble Lime Silo Loading via Bucket Elevator	632,069	4,974,206	8.8 (29.0)	0.0 (-459.7)	4.1 (13.4)	0.10 (0.33)	D

a. Universal Transverse Mercator.
b. m: meters.
c. ft: feet.
d. K: Kelvin; °F: degrees Fahrenheit.
e. m/sec: meters per second; fps: feet per second.
f. D: default (vertical, uninterrupted release); R: raincap; H: horizontal.
g. The exhaust temperature for the new silo was set to 0 K. This triggers AERMOD to use the actual temperatures from the meteorological data input files.

Table 14. PROCESS AND ANCILLARY VOLUME SOURCE EMISSION RELEASE PARAMETERS IN METRIC UNITS (ENGLISH UNITS IN PARENTHESES).							
Release Point	**Description**	**UTM[a] Coordinates**		**Release Height in m (ft)[c]**	**Init. Horiz. Dim. in m (ft)**	**Init. Vert. Dim. in m (ft)**
		Easting-X in m[b]	**Northing-Y in m**			
OC1	Loader Transfer of Ore to Grizzly	632,045	4,974,583	19.5 (64.0)	3.8 (12.3)	18.1 (59.5)
OC2	Grizzly to Apron Feeder	632,045	4,974,583	19.5 (64.0)	3.8 (12.3)	18.1 (59.5)
OC3	Apron Feeder to Dribble Conveyor	632,045	4,974,583	19.5 (64.0)	3.8 (12.3)	18.1 (59.5)
OC4	Apron Feeder to Vibrating Grizzly	632,045	4,974,583	19.5 (64.0)	3.8 (12.3)	18.1 (59.5)
OC5	Dribble Conveyor to Vibrating Grizzly	632,045	4,974,583	19.5 (64.0)	3.8 (12.3)	18.1 (59.5)
OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	632,045	4,974,583	19.5 (64.0)	3.8 (12.3)	18.1 (59.5)
OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	632,045	4,974,583	19.5 (64.0)	3.8 (12.3)	18.1 (59.5)
OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	631,947	4,974,520	10.9 (35.8)	0.2 (0.7)	10.2 (33.3)
OC9	Stockpile Transfers to Reclaim Conveyors	631,947	4,974,520	1.2 (4.0)	0.6 (1.9)	1.1 (3.7)
OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	631,947	4,974,520	1.2 (4.0)	0.6 (1.9)	1.1 (3.7)
OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	632,113	4,974,243	20.7 (69.0)	0.3 (0.9)	0.6 (1.9)
OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	632,028	4,974,187	3.0 (10.0)	2.3 (7.6)	2.8 (9.3)
OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	632,028	4,974,187	3.0 (10.0)	2.3 (7.6)	2.8 (9.3)
LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	632,095	4,974,272	1.4 (4.5)	0.1 (0.2)	0.1 (0.5)
MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	632,090	4,974,282	1.4 (4.5)	0.1 (0.2)	0.1 (0.5)
ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	632,267	4,974,124	1.4 (4.5)	0.1 (0.2)	0.1 (0.5)
ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	632,257	4,974,140	1.4 (4.5)	0.1 (0.2)	0.1 (0.5)
ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	632,248	4,974,156	1.4 (4.5)	0.1 (0.2)	0.1 (0.5)
ACS42 U	AC Lime Silo #4 Unloading to Lime Slaker	632,238	4,974,171	1.4 (4.5)	0.1 (0.2)	0.1 (0.5)
PSU	Prill Silos Unloading (2 x 100 ton)	632,346	4,973,500	1.4 (4.5)	0.1 (0.2)	0.1 (0.5)
CS1U	Cement/Shotcrete Silo #1 Unloading	632,095	4,974,272	1.5 (5.0)	5.1 (16.8)	1.4 (4.7)
CS2U	Cement/Shotcrete Silo #2 Unloading	632,095	4,974,272	1.5 (5.0)	5.1 (16.8)	1.4 (4.7)
CAL	Aggregate Bin Loading	632,095	4,974,272	1.5 (5.0)	5.1 (16.8)	1.4 (4.7)
CAU	Aggregate Bin Unloading	632,095	4,974,272	1.5 (5.0)	5.1 (16.8)	1.4 (4.7)
CM	Central Mixer Loading	632,095	4,974,272	1.5	5.1	1.4

Table 14. PROCESS AND ANCILLARY VOLUME SOURCE EMISSION RELEASE PARAMETERS IN METRIC UNITS (ENGLISH UNITS IN PARENTHESES).						
Release Point	**Description**	**UTM[a] Coordinates**		**Release Height in m (ft)[c]**	**Init. Horiz. Dim. in m (ft)**	**Init. Vert. Dim. in m (ft)**
		Easting-X in m[b]	**Northing-Y in m**			
				(5.0)	(16.8)	(4.7)
PCSP1	Portable Crushing and Screening Plant 1	632,348	4,973,429	2.1 (7.0)	13.1 (43.1)	2.0 (6.5)
PCSP2	Portable Crushing and Screening Plant 2	632,348	4,973,369	2.1 (7.0)	13.1 (43.1)	2.0 (6.5)
LS1	Limestone transfer to Primary Crusher Hopper	632,239	4,974,256	3.4 (11.3)	1.6 (5.2)	3.2 (10.5)
LS2	Primary Crushing and Associated Transfers In and Out	632,239	4,974,256	3.4 (11.3)	1.6 (5.2)	3.2 (10.5)
LS3	Primary Screening and Associated Transfers In and Out	632,239	4,974,256	3.4 (11.3)	1.6 (5.2)	3.2 (10.5)
LS4	Secondary Crushing and Associated Transfers In and Out	632,227	4,974,268	3.4 (11.3)	1.6 (5.2)	3.2 (10.5)
LS5	Secondary Screening and Associated Transfers In and Out	632,227	4,974,268	3.4 (11.3)	1.6 (5.2)	3.2 (10.5)
LS7	Limestone transfer to Ball Mill Feed Conveyor	632,181	4,974,307	1.1 (3.5)	0.1 (0.2)	0.4 (1.4)
LS8	Ball Mill Feed transfer to Ball Mill	632,200	4,974,273	8.5 (28.0)	0.3 (0.9)	0.6 (1.9)
LS10	Limestone transfer to Lime Kiln Feed Conveyor	632,169	4,974,325	1.1 (3.5)	0.1 (0.2)	0.4 (1.4)
LS11	Fines Screening and Associated Transfers In and Out	632,151	4,974,314	0.8 (2.5)	0.6 (1.9)	0.7 (2.3)
LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	632,056	4,974,285	20.7 (68.0)	0.3 (0.9)	0.6 (1.9)
LSU	Pebble Lime Silo discharge to Lime Slaker	632,069	4,974,206	1.1 (3.5)	0.1 (0.2)	0.4 (1.4)

a. Universal Transverse Mercator.
b. m: meters.
c. ft: feet.

3.1.9 Emission Release Parameter Justification

Modeled Process and Ancillary Point Sources

The pneumatic transfer silo loadings and bin transfers (LS1L, MillS2L, ACS1L, ACS2L, ACS3L, ACS4L, PSL, CS1L, CS2L, LS6, LSBM, LS9, LSL) were modeled as POINT sources with a 3-foot bin vent above standard silo height as release height. Exit velocity was estimated using the standard stack diameter and flow rates for similar sources (NDEP 2019) or 0.001 meter per second for horizontal exhaust. These sources were modeled with ambient exhaust temperature.

For propane-fired process (Sb1, ACB, CKB, PV, HS) and building heaters (H1M, H2M, HM, HAC, HR, HA, HMO, HTS, HW), exhaust flow rates were calculated using EPA Method 9 with 3% oxygen content and 15% moisture content. Standard stack diameters were selected based on the heater rating. The process heaters were modeled with a 10-foot stack above the building, whereas the building heaters were modeled with a release height of 1 foot above the respective buildings.

Similar source exhaust temperature, flow, and diameter from (NDEP 2017) were used for refinery sources, including the carbon regeneration kiln (CKD), electrowinning cells (EW), mercury retort (MR), and induction furnace (MF). Each of these sources was modeled with a 10- foot stack above the refinery building.

For emergency generators (EDG1, EDG2, EDG3) and the fire pump (EDFP), the exhaust flow rates were calculated using EPA Method 9 with 9% oxygen content and 8% moisture content. Standard stack diameters were selected based on engine rating. Each engine was modeled with a 7-foot-high stack.

Antimony bagging (Sb2), autoclave (AC), lime kiln (LK) (common stack with kiln burner (LKC)), and lime crushing (LCR) were characterized with similar source parameters from (NDEP 2015b), (APT 2013), and (NDEP 2010). Each of these sources was modeled with a 10-foot stack above its respective building.

Release parameters for the process and ancillary point sources were appropriately documented and justified. DEQ's source-group analysis (Table 27 in Section 4.1.4) suggests that the process and ancillary point sources contribute a small amount to the modeled design concentrations.

Modeled Process and Ancillary Volume Sources

For the following VOLUME source characterization discussion, release height was estimated as half of the vertical length (for example, building height), initial vertical dispersion was calculated by dividing the vertical length by the applicable EPA-recommended constant (EPA 2018c) for a single VOLUME source (4.3), and initial lateral dispersion was determined using the lesser lateral dimension (for example, building width) divided by the applicable EPA-recommended constant (EPA 2018c) for the surface source or elevated source with a building (2.15).

The sources associated with the primary crusher building, including loader transfer (OC1), grizzly feeder (OC2), apron feeders (OC3, OC4), ore transfers (OC5, OC6), and primary crusher (OC7), were characterized by the primary crusher building dimensions: 128' high and 52.9' wide.

The stockpile height (71.6') and the conveyor width (3') were used to determine the VOLUME source parameters for the stockpile feed conveyor (OC8).

Tunnel exit dimensions (8' high and 8' wide) were used to estimate the VOLUME release parameters for the stockpile transfer points (OC9, OC10). The SAG mill feed conveyor transfer (OC11) was characterized by a building opening (4' high and 4' wide) at the mid-height (70') of the mill building.

Pebble crusher building dimensions (20' high and 32.7' wide) were used to characterize the pebble crusher-associated sources (OC12, OC13).

Silo/bin unloading sources (LS1U, Mill2SU, ACS1U, ACS2U, ACS3U, ACS42U, PSU) were characterized by a typical screw discharge feeder characteristic, i.e., 5' above the ground with a 1' diameter.

Aggregate transfer and handling sources (CS1U, CS2U, CAL, CAU, CM) were characterized by the aggregate stockpile dimensions: 20' high and 72.2' wide.

Each portable crushing and screening plant was characterized by typical portable crushing and screening plant dimensions: 14' high and 185' wide.

Sources associated with limestone crushing (LS1, LS2, LS3, LS4, LS5) were characterized by the associated crusher building dimensions: 22.6' high and 22.6' wide.

The crushed limestone/pebble lime transfers (LS7, LS10, LSU) were characterized by a typical screw discharge to a conveyor characteristic, i.e., 5' above the ground, 3' drop, and a 1' diameter.

The limestone ball mill feed discharge (LS8) was characterized by a building opening (4' high and 4' wide) at the mid-height (30') of the ball mill building.
The limestone fines screening (LS11) was characterized by screen dimensions: 5' drop and 8' wide.

The limestone kiln feed (LS12) was characterized by a building opening (4' high and 4' wide) at the mid-height (70') of the kiln building.

Model input source characterization for fugitive emissions is described in Sections 3.1.5 and 3.1.6. Fugitive activity locations and their respective dimensions are provided in Table 10 and associated release parameters are listed in Table 11.

Release parameters for the process and ancillary volume sources were appropriately documented and justified. DEQ's source-group analysis (Table 27 in Section 4.1.4) suggests that the process and ancillary volume sources contribute a small amount to the modeled design concentrations.

3.2 Background Concentrations

Background concentrations are used if a cumulative NAAQS impact analysis is needed to demonstrate compliance with applicable NAAQS.

3.2.1 Onsite Particulate Monitoring

To establish background ambient air conditions for the SGP area, PRI developed an onsite monitoring program to collect site-specific meteorological parameters and determine ambient particulate matter ($PM_{2.5}$ and PM_{10}) concentrations at its Stibnite monitoring station.

In September 2015, PRI submitted the data collected at the Stibnite monitoring station for the period of November 2013 through June 2015 to DEQ. After reviewing the data and associated quality control procedures, DEQ concluded that the $PM_{2.5}$ and PM_{10} data collected at the Stibnite monitoring station satisfied the applicable regulatory requirements and approved the data to be used for background concentrations in the SGP air quality analyses (DEQ 2015). In its conclusions, DEQ recommended that the $PM_{2.5}$ and PM_{10} background concentrations should be based on calendar year 2014 instead of the complete dataset (November 2013 through June 2015).

DEQ-approved $PM_{2.5}$ and PM_{10} background concentrations, in units of micrograms per cubic meter ($\mu g/m^3$), are provided in Table 15. For 24-hour PM_{10}, the design value is the *second-highest* 24-hour average concentration in a given year. However, review of the Meteorological and Air Quality Data Summary for the SGP Monitoring Network (Perpetua Resources Idaho 2015) indicates that the DEQ-approved background for 24-hour PM_{10} (37.0 $\mu g/m^3$) is the *first-highest* 24-hour average concentration measured in 2014 (DEQ 2015). Therefore, using the first-high instead of the second-high as background adds a layer of conservatism to the cumulative NAAQS impact analyses for 24-hour PM_{10}.

Table 15. DEQ-APPROVED $PM_{2.5}$ AND PM_{10} BACKGROUND CONCENTRATIONS FOR SGP.			
Pollutant	**Averaging Time**	**Background Concentration (μg/m³)**	**Design Value Rank**
$PM_{2.5}$	1 year	3.5	Weighted average of quarterly means
	24 hours	15.0	98th percentile/8th high
PM_{10}	24 hours	37.0	Highest 1st high

3.2.2 Gaseous Pollutant Background Concentrations

With a few exceptions of very large facilities or facilities located in nonattainment areas, regulatory agencies do not require the collection of gaseous criteria pollutants, including CO, NOx (and/or nitrogen dioxide [NO_2]), O_3, and SO_2. For these gaseous pollutants, data collected at government-regulated monitoring stations located in settings similar to the project area in terms of terrain, land use, and proximity of emission sources are typically used to establish background concentrations.

To determine representative background concentrations of CO, NOx, O_3, and SO_2 for the SGP site, which is located in a remote rural area, the DEQ-maintained ambient monitoring network was reviewed by Air Sciences. This review revealed that DEQ only conducts limited trace monitoring for CO, NOx, O_3, and SO_2 in the Boise metropolitan area along the Interstate 84 corridor. Thus, the data collected at these monitors are exposed to high emissions from industrial, urban, and transportation sources (DEQ 2015a) (DEQ 2018). For this reason, the gaseous pollutant concentrations recorded at these urban monitoring locations were not considered to be representative of a rural area, like the SGP site.

The EPA-maintained monitoring stations (EPA 2018a) in Idaho and surrounding states also were reviewed by Air Sciences to determine representative gaseous pollutant background concentrations for the SGP site. This review also did not identify any representative monitoring station to establish background gaseous pollutant concentrations for the SGP site.

The DEQ-recommended (DEQ 2019) CO, NOx, O_3, and SO_2 background concentrations for the SGP air quality analyses in units of parts per billion (ppb) and μg/m³, are provided in Table 16. These background concentrations were obtained from the Northwest International Air Quality Environmental Science and Technology Consortium (NW AIRQUEST; https://arcg.is/1jXmHH) online tool using the project site coordinates. These background air pollutant levels are based on regional-scale air pollution modeling of pollutants in Washington, Oregon, and Idaho, with modeling results adjusted according to available monitoring data.

Table 16. DEQ-RECOMMENDED GASEOUS POLLUTANT BACKGROUND CONCENTRATIONS FOR SGP.				
Pollutant	**Averaging Time**	**Background Concentration**		**Reference**
		(ppb)	**(μg/m³)**	
CO	8 hours	970	1,110	NW AIRQUEST, 2014-2017 design value
	1 hour	1,520	1,740	
NO_2	1 year	0.5	0.9	
	1 hour	2.3	4.3	
O_3 (for NO_2 modeling)	8 hours	55	107.9	
SO_2	3 hours	6.4	16.8	
	1 hour	4.7	12.3	

3.2.3 Medium-Traffic Pollutant Background Concentrations

For additional information, background concentrations were obtained from NW AIRQUEST for the road section between mile markers 143 and 144 on Highway 55 passing through the town of McCall. This site (latitude 44.906° N, longitude 116.098° W) is approximately 38 miles west of the SGP. The annual average daily traffic count for this road section is over 10,000 vehicles per day. Table 17 provides the background concentrations for this medium-traffic site. Although these concentrations are not representative of the rural SGP area, they do provide additional information regarding the relative contribution of traffic emissions.

Table 17. MEDIUM-TRAFFIC BACKGROUND CONCENTRATIONS.

Pollutant	Averaging Time	Background Concentration (ppb)	Background Concentration ($\mu g/m^3$)	Reference
CO	8 hours	1,000	1,145	NW AIRQUEST, 2014-2017 design value, near McCall, ID (44.91°N, 116.10°W)
	1 hour	1,570	1,797	
NO_2	1 year	1.4	2.6	
	1 hour	7.6	14.3	
$PM_{2.5}$	1 year	--	5.1	
	24 hours	--	17.5	
PM_{10}	24 hours	--	60.1	
SO_2	3 hours	6.4	16.8	
	1 hour	4.7	12.3	

3.3 Impact Modeling Methodology

This section describes the modeling methods used by the applicant/consultant to demonstrate preconstruction compliance with applicable air quality standards.

3.3.1 General Overview of Impact Analyses

Air Sciences performed the project-specific air pollutant emission inventory and air impact analyses that were submitted with the application. The submitted information/analyses, in combination with results from DEQ's air impact analyses, demonstrate compliance with applicable air quality standards to DEQ's satisfaction, provided the facility is operated as described in the submitted application and in this memorandum.

Table 18 provides a brief description of parameters used in the modeling analyses.

Table 18. MODELING PARAMETERS.

Parameter	Description/Values	Documentation/Addition Description
General Facility Location	Stibnite, Idaho	The area is an attainment or unclassified area for all criteria pollutants.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 19191.
Meteorological Data	Onsite and McCall, Idaho surface data; Boise, Idaho upper air data	See Section 3.3.5 of this memorandum for additional details of the meteorological data.
Terrain	Considered	1/3 arc second National Elevation Dataset (NED) was acquired from the USGS for the surrounding area. AERMAP version 18081 was used to process terrain elevation data for all buildings and receptors. See Section 3.3.6 for more details.
Building Downwash	Considered	Plume downwash was considered for the structures associated with the

		facility. BPIP-PRIME was used to evaluate building dimensions for consideration of downwash effects in AERMOD. See Section 3.3.7.
NOx Chemistry	Ozone Limiting Method	See Section 3.3.8.
Receptor Grid	**SIL Analysis** A SIL analysis was not performed.	
	Cumulative NAAQS Impact Analysis The selection of receptors for use in the cumulative NAAQS impact analysis is as follows (see Section 3.3.12):	
	Boundary	25-meter (m) spacing
	Grid 1	50-m spacing, 0.25 kilometers (km) out
	Grid 2	100-m spacing, 0.25 km to 1.25 km out
	Grid 3	500-m spacing, 1.25 km to 5 km out
	Grid 4	1,000-m spacing, 5 km to 10 km out
	Hotspot	25-m spacing, 200-m × 200-m around highest model impacts
	TAPs Analysis The receptor network used in the cumulative NAAQS impact analysis was also used in the TAPs analysis.	

3.3.2 Modeling Protocol

A modeling protocol for the SGP analyses was submitted to DEQ prior to the application, on May 30, 2019. The protocol was submitted by Brown and Caldwell on behalf of PRI. Conditional DEQ protocol approval was provided to Brown and Caldwell on June 27, 2019.

3.3.3 Modeling Methodology

Project-specific modeling and other required impact analyses were generally conducted using data and methods described in the *Idaho Air Quality Modeling Guideline* (DEQ 2013).

3.3.4 Model Selection

Idaho Air Rules Section 202.02 requires that estimates of ambient concentrations be based on air quality models specified in *Appendix W*. The refined, steady-state, multiple-source, Gaussian dispersion model AERMOD was promulgated as the replacement model for ISCST3 in December 2005. AERMOD retains the single straight-line trajectory of ISCST3, but it includes more advanced algorithms to assess turbulent mixing processes in the planetary boundary layer for both convective and stable stratified layers.

AERMOD version 19191 was used by Air Sciences for the modeling analyses to evaluate impacts of the facility. This version was the current version at the time the application was received by DEQ.

3.3.5 Meteorological Data

AERMOD requires an input of hourly meteorological data to estimate pollutant concentrations in ambient air resulting from modeled source emissions. These data are commonly obtained from National Weather Service (NWS) stations at airports throughout the state. Applicants select data from an airport site that is determined to be reasonably representative of the permitted site location. Collection of meteorological data from the permitted site is not typically required by DEQ for minor source permit applications. The collection of one year of onsite data is required for permitting projects subject to the Prevention of Significant Deterioration (PSD) program, which is triggered by larger non-fugitive emission quantities.

Site-specific hourly surface meteorological data were collected and used in air impact analyses for this project, as described in the submitted modeling report. These data were collected from January 1, 2014 through December 31, 2014 at the Stibnite monitoring station. They were collected for analyses supporting an Environmental Impact Statement (EIS) and the Idaho DEQ minor source permit.

The site-specific surface data were supplemented with the twice-daily upper-air data (all levels) collected at the National Weather Service (NWS) station in Boise, Idaho (WBAN 24131).

These meteorological datasets were processed with the most recent version (19191) of the AERMOD meteorological pre-processor, AERMET, to produce AERMOD-input-ready hourly surface and profile meteorological files. The default option of adjusted surface friction velocity (ADJ_U*) and the Bulk Richardson (BULKRN) method for boundary layer parameter calculations was used for this meteorological data processing.

Additionally, an alternative meteorological dataset was processed without using the BULKRN method (NON-BULKRN). This alternate processing used the onsite and upper air datasets discussed above, supplemented with the cloud-cover data collected at the NWS station in McCall, Idaho (WBAN 94182).

Both processing methods (BULKRN and NON-BULKRN) are considered default for regulatory modeling analyses. EPA Region X Regional Modeling Contact, Jay McAlpine, PhD, was consulted for guidance on which data processing procedure to require for the analyses supporting the Idaho PTC. The BULKRN method was used for air impact analyses supporting the EIS after consultation with EPA, DEQ, and the US Forest Service. EPA recommended (June 18, 2019, email from Jay McAlpine, EPA, to Kevin Schilling, DEQ) using the BULKRN method since “use of the onsite data best fulfills the Guidance, and ensures consistency with the EIS, but this should be looked upon as technical advice only and not a requirement of the EPA.”

Compliance with all NAAQS was easily demonstrated using meteorological data processed by the NON-BULKRN method; however, a small number of receptors showed 24-hour PM_{10} violations when the meteorological data processed with BULKRN method was used. DEQ performed a weight of evidence analyses (see Section 4.1.4 of this memorandum) to further evaluate the confidence of NAAQS compliance, using sensitivity analyses of various model input variables and the meteorological data processed using the BULKRN method.

AERMET requires the input of three surface boundary layer parameters: midday Bowen ratio (B_o), midday albedo (r), and surface roughness length (z_o). These parameters are dependent on the land use and vegetative cover of the area being evaluated. The EPA-recommended model, AERSURFACE, was used to estimate these surface parameters for the Stibnite meteorological data processing. AERSURFACE uses 1992 National Land Cover Data to determine these surface characteristics.

The determination of B_o is dependent on ambient moisture conditions (i.e., wet, average, or dry). For this purpose, historic 30-year (1985–2014) precipitation data from the Taylor Ranch station in Idaho (the closest station from which this type of data is available) were used.

The 70^{th} and 30^{th} percentile values estimated from the 30-year precipitation data were used to assign a moisture class to each calendar month per the following scheme: monthly precipitation greater than the 70^{th} percentile was considered “wet”; between the 70^{th} and 30^{th} percentiles was considered “average”; and less than the 30^{th} percentile was considered “dry.” The monthly season and moisture classifications and estimated r and B_o for 2014 Stibnite meteorological data processing are presented in Table 19.

Table 19. 2014 MONTHLY SEASON AND MOISTURE CLASSIFICATION, AND CALCULATED *r* AND B_O.							
Month	**Season**	***r***	**30-Year Precipitation Percentile (in)**		**2014 Precipitation (in)**	**Moisture Classification**	***Bo***
			30th	**70th**			
January	Winter	0.38	0.64	1.29	0.74	Average	0.50
February	Winter	0.38	0.40	0.81	0.99	Wet	0.50
March	Spring	0.13	0.83	1.23	2.33	Wet	0.34
April	Spring	0.13	1.11	1.57	0.99	Dry	1.57
May	Spring	0.13	1.43	2.23	0.74	Dry	1.57
June	Summer	0.13	1.17	1.80	1.32	Average	0.37
July	Summer	0.13	0.46	1.45	0.40	Dry	0.76
August	Summer	0.13	0.42	1.11	2.03	Wet	0.25
September	Fall	0.13	0.27	1.23	0.43	Average	0.87
October	Fall	0.13	0.59	1.69	1.75	Wet	0.35
November	Fall	0.13	0.72	1.44	3.73	Wet	0.35
December	Winter	0.38	0.64	1.16	0.83	Average	0.50

The seasonal z_o values in m for each 30-degree sector of the 1-km radius for the Stibnite monitoring station are provided in Table 20 (i.e., Sector 1 is 0° to 30° clockwise from the north, Sector 2 is 30° to 60° clockwise from the north, etc.).

Table 20. CALCULATED SEASONAL z_O VALUES (m).				
Sector	**Winter**	**Spring**	**Summer**	**Fall**
1	0.410	0.564	0.610	0.607
2	0.212	0.347	0.392	0.387
3	0.517	0.640	0.671	0.669
4	0.769	0.865	0.894	0.894
5	0.989	1.044	1.055	1.055
6	0.741	0.874	0.918	0.915
7	0.400	0.563	0.617	0.614
8	0.414	0.522	0.552	0.550
9	0.049	0.171	0.244	0.243
10	0.060	0.197	0.274	0.274
11	0.183	0.372	0.449	0.449
12	0.576	0.710	0.743	0.742

Winter = December, January, February
Spring = March, April, May
Summer = June, July, August
Fall = September, October, November

Wind frequency distribution for the 2014 Stibnite meteorological dataset is presented in Figure 5, and a map showing the location of the meteorological monitoring stations used for this meteorological data processing is presented in Figure 6.

Figure 5. WIND FREQUENCY DISTRIBUTION FOR 2014 SGP METEOROLOGICAL DATA (NON-BULKRN).

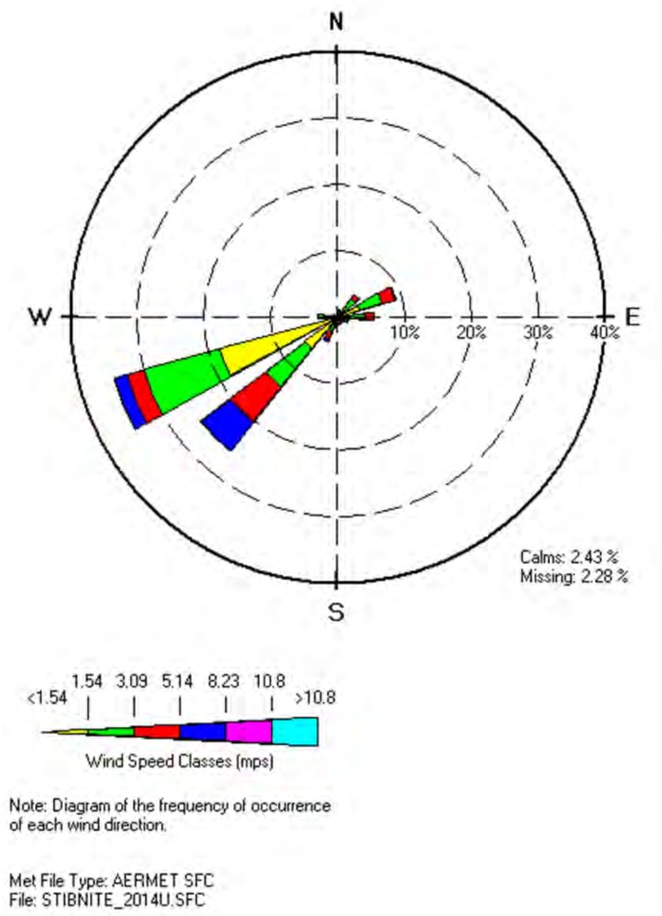


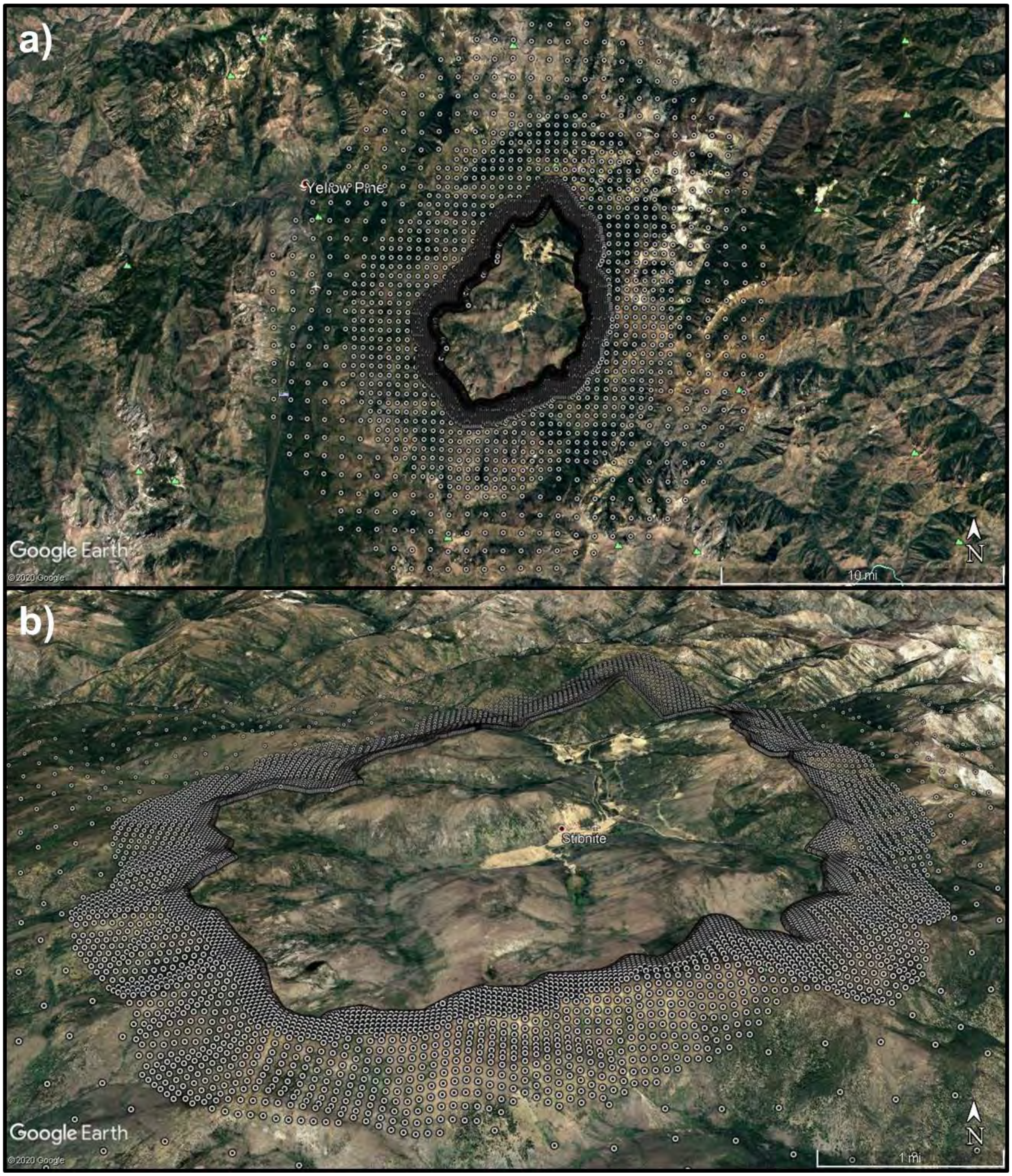
Figure 6. METEOROLOGICAL STATION LOCATIONS FOR SGP MODELING.

3.3.6 Effects of Terrain on Modeled Impacts

Submitted ambient air impact analyses used terrain data extracted from United States Geological Survey (USGS) National Elevation Dataset (NED) files.

The terrain preprocessor AERMAP version 18081 was used by Air Sciences to extract the elevations from the NED files and assign them to receptors in the modeling domain in a format usable by AERMOD. AERMAP also determined the hill-height scale for each receptor. The hill-height scale is an elevation value based on the surrounding terrain which has the greatest effect on that individual receptor. AERMOD uses those heights to evaluate whether the emission plume has sufficient energy to travel up and over the terrain or if the plume will travel around the terrain. Figure 7a depicts the full receptor grid used in the modeling analyses and Figure 7b illustrates a close-up of Figure 7a, overlaid on a terrain image from Google Earth.

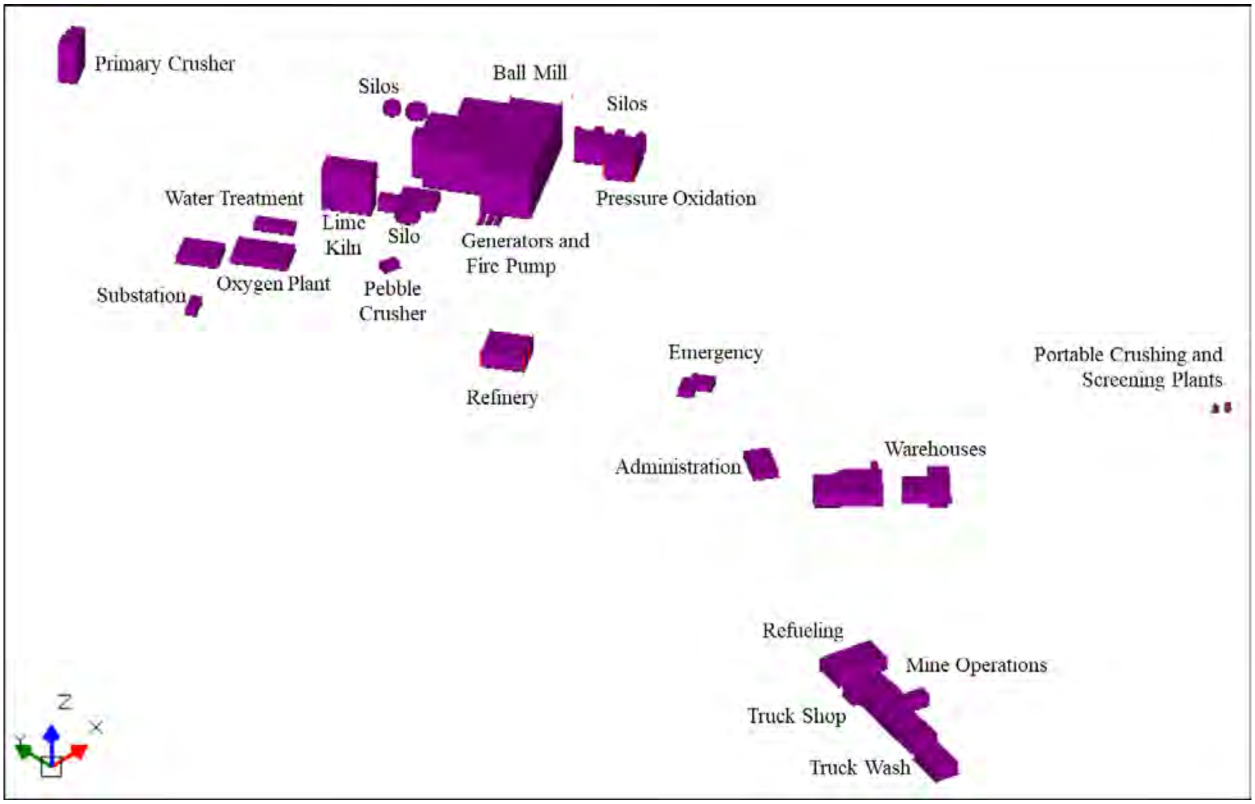
Figure 7. RECEPTOR GRID CENTERED AT THE SGP FACILITY.



3.3.7 Facility Layout and Downwash

Figure 3 shows the processing and refining area buildings and sources at the SGP facility. Figure 8 below depicts a three-dimensional view of Figure 3, as viewed from the southwest.

Figure 8. THREE-DIMENSIONAL VIEW OF PROCESSING AND REFINING AREA BUILDINGS AND SOURCES AT THE SGP FACILITY AS VIEWED FROM THE SOUTHWEST.



DEQ verified proper identification of the site location and the ambient air boundary by comparing a graphical representation of the modeling input file to aerial photographs on Google Earth (available at https://www.google.com/earth).

Potential downwash effects on emission plumes were accounted for in the model by using building dimensions and locations (locations of building corners, base elevation, and building heights). Dimensions and orientation of proposed buildings were used as input to the Building Profile Input Program for the Plume Rise Model Enhancements downwash algorithm (BPIP-PRIME version 04274) to calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information for input to AERMOD.

3.3.8 NOx Chemistry

The atmospheric chemistry of NO, NO_2, and O_3 complicates accurate prediction of NO_2 impacts resulting from NOx emissions. The conversion of NO to NO_2 can be conservatively addressed through the use of several methods as outlined in a *2014 EPA NO_2 Modeling Clarification Memorandum* (EPA 2014). The guidance outlines a three-tiered approach:

- Tier 1 – assume full conversion of NO to NO_2 where total NOx emissions are modeled and modeled impacts are assumed to be 100 percent NO_2.

- Tier 2 – use an ambient ratio to adjust impacts from the Tier 1 analysis.

- Tier 3 – use a detailed screening method to account for $NO/NO_2/O_3$ chemistry such as the Ozone Limiting Method (OLM) or the Plume Volume Molar Ratio Method (PVMRM).

The default option of the Ozone Limiting Method (OLM), a third-tier method from 40 CFR 51, *Appendix W*, was used by Air Sciences to estimate the NO_2 1-hour and annual impacts for these analyses. The OLM method requires an input of in-stack NO_2/NOx ratio for each modeled source.

An in-depth literature review was conducted by Air Sciences to identify reasonable NO_2/NOx ratios for different combustion source categories. Based on this research, the NO_2/NOx ratio recommended for the heavy-duty diesel trucks in the California Air Pollution Control Officers Association (CAPCOA) Guidance Document (CAPCOA 2011) was selected for stationary diesel combustion sources. This NO_2/NOx ratio (11 percent) is conservatively higher than the diesel combustion NO_2/NOx ratio provided in the EPA ISR (In-Stack Ratio) database: 6 percent average, 9.8 percent maximum. The CAPCOA document and the EPA ISR database do not provide an NO_2/NOx ratio for propane boilers. The CAPCOA-recommended NO_2/NOx ratio for natural gas boilers was selected for the propane boilers. The natural gas boilers NO_2/NOx ratio is considered appropriate for the propane boilers because both are gaseous fuels with relatively similar combustion characteristics and are expected to have similar NO_2/NOx ratios. The NO_2/NOx ratio for blasting is based on blasting plume measurements provided in an Australian study (CSIRO 2008). The NO_2/NOx ratios used for the SGP NO_2 analyses are presented in Table 21.

Table 21. NO_2/NOx RATIOS.

Source Type	NO_2/NOx Ratio	Reference
Blasting	0.036	Commonwealth Scientific and Industrial Research Organization (CSIRO 2008)
Diesel Engines	0.11	CAPCOA Guidance Document, heavy-duty diesel trucks (CAPCOA 2011)
Propane Heaters	0.10	CAPCOA Guidance Document, natural gas boilers (CAPCOA 2011)

DEQ performed a sensitivity analysis using a Tier 2 screening method (ARM2), which is more conservative than OLM, and found that the SGP facility is safely below the 1-hour and annual NO_2 NAAQS. Results are summarized in Section 4.1.3.

3.3.9 Particulate Deposition

For $PM_{2.5}$ and PM_{10} analyses, default particulate modeling methods, including deposition (Method 1, to account for depletion due to particulate settling), were used. To account for particulate settling, AERMOD requires the following source-specific variables:

1. Mass-mean aerodynamic particle diameter (PARTDIAM) for each particle size bin
2. Mass fraction (MASSFRAX) for each particle size bin
3. Particle density (PARTDENS) for each particle size bin

A list of references that were used to develop the broad source category particle size bins and associated mass fractions was provided in the application. PRI (Perpetua Resources Idaho 2017b) provided the ore and DR material densities. The diesel and propane combustion particulate densities were adopted from technical literature (UMN 2002) and (Khalizov et al. 2012), respectively. Densities for the remaining materials were obtained from the Engineering Toolbox (https://www.engineeringtoolbox.com/density-materials-d_1652.html). An average density was used when a material-specific density range was available.

For sources that were aggregated and modeled as activity locations, deposition parameters were selected for the dominant source within the activity location. For open-pits (YPP, HFP, WEP), approximately 90% of emissions were associated with drilling; therefore, drilling deposition parameters were assigned to these sources. Similarly, emissions from dozing accounted for over 70% of emissions in the DRSF (FDRSF, HFDRSF, WEDRSF) and BT; therefore, these sources were assigned deposition parameters based on a dozing particulate profile.

The deposition parameters including mass fractions, mass mean diameters, and densities for the different source categories/groups are provided in Table 22.

Table 22. DEPOSITION PARAMETERS BY SOURCE CATEGORY.

Source Category	**Parameter**	**PM_{10}**				**$PM_{2.5}$**	
		Bin 1	**Bin 2**	**Bin 3**	**Bin 4**	**Bin 1**	**Bin 2**
Haul Roads	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction	0.10	0.90	--	--	1.00	--
	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (YPP, HFP, WEP DR average)	2.46	2.46	--	--	2.46	--
Material Handling (Ore, DR, Limestone)	Bin Upper Diameter (µm)	2.50	5.00	10.00	--	2.50	--
	Mass Fraction	0.15	0.42	0.43	--	1.00	--
	Mass Mean Diameter (µm)	2.50	5.00	10.00	--	2.50	--
	Density (g/cm^3) (Ore)	Pit-specific, see Table 23.					
	Density (g/cm^3) (Ore and Waste)	Pit-specific, see Table 23.					
	Density (g/cm^3) (Limestone)	1.09	1.09	1.09	--	1.09	--
Baghouses	Bin Upper Diameter (µm)	2.50	6.00	10.00	--	2.50	--
	Mass Fraction	0.28	0.50	0.22	--	1.00	--
	Mass Mean Diameter (µm)	2.50	6.00	10.00	--	2.50	--
	Density (g/cm^3) (Ore)	Pit-specific, see Table 23.					
Diesel Engines	Bin Upper Diameter (µm)	1.00	2.50	6.00	10.00	1.00	2.50
	Mass Fraction	0.85	0.08	0.03	0.03	0.91	0.09
	Mass Mean Diameter (µm)	1.00	2.50	6.00	10.00	1.00	2.50
	Density (g/cm^3) (Diesel Combustion)	1.00	1.00	1.00	1.00	1.00	1.00
Heaters and Boilers	Bin Upper Diameter (µm)	1.00	2.50	6.00	10.00	1.00	2.50
	Mass Fraction	0.29	0.28	0.32	0.11	0.51	0.49
	Mass Mean Diameter (µm)	1.00	2.50	6.00	10.00	1.00	2.50
	Density (g/cm^3) (Propane Combustion)	1.24	1.24	1.24	1.24	1.24	1.24
Lime Loading and Unloading (Quick, Pebble)	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction	0.15	0.85	--	--	1.00	--
	Mass Mean Diameter	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (Quick)	0.44	0.44	--	--	0.44	--
	Density (g/cm^3) (Pebble)	0.96	0.96	--	--	0.96	--
Lime Unloading (Quick, Pebble)	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction	0.15	0.85	--	--	1.00	--
	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (Quick)	0.44	0.44	--	--	0.44	--
	Density (g/cm^3) (Pebble)	0.96	0.96	--	--	0.96	--
Cement and	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--

Table 22. DEPOSITION PARAMETERS BY SOURCE CATEGORY.							
Source Category	**Parameter**	**PM_{10}**				**$PM_{2.5}$**	
		Bin 1	**Bin 2**	**Bin 3**	**Bin 4**	**Bin 1**	**Bin 2**
Aggregate Loading and Unloading	Mass Fraction	0.15	0.85	--	--	1.00	--
	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (Cement)	1.44	1.44	--	--	1.44	--
	Density (g/cm^3) (Aggregate)	1.28	1.28	--	--	1.28	--
Prill Loading and Unloading	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction	0.15	0.85	--	--	1.00	--
	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (Prill)	0.84	0.84	--	--	0.84	--
Refining Processes	Bin Upper Diameter (µm)	1.00	2.50	6.00	10.00	1.00	2.50
	Mass Fraction	0.78	0.11	0.08	0.03	0.88	0.12
	Mass Mean Diameter (µm)	1.00	2.50	6.00	10.00	1.00	2.50
	Density (g/cm^3) (Diesel Combustion)	1.00	1.00	1.00	1.00	1.00	1.00
Portable Crushing and Screening Plant	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction	0.13	0.87	--	--	1.00	--
	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (YPP, HFP, WEP DR average)	2.46	2.46	--	--	2.46	--
Lime Kiln and Ball Mill	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction (Kiln)	0.49	0.51	--	--	1.00	--
	Mass Fraction (Ball Mill)	0.36	0.64	--	--	1.00	--
	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3)	1.09	1.09	--	--	1.09	--
Blasting and Drilling	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction	0.06	0.94	--	--	1.00	--
	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (Ore or DR)	Pit-specific, see Table 23.					
Dozing	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction	0.55	0.45	--	--	1.00	--
	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (DR)	Pit-specific, see Table 23.					

In order to account for variability in ore and DR densities for different pits, pit-specific densities were used for the ore and DR for each modeling scenario, with the following exception – for haul roads, access roads, and portable crushers, the average DR density from YPP, HFP, and WEP was used. Note that the BT density was excluded from those sources because the BT material will not be used for roads or construction. The pit-specific ore and DR densities are provided in Table 23.

Table 23. PIT-SPECIFIC ORE AND DEVELOPMENT ROCK DENSITIES FOR DEPOSITION.		
Pit	**Material**	**Density (g/cm^3)**
YPP	Ore	2.59
BT	Ore	2.00
HFP	Ore	2.59
WEP	Ore	2.68
YPP	DR	2.48
BT	DR	2.00
HFP	DR	2.34
WEP	DR	2.57
Average (YPP,HFP, WEP)	DR	2.46

3.3.10 Ambient Air Boundary

Ambient air is defined in Section 006 of the Idaho Air Rules as "that portion of the atmosphere, external to buildings, to which the general public has access."

PRI will legally control the SGP, an active industrial site where mining activities will occur, such as heavy equipment operation. Most areas of the mine will require strict safety protocols and controlled access. PRI has established an operations boundary to identify the area where public access will be excluded. Public access inside the operations boundary will be restricted for the life of the mine by physical barriers at points of potential access, including the current Stibnite Road point of entry and proposed site access via the Burntlog Route, as well as natural features of the landscape that prevent access. Consistent with the guidance provided in the EPA's draft revised policy on ambient air (EPA 2018b), public access control will include the following measures:

- Primary Access Points: The Stibnite Road (north) and Burntlog Route (south) access points will include locked gates. Guard shacks will be located at each gate to monitor all vehicle ingress/egress. Each gate also will include appropriate adjacent barriers (i.e., fencing, bollards, boulders, or other barriers) to prevent any vehicle from circumventing the gate and gaining site access. These primary access points are also controlled by adjacent natural features, such as streams and creeks, steep topography, and areas of thick vegetation and undergrowth that serve as natural barriers or impediments to access.

- Secondary Access Points: Other potential access points, such as secondary roadways and trails, will include posted signs warning the public against entry into the site. At these locations, boulders will be placed across the trail and at an appropriate width adjacent to the trail to prevent any vehicle from circumventing the barrier. These secondary access points also incorporate adjacent natural features, such as streams and creeks, steep topography, and areas of thick vegetation and undergrowth that serve as natural barriers or impediments to access. Some mine features, such as the TSF and process plant areas, will include perimeter fencing.

- Surveillance: PRI security personnel will routinely patrol mine facilities and roadways for unauthorized individuals. In addition, all onsite personnel will be trained on the necessity of restricting public access to areas within the operations boundary. Any suspected trespassing by unauthorized individuals will be reported immediately to security, and trespassers will be escorted off the site.

In response to comments from local community citizens, PRI will manage an access route to provide the general public with limited access through the SGP site between Stibnite Road at Sugar Creek and Thunder Mountain Road at Meadow Creek (shown in Figure 2). This route will be managed in accordance with the Stibnite Road Access Management Plan which is summarized as follows:

The proposed Stibnite Road access route through the SGP site is meant to provide controlled through-site access that is safe, provides travel-time comparable to current conditions and is consistent with the United States Forest Service travel management plan. The Stibnite Road access route extends from the north entry point southward to the Administration, Warehouse and Storage Area. Continuing southward, the Stibnite Road access route incorporates the Burntlog access road segment that occurs within the operations area and extends to the south entry point as shown on Figure 2. PRI has the legal authority to control access to the Stibnite Road access route and would provide seasonal (non-winter conditions) access only. At the discretion of PRI, additional access controls may occur during various phases of construction, during mine operations that present potential safely hazards such as blasting, due to inclement weather, or under any other circumstances that may present a threat to the protection of public or employee health and safety. PRI has the legal and practical ability to enforce its control over roadway access and to monitor traffic passing through the SGP site. Signage will be placed at the North Security Gate (near the bridge over Sugar Creek) and the South Security Gate (near the Stibnite Lodge) to provide information to travelers, and guard shacks will be located at each gate to monitor all vehicle ingress/egress. Persons wishing to traverse the SGP site on the Stibnite Road access route will be required to check in at the security gate to receive a safety briefing and to alert mine staff of their presence. Travelers will be required to check out upon exiting the site to ensure passage through the site in a safe and timely manner. Travelers will not be allowed to stop or loiter while traveling though the operations area. Along its full length, the Stibnite Road access route would have appropriate signage to direct travelers and would be separated from mine haul roads and areas of mine operations by fencing, berms, or gates to prevent travelers from straying from the route. When possible and to the degree practicable, anticipated public access restrictions will be communicated to the public in a timely manner so that they may plan appropriately. Receptors on the Stibnite Road access route were not included in the SGP air quality analyses as this road is not considered ambient air.

The worker housing facility will be located within the project operations boundary, near the south access security gate. This housing facility will be used strictly for accommodating employees, contractors, and official visitors, and it will not be accessible to the general public. Therefore, the atmosphere over the land occupied by the worker housing facility is not considered ambient air, and receptors were not placed at this location for the air quality analyses.

The operations boundary, shown in Figure 2 above and Figure 9 below, was used to define the ambient air boundary for air dispersion modeling purposes.

3.3.11 Nearby Co-Contributing Sources

If impacts of neighboring emission sources on receptors showing a significant impact from the sources subject to the permitting action are not adequately accounted for by the background concentration used, then emissions from those sources must be modeled. The nearest significant permitted facility to SGP is Tamarack Mill, located more than 75 kilometers (km) west. This facility is located too far away to cause a significant concentration gradient along the periphery of the SGP and was therefore not included in the cumulative impact analyses for SGP.

3.3.12 Receptor Network

DEQ determined that the receptor grid used in the submitted modeling analyses was adequate to resolve maximum modeled impacts.

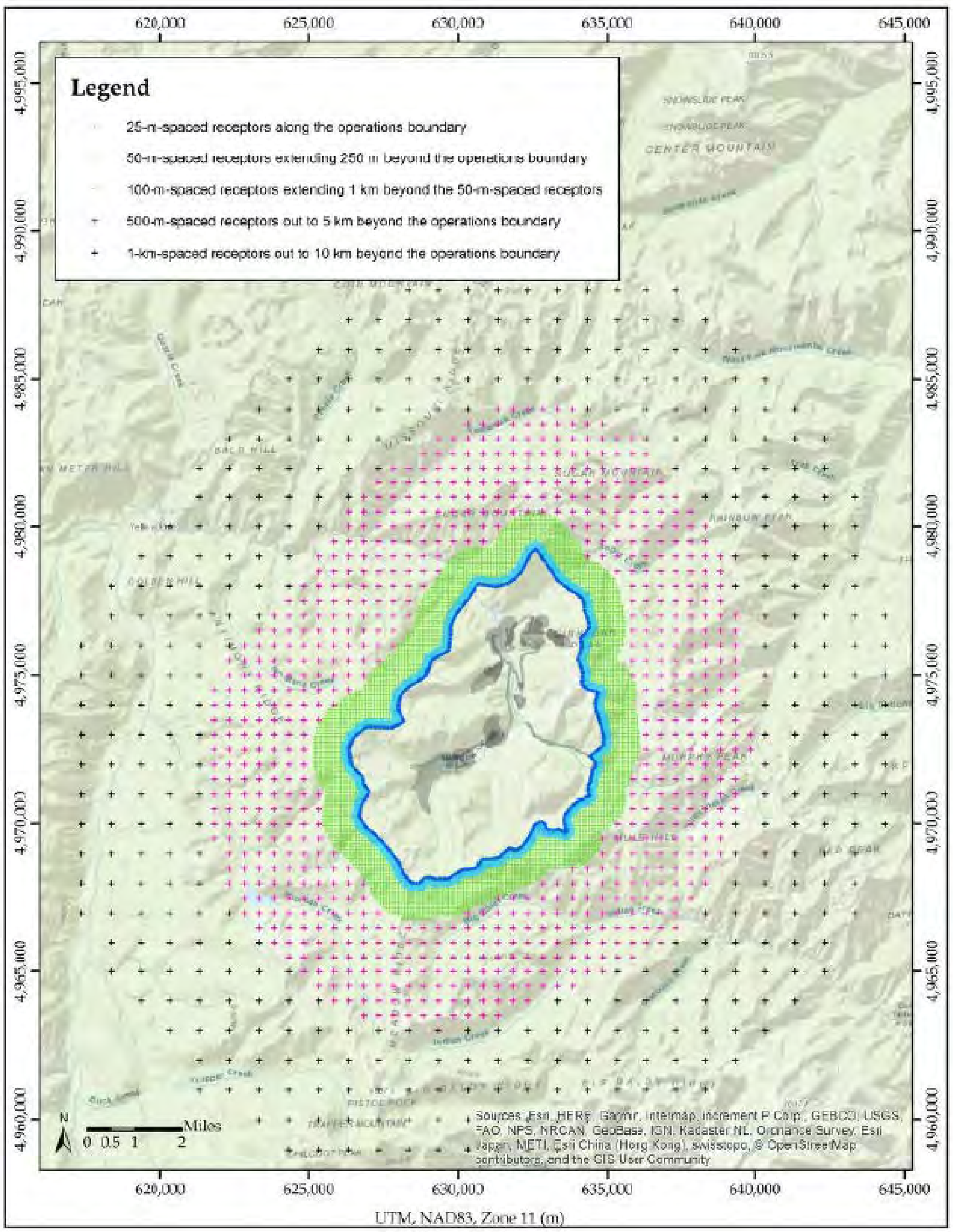
The SGP air quality analyses were performed using the following receptor spacing and extents (Table 18):

- 25-m-spaced receptors placed along the ambient air boundary;
- 50-m-spaced receptors extending 250 m beyond the ambient air boundary;
- 100-m-spaced receptors extending 1 km beyond the 50-m-spaced receptors;
- 500-m-spaced receptors extending 5 km beyond the ambient air boundary; and
- 1-km-spaced receptors extending 10 km beyond the ambient air boundary.

In addition, each highest modeled impact was evaluated further by performing a hot-spot analysis using a finer 25-m-spacing receptor grid. The modeling receptor grid is shown below in Figure 9. The full grid, along with the fenceline receptors, includes a total of 9,631 receptors. A SIL analysis was not conducted. The full receptor grid was used in the cumulative NAAQS impact and TAPs impact analyses.

The receptor grid used in the submitted modeling analyses met the minimum recommendations specified in the *Idaho Air Quality Modeling Guideline* (DEQ 2013), and DEQ determined that the receptor network was effective in reasonably assuring compliance with applicable air quality standards at all ambient air locations.

Figure 9. SGP AMBIENT AIR BOUNDARY AND MODELING RECEPTOR GRID.



3.3.13 Good Engineering Practice Stack Height

An allowable good engineering practice (GEP) stack height may be established using the following equation in accordance with Idaho Air Rules Section 512.03.b:

$H = S + 1.5L$, where:

H = good engineering practice stack height measured from the ground-level elevation at the base of the stack.

S = height of the nearby structure(s) measured from the ground-level elevation at the base of the stack.

L = lesser dimension, height or projected width, of the nearby structure.

Sources from the SGP facility are below GEP stack height. Therefore, consideration of downwash caused by nearby buildings was required.

4.0 NAAQS and TAPs Impact Modeling Results

4.1 Results for NAAQS Analyses

4.1.1 Significant Impact Level Analyses

A SIL analysis was not performed for the SGP project.

4.1.2 Cumulative NAAQS Impact Analyses

Table 24 provides results (highest of 14 scenarios) for the cumulative NAAQS impact analysis. It provides the model-predicted maximum design concentration (including the hot-spot analyses) and the associated modeling scenario, the background concentration, and the estimated total concentration (SGP impact plus background) for each pollutant-averaging time combination. A comparison of the estimated total concentrations with the applicable NAAQS is also provided in this table. For each pollutant and averaging period, two modeled design concentrations are listed, each corresponding to the meteorological data processed with (BULKRN) and without (NON-BULKRN, grey shading) the Bulk Richardson method.

Table 24. RESULTS FOR CUMULATIVE NAAQS IMPACT ANALYSES.

Pollutant	Averaging Time	Max. Conc.[a] ($\mu g/m^3$)[b]	Model Scenario	Back. Conc.[c] ($\mu g/m^3$)	Total Conc.[d] ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Percent of NAAQS
Carbon monoxide	8 hours	6,218[e]	W1	1,110	7,328	10,000	73.3%
		3,516[f]	W1		4,626		46.3%
	1 hour	17,054	W1	1,740	18,794	40,000	47.0%
		9,467	W1		11,207		28.0%
Nitrogen dioxide	1 year	2.3	W1	0.9	3.2	100	3.2%
		1.4	W1		2.3		2.3%
	1 hour	116.7	B1	4.3	121.0	188	64.4%
		111.0	W1		115.3		61.3%

$PM_{2.5}$[g]	1 year	7.7	W5	3.5	11.2	12	93.3%
		4.2	W5		7.7		64.2%
	24 hours	18.6	W5	15.0	33.6	35	96.0%
		11.0	W5		26.0		74.3%
PM_{10}[h]	24 hours	121.5	W5	37.0[i]	158.5	150	105.7%[j]
		75.7	W5		112.7		75.1%
Sulfur dioxide	3 hours	1.8	B1	16.8	18.6	1,300	1.4%
		1.2	B1		18.0		1.4%
	1 hour	3.2	B1	12.3	15.5	196	7.9%
		2.7	B1		15.0		7.7%

a. Max. Conc. = maximum modeled design concentration.
b. Micrograms per cubic meter.
c. Back. Conc. = background concentration.
d. Total Conc. = total (modeled + background) concentration.
e. The first Max. Conc. value for each pollutant and averaging time represents results using the BULKRN meteorological data.
f. The second (grey-shaded) Max. Conc. value for each pollutant and averaging time represents results using the NON-BULKRN meteorological data.
g. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
h. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
i. For 24-hour PM_{10}, the design value is the *second-highest* 24-hour average concentration in a given year. However, the background value that was used in the modeling analyses represents the *first-highest* 24-hour average concentration measured in 2014. Therefore, using a larger background concentration adds a layer of conservatism to the calculated total impact for 24-hour PM_{10}.
j. Results for 24-hour PM_{10} with meteorological data processed using BULKRN show up to five hotspot receptors that exceed NAAQS. Refer to Section 4.1.4 of this modeling memo for a weight-of-evidence analysis demonstrating NAAQS compliance.

Table 24 shows that modeled concentrations derived using the BULKRN meteorological data are higher than the NON-BULKRN dataset. It also shows that the total (modeled + background) concentrations from the SGP cumulative impact analyses do not exceed the applicable NAAQS, except for when the BULKRN meteorological data are used in modeling 24-hour PM_{10} (total concentration is 105.7% of the 24-hour PM_{10} NAAQS).

PM_{10} modeling with the meteorological dataset processed with the BULKRN method shows up to five hotspot receptors for three modeling scenarios (W1, W3, and W5) with slight exceedance of NAAQS. Scenario W5 is the worst-case scenario, with a maximum total concentration of 158.5 $\mu g/m^3$ which exceeds the NAAQS of 150 $\mu g/m^3$. A weight-of-evidence analysis demonstrating PM_{10} NAAQS compliance is presented in Section 4.1.4 of this modeling memo.

The locations of the maximum impacts for each pollutant and averaging time are illustrated in Figure 10. The results presented in this figure include the hot-spot analyses conducted for each applicable pollutant-averaging time combination. For $PM_{2.5}$ and PM_{10}, the alternate meteorological data (NON-BULKRN) were used.

Modeling for ozone and secondary $PM_{2.5}$ were not performed for this minor stationary source. These analyses are typically associated with applications for major stationary sources. Nonetheless, taking the ratio of the VOC, NOx, and SO_2 emissions from the SGP facility by the emissions and resulting concentrations of O_3 and secondary $PM_{2.5}$ from EPA's modeled emission rates for precursors (MERPs) guidance yields estimated O_3 and secondary $PM_{2.5}$ concentrations of less than 1 ppb of O_3 and less than 0.1 $\mu g/m^3$ of $PM_{2.5}$ (24-hour and annual) for the SGP. These estimated concentrations have a negligible effect on compliance demonstration with the NAAQS.

Figure 10. SGP CUMULATIVE IMPACTS (μg/m^3) AND LOCATIONS.

Higher background concentrations from McCall that include medium-traffic emissions provided in Section 3.2.3 were then combined with the SGP model-predicted maximum design concentrations to provide an additional level of conservatism in demonstrating compliance. These results are shown in Table 25. For $PM_{2.5}$ and PM_{10}, the alternate meteorological data (NON-BULKRN) were used. For the rest of the criteria pollutants, the BULKRN meteorological data were used.

Table 25. RESULTS FOR CUMULATIVE NAAQS IMPACT ANALYSES WITH MEDIUM-TRAFFIC BACKGROUND.							
Pollutant	**Averaging Time**	**Max. Conc.[a] (μg/m³)[b]**	**Model Scenario**	**Back. Conc.[c] (μg/m³)**	**Total Conc.[d] (μg/m³)**	**NAAQS (μg/m³)**	**Percent of NAAQS**
Carbon monoxide	8 hours	6,218	W1	1,145	7,363	10,000	73.6%
	1 hour	17,054	W1	1,797	18,851	40,000	47.1%
Nitrogen dioxide	1 year	2.3	W1	2.6	4.9	100	4.9%
	1 hour	116.7	B1	14.3	131.0	188	69.7%
$PM_{2.5}$[e]	1 year	4.2	W5	5.1	9.3	12	77.5%
	24 hours	11.0	W5	17.5	28.5	35	81.4%
PM_{10}[f]	24 hours	75.7	W5	60.1	135.8	150	90.5%
Sulfur dioxide	3 hours	1.8	B1	16.8	18.6	1,300	1.4%
	1 hour	3.2	B1	12.3	15.5	196	7.9%

a. Max. Conc. = maximum modeled design concentration.
b. Micrograms per cubic meter.
c. Back. Conc. = background concentration.
d. Total Conc. = total (modeled + background) concentration.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
f. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.

4.1.3 DEQ's Sensitivity Analyses for 1-hour and Annual NO_2

DEQ performed a sensitivity analysis for 1-hour and annual NO_2 using a Tier 2 (ARM2) screening method. Minimum and maximum NO_2/NOx ratios of 0.5 and 0.9, respectively, were used. Results from DEQ's cumulative NAAQS impact analyses, summarized below in Table 26, indicate that the SGP facility is safely below the 1-hour and annual NO_2 NAAQS even when using a more conservative NO_2 screening method.

Table 26. RESULTS FOR DEQ'S NO_2 SENSITIVITY ANALYSES USING TIER 2 (AMBIENT RATIO METHOD 2) SCREENING METHOD.							
Pollutant	**Averaging Time**	**Max. Conc.[a] (μg/m³)[b]**	**Model Scenario**	**Back. Conc.[c] (μg/m³)**	**Total Conc.[d] (μg/m³)**	**NAAQS (μg/m³)**	**Percent of NAAQS**
Nitrogen dioxide	1 year	1.8	B1	0.9	2.7	100	2.7%
		1.8	H1		2.7		2.7%
		2.3	W1		3.2		3.2%
		1.8	Y1		2.7		2.7%
	1 hour	110.9	B1	4.3	115.2	188	61.3%
		73.0	H1		77.3		41.1%
		162.6	W1		166.9		88.8%
		59.8	Y1		64.1		34.1%

a. Max. Conc. = maximum modeled design concentration.
b. Micrograms per cubic meter.
c. Back. Conc. = background concentration.
d. Total Conc. = total (modeled + background) concentration.

4.1.4 DEQ's Weight-of-Evidence Analyses for 24-hour PM_{10}

This section describes a weight-of-evidence analysis that provides additional analytical information to evaluate the degree of NAAQS compliance confidence for 24-hour PM_{10}. NAAQS compliance was demonstrated in the submitted application using meteorological data processed with an EPA-approved method using regional cloud cover to calculate stability parameters rather than site-specific monitored solar radiation and measured temperature differences with height. Both methods are considered default for regulatory purposes, and modeling using this dataset shows that the facility is well below NAAQS.

As described in Section 4.1.2, PM_{10} modeling with meteorological dataset processed using the site-specific BULKRN method shows up to five hotspot receptors for Scenario W5 (the highest PM_{10} modeling scenario) that exceed NAAQS (150 µg/m^3). The hotspot receptors have a 25-meter grid spacing. Hotspot receptors that exceed 24-hour PM_{10} NAAQS have total (modeled + background) concentrations of 152.7, 154.3, 155.0, 155.7, and 158.5 µg/m^3. Locations of these receptors are illustrated in Figure 11. Figure 12 shows these receptors overlaid on Google Earth. As noted in Section 3.2.1 of this modeling memorandum, the design value for 24-hour PM_{10} is the *second-highest* 24-hour average concentration in a given year. However, the background value that was used in the modeling analyses (37.0 µg/m^3) represents the *first-highest* 24-hour average concentration measured in 2014. Therefore, using a larger background concentration adds another layer of conservatism to the calculated total impact for 24-hour PM_{10}. If the *second-highest* 24-hour average concentration (34.0 µg/m^3) were used in the modeling analyses, the number of receptors that exceed the 24-hour PM_{10} NAAQS is reduced from five to four.

Figure 11. HOTSPOT RECEPTORS THAT EXCEED 24-HOUR PM_{10} NAAQS (SCENARIO W5, BULKRN METEOROLOGICAL DATA).

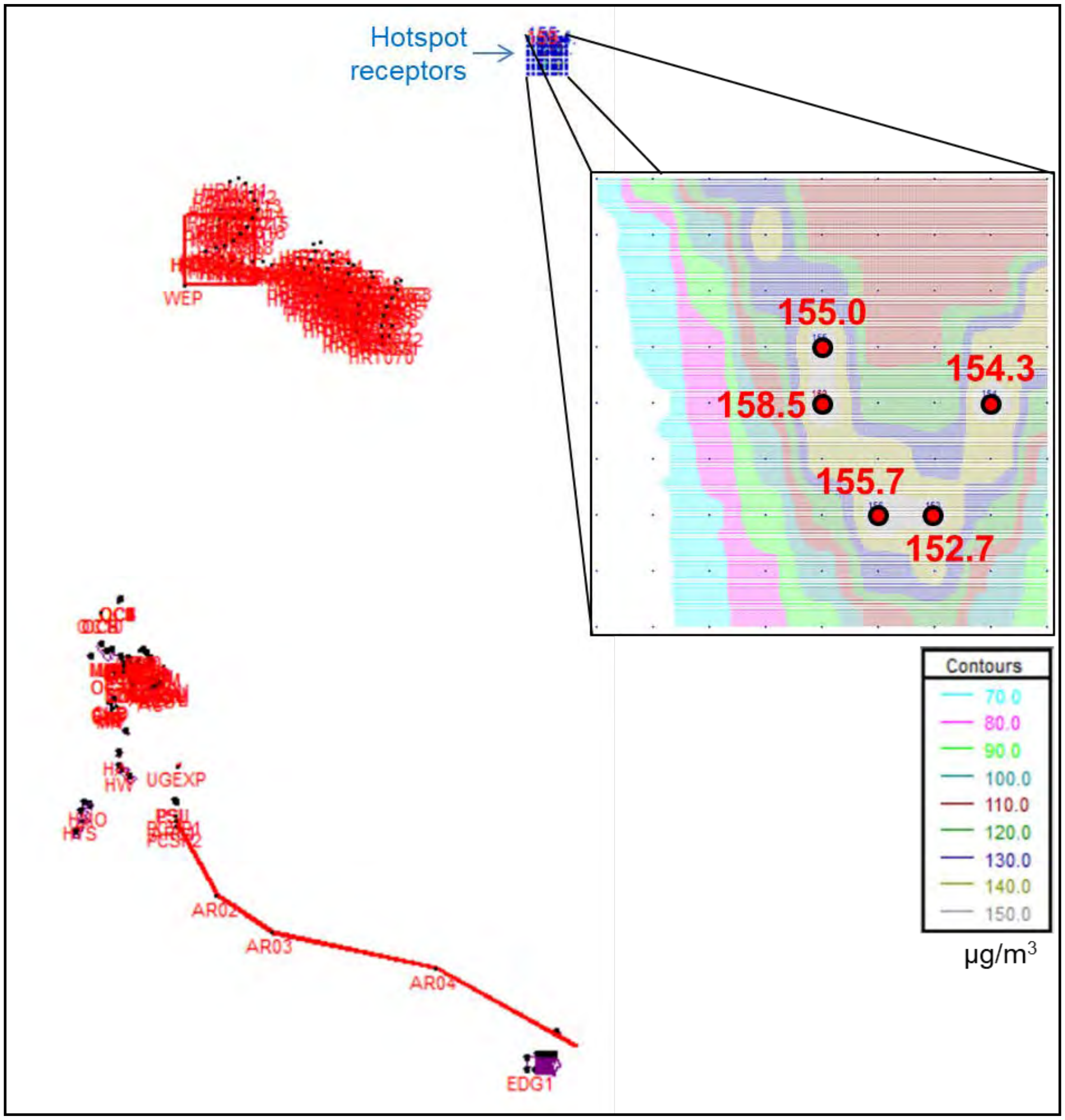
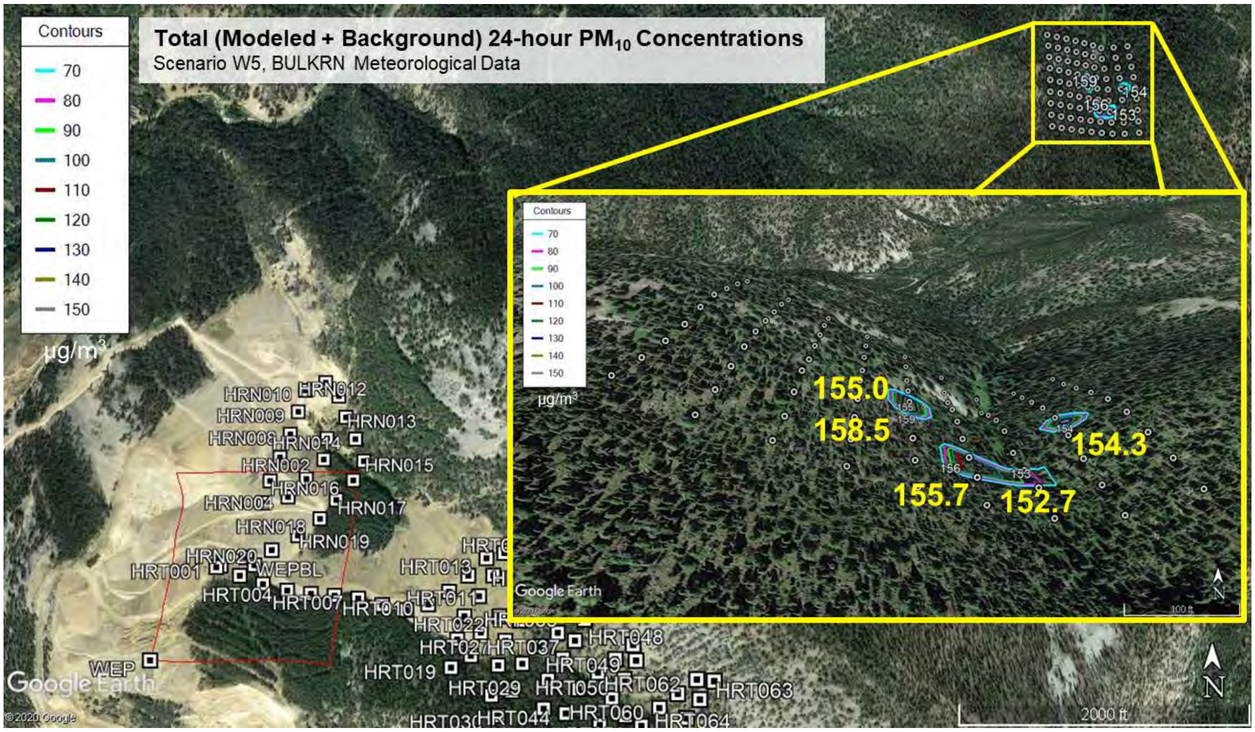


Figure 12. HOTSPOT RECEPTORS THAT EXCEED 24-HOUR PM_{10} NAAQS, OVERLAID ON GOOGLE EARTH IMAGE (SCENARIO W5, BULKRN METEOROLOGICAL DATA).



Figures 11 and 12 show that the modeled PM_{10} NAAQS exceedances are located northeast of the SGP facility. These receptors are located 2 km away from the center of the West End Pit (WEP). The AERMOD output files indicate that all modeled violations occur during winter (all modeled violations occur on December 23, 2014). Data provided in the SGP baseline study (Perpetua Resources Idaho 2017a) specify an average snow depth of 21-68 inches and an average precipitation of 6.0 inches at the project site during this period. Therefore, fugitive road dust emissions during high-modeled impact hours could be overestimated.

DEQ performed a source-group analysis (Table 27) which indicates that emissions from the WEP and the Haul Road (HR) are the largest contributors to the maximum modeled PM_{10} design concentrations. For comparison, source-group analyses using the NON-BULKRN meteorological data are also listed in Table 27.

Table 27. SOURCE-GROUP ANALYSES FOR 24-HOUR PM_{10} (SCENARIO W5).

Emission Source Group	Modeled Design Concentration (µg/m³)[a]	
	BULKRN	**NON-BULKRN**
ALL	121.5	75.7
West End Pit (WEP)	89.3	24.5
West End Pit Blasting (WEPBL)	1.94	1.81
West End Pit Development Rock Storage Facility (WEDRSF)	0.98	3.47
Haul Road (HR)	51.0	52.5
Access Road (ACCRD)	0.0064	0.0074
Underground Exploration (UGEXP)	0.00001	0.00001

Process & Ancillary Point Sources	0.23	0.76
Process & Ancillary Volume Sources	0.20	0.29

a. Micrograms per cubic meter.

The six source groups listed in Table 27 that are related to mining activity and emissions (WEP, WEPBL, WEDRSF, HR, ACCRD, UGEXP) were examined further. Table 28 lists the daily modeled PM_{10} emissions (in pounds per day [lb/day]), grouped according to mining activity. Key assumptions for calculating the daily emissions are also listed in this table. Total modeled PM_{10} emission from mining activity for Scenario W5 is 3,336.76 lb/day. The contribution from each source group is listed in the second column of Table 28, and a pie chart is illustrated in Figure 13.

Table 28. KEY ASSUMPTIONS FOR CALCULATING DAILY MINING ACTIVITY EMISSIONS FOR 24-HOUR PM_{10} (SCENARIO W5).

Mining Activity	**Emissions (lb/day)[a]**
WEP (West End Pit)	**885.54**
Open Pit Drilling • Blasting 180,000 tons of material (DR) per day • Drilling 1,200 holes per day	811.20
Material Loading • Blasting 180,000 tons of material (DR) per day	18.00
Dozing • Dozers operating 144 hours per day • Surface material silt content of 6.9% • Material moisture content of 7.9%	54.20
Surface Exploration • Total wet drilling holes of 700 divided by 14 years • 50 holes per year	2.15
WEPBL (West End Pit Blasting)	**334.38**
Open Pit Blasting • Blasting 180,000 tons of material (DR) per day • Two blasts per day	334.38
WEDRSF (West End Pit Development Rock Storage Facility)	**57.12**
Material Unloading • Blasting 180,000 tons of material (DR) per day	2.88
Dozing • Six dozers operating 144 hours per day • Surface material silt content of 6.9% • Material moisture content of 7.9%	54.20
Wind Erosion	0.04
HR (Haul Road)	**2,050.34**
Onsite Hauling • Blasting 180,000 tons of material (DR) per day • One-way hauling distance of 3.07 miles • Total travel of 7,758 vehicle miles traveled (VMT) per day • Surface material silt content of 4% • Daily PM_{10} emission factor of 3.55 pounds per VMT • Control efficiency of 90% for chemical suppressant • Control efficiency of 33% for watering	1,842.97
Grading • Grader average speed of 6.5 mph • Three graders operating 72 hours per day • Control efficiency of 90% for chemical suppressant	60.51
Water Truck Travel • Two water trucks operating 48 hours per day	146.86

• Average truck speed of 15 mph • Surface material silt content of 4% • Daily PM_{10} emission factor of 3.04 pounds per VMT • Control efficiency of 90% for chemical suppressant • Control efficiency of 33% for watering	
ACCRD (Access Road)	**9.38**
Vehicle Travel • Access road length of 1.6 miles (within project boundary) • Surface material silt content of 4% • Daily PM_{10} emission factor of 1.26 pounds per VMT • Control efficiency of 90% for chemical suppressant • Control efficiency of 33% for watering	9.17
Grading • PM_{10} emission factor of 1.3 pounds per VMT • Control efficiency of 90% for chemical suppressant	0.21
UGEXP (Underground Exploration)	**0.004**
Underground Exploration • Wet drilling 25 holes per year	0.004

a. Pounds per day.

Figure 13. PIE CHART FOR DAILY MODELED PM_{10} EMISSIONS FROM MINING ACTIVITY (SCENARIO W5).

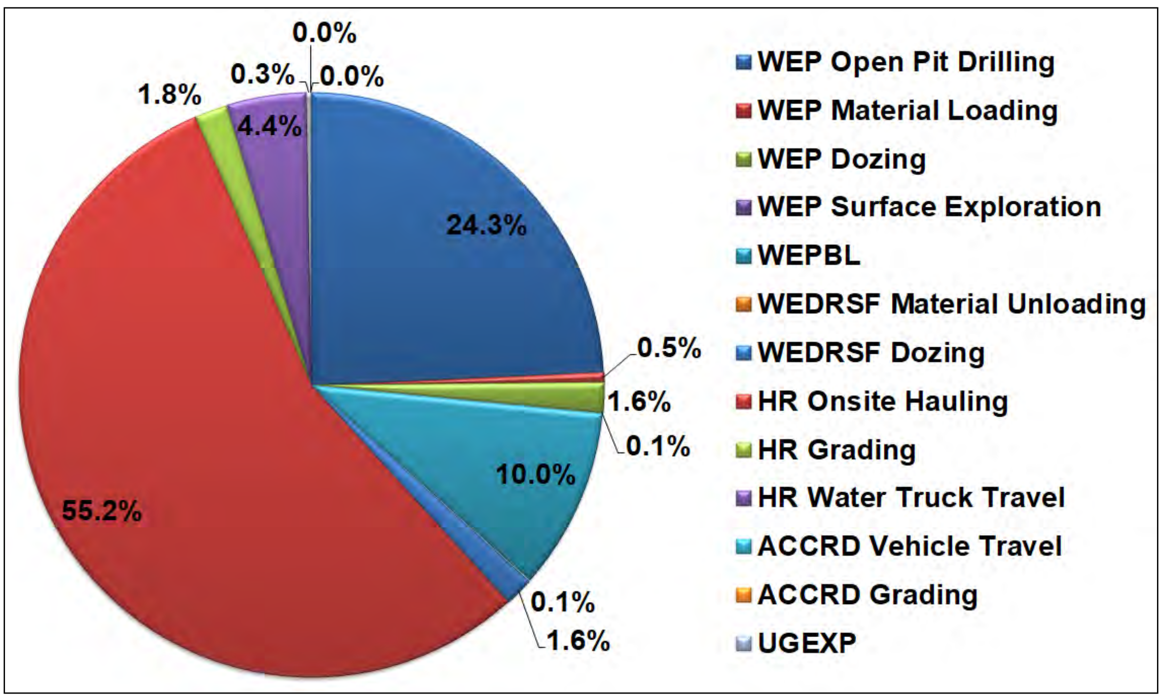


Figure 13 shows that onsite hauling on haul roads ("HR Onsite Hauling") accounts for 55.2% of the total daily PM_{10} emissions. Open pit drilling at the WEP ("WEP Open Pit Drilling") and blasting ("WEPBL") account for 24.3% and 10.0% of the daily PM_{10} emissions, respectively. Therefore, it is not surprising that HR, WEP, and WEPBL are associated with the highest modeled design concentrations in Table 27.

Table 29 shows the ten highest-ranked modeled 24-hour PM_{10} impacts from each emission source group. Note that for 24-hour PM_{10}, the design value is the *second-highest* 24-hour average concentration in a given year. Therefore, the second-high modeled value for source group ALL (121.5 µg/m^3) was summed with the background concentration for comparison to NAAQS. The calculated total impact (modeled design value + background concentration) is conservative because the background value that was used in the cumulative NAAQS impact analyses (37.0 µg/m^3) represents the *first-highest* 24-hour average concentration measured in 2014.

Table 29. TEN HIGHEST-RANKED MODELED 24-HOUR PM_{10} IMPACTS IN µg/m^3 FROM DIFFERENT SOURCE GROUPS (SCENARIO W5, BULKRN METEOROLOGICAL DATA).

Rank	ALL[a]	WEP[b]	WEPBL[c]	WEDRSF[d]	HR[e]	ACCRD[f]	UGEXP[g]	PRCSPT[h]	PRCSVOL[i]
1ST	142.2	102.5	2.27	1.02	52.1	7.26E-03	1.00E-05	0.24	0.23
2ND	121.5	89.3	1.94	0.98	51.0	6.41E-03	1.00E-05	0.23	0.20
3RD	113.4	78.1	1.83	0.96	49.6	5.31E-03	1.00E-05	0.22	0.13
4TH	110.1	77.0	1.73	0.93	49.4	3.39E-03	1.00E-05	0.20	0.10
5TH	108.5	76.9	1.62	0.90	46.1	3.39E-03	1.00E-05	0.18	0.09
6TH	107.7	75.7	1.57	0.85	45.5	3.22E-03	1.00E-05	0.17	0.08
7TH	105.7	73.3	1.49	0.84	43.4	3.21E-03	0	0.16	0.08
8TH	105.6	72.3	1.30	0.77	42.9	2.91E-03	0	0.15	0.08
9TH	101.5	71.4	1.28	0.77	41.8	2.87E-03	0	0.15	0.08
10TH	99.8	71.2	1.23	0.76	41.8	2.56E-03	0	0.15	0.08

a. ALL = all emission sources.
b. WEP = West End Pit.
c. WEPBL = West End Pit Blasting.
d. WEDRSF = West End Pit Development Rock Storage Facility.
e. HR = Haul Road.
f. ACCRD = Access Road.
g. UGEXP = Underground Exploration.
h. PRCSPT = Process & Ancillary Point Sources.
i. PRCSVOL = Process & Ancillary Volume Sources.

Given a background of 37.0 µg/m^3 and a NAAQS of 150 µg/m^3, the critical modeled concentration threshold for any 24-hour PM_{10} NAAQS violation is therefore 113.0 µg/m^3. Table 29 shows that the third-high modeled value for source group ALL (113.4 µg/m^3) barely exceeds NAAQS. Fourth-high (and lower-ranked) modeled impacts, when added to the background concentration, are below NAAQS.

As discussed earlier in this section, HR Onsite Hauling, WEP Open Pit Drilling, and WEP Blasting are the three largest components of the total daily PM_{10} emissions. Therefore, it is not surprising that HR, WEP, and WEPBL are associated with the highest modeled concentrations among all source groups.

To investigate the potential culpability of each source group to the modeled 24-hour PM_{10} NAAQS violation, DEQ performed a culpability analysis using the MAXIFILE output option in AERMOD. The MAXIFILE option provides the receptor location and date of an impact. DEQ performed two MAXIFILE runs. In the first MAXIFILE simulation, the model was run using source group ALL. A threshold value (113.0 µg/m^3) equal to the NAAQS minus background was set. The output file provided a list of the receptors where the NAAQS is exceeded. In the second MAXIFILE simulation, the model was run using only the receptors identified by the first MAXIFILE run. Source groups were included in the second modeling simulation. A threshold value equal to the 24-hour PM_{10} SIL (5.0 µg/m^3) was set. The output file provided a date stamp for any day when a source group exceeds the SIL and potentially contributes to a violation of the NAAQS. A significant contribution to a NAAQS violation would be predicted to occur if the date stamps for source group ALL (from the first MAXIFILE run) and for a specific source group (from the second MAXIFILE run) matched.

DEQ's culpability analyses confirm that emission source groups HR and WEP are culpable for the 24-hour PM_{10} NAAQS exceedances. The date stamps indicate NAAQS violations during the winter season (January 6, January 15, and December 23). We show next that when modeled emissions are more-closely representative of typical daily mining production rates for a high-production period (everything else held constant), the SGP facility is able to demonstrate compliance with 24-hour PM_{10} NAAQS at those few receptors showing a potential violation when using meteorological data processed with the BULKRN method. We also discuss next the implication of NAAQS violations occurring during the winter season.

As listed in Table 28, PM_{10} modeling simulation for Scenario W5 was based on a mining production rate of 180,000 ton/day of development rock. This corresponds to 65,700,000 ton/year, which is more conservative than the expected peak production rate of 42,692,000 ton/year (116,964 ton/day). To investigate the effect of a lower modeled mining production rate on design value concentrations, DEQ performed a modeling simulation ("DEQ Run 1") where mining production rate was assumed to be 120,000 ton/day instead of 180,000 ton/day, but all other model variables were held constant. This adjustment lowered the modeled daily emission rates for WEP, WEDRSF, and HR, which are summarized in Table 30. Because the modeled emission rates were lower, the modeled design concentrations were also lower. Results for DEQ's sensitivity analyses are summarized in Table 31.

Table 30. DAILY MINING ACTIVITY EMISSIONS USED IN DEQ'S SENSITIVITY ANALYSES FOR 24-HOUR PM_{10} (SCENARIO W5).

Mining Activity	Emissions (lb/day)[a]	
	Applicant's Submittal	**DEQ Run 1**
WEP (West End Pit)	**885.54**	**879.54**
Open Pit Drilling	811.20	811.20
Material Loading	18.00	12.00
Dozing	54.20	54.20
Surface Exploration	2.15	2.14
WEPBL (West End Pit Blasting)	**334.38**	**334.38**
Open Pit Blasting	334.38	334.38
WEDRSF (West End Pit Development Rock Storage Facility)	**57.12**	**56.15**
Material Unloading	2.88	1.92
Dozing	54.20	54.20
Wind Erosion	0.04	0.03
HR (Haul Road)	**2,050.34**	**1,436.50**
Onsite Hauling	1,842.97	1,229.13
Grading	60.51	60.51
Water Truck Travel	146.86	146.86
ACCRD (Access Road)	**9.38**	**9.38**
Vehicle Travel	9.17	9.17
Grading	0.21	0.21
UGEXP (Underground Exploration)	**0.004**	**0.004**
Underground Exploration	0.004	0.004
Total	**3,336.76**	**2,715.95**

a. Pounds per day.

Table 31. RESULTS FOR DEQ'S SENSITIVITY ANALYSES FOR 24-HOUR PM_{10} (SCENARIO W5, BULKRN METEOROLOGICAL DATA).

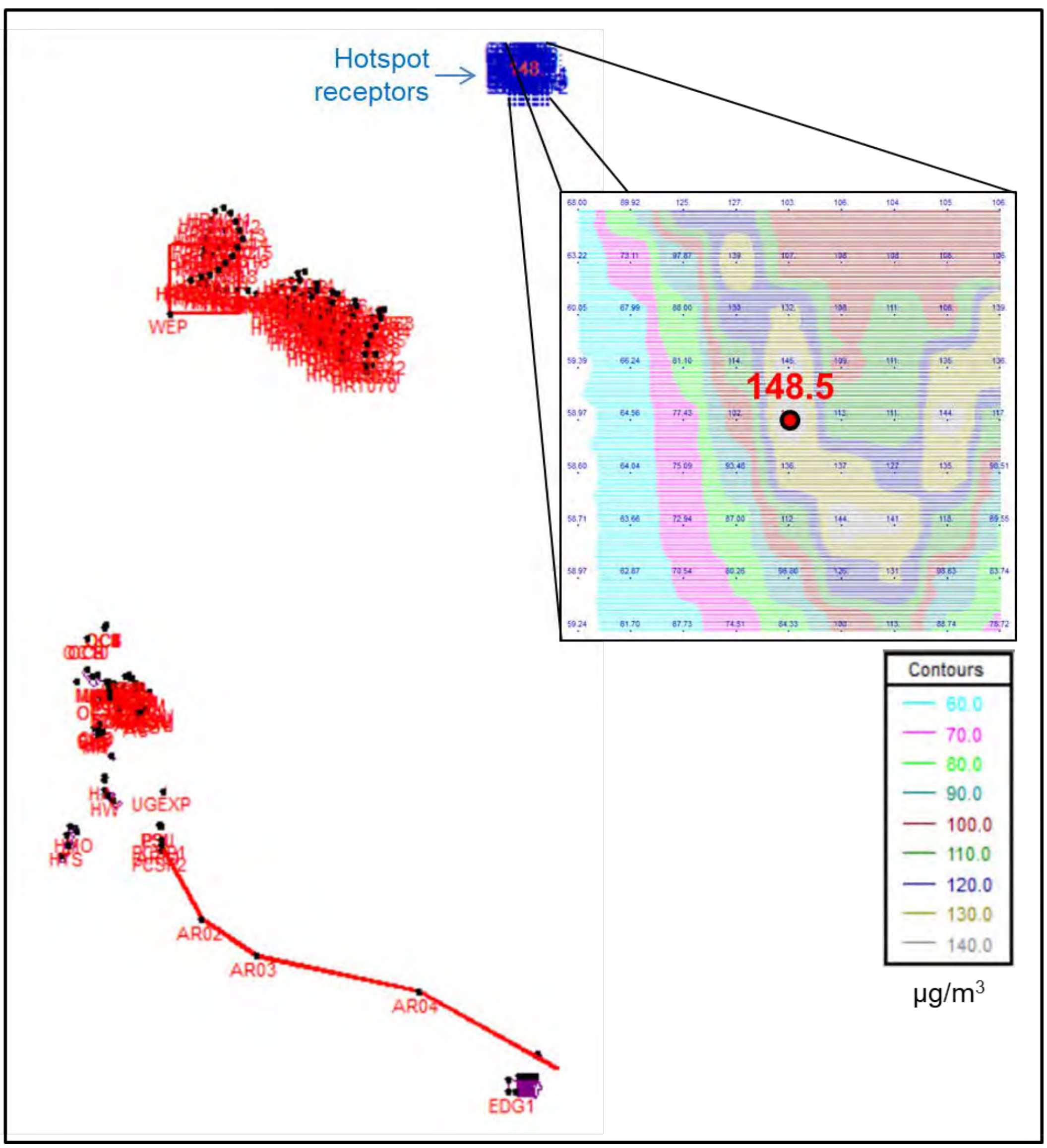
Pollutant	Averaging Time	Max. Conc.[a] (μg/m³)[b]	Model Scenario	Back. Conc.[c] (μg/m³)	Total Conc.[d] (μg/m³)	NAAQS (μg/m³)	Percent of NAAQS
PM_{10}[e]	24 hours	111.5[f]	W5	37.0[g]	148.5	150	99.0%

a. Max. Conc. = maximum modeled design concentration.
b. Micrograms per cubic meter.

c. Back. Conc. = background concentration.
d. Total Conc. = total (modeled + background) concentration.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
f. DEQ Run 1: mining production rate was modeled at 120,000 ton/day instead of 180,000 ton/day. Everything else was held constant.
g. For 24-hour PM_{10}, the design value is the *second-highest* 24-hour average concentration in a given year. However, the background value that was used in the modeling analyses represents the *first-highest* 24-hour average concentration measured in 2014. Therefore, using a larger background concentration adds a layer of conservatism to the calculated total impact for 24-hour PM_{10}.

Maximum modeled concentration for “DEQ Run 1”, when summed with the background concentration, is lower than NAAQS thereby demonstrating NAAQS compliance. Total (modeled + background) concentrations for all hotspot receptors are depicted in Figure 14; maximum total impact is depicted by the red circle. The SGP facility complies with the 24-hour PM_{10} NAAQS when daily mining production rates closer to a more typical daily rate for a high-production period are used in the model, instead of a very conservative mining production rate, even when using site-specific BULKRN meteorological data.

Figure 14. RESULTS FOR DEQ’S SENSITIVITY ANALYSES SHOWING TOTAL (MODELED + BACKGROUND) 24-HOUR PM_{10} CONCENTRATIONS AT HOTSPOT RECEPTORS (SCENARIO W5, BULKRN METEOROLOGICAL DATA).



Meteorological data processing with and without BULKRN are considered acceptable by EPA. However, the BULKRN meteorological data yielded higher modeled design values for the SGP facility than the meteorological data processed without the BULKRN method. DEQ's analyses suggest that when daily mining production rates closer to a more typical daily rate for a high-production period are used (everything else held constant), the SGP facility is able to demonstrate compliance with 24-hour PM_{10} NAAQS at those few receptors showing a potential violation when using meteorological data processed with the BULKRN method.

Maximum modeled design value 24-hour PM_{10} impacts, even with the use of more reasonably expected daily production rates, are still just under the 150 $\mu g/m^3$ NAAQS. As noted earlier in this section, these high values were observed during the winter season. During this period, not only are fugitive emissions minimized because of the higher moisture content of material handled or driven over, but background concentrations in such remote areas are generally much lower because of the absence of wildfires and dust-generating sources.

To summarize, DEQ considered the following assumptions and results in its weight-of-evidence analyses:

a. All modeled impacts are below NAAQS for meteorological data with stability parameters calculated by regional cloud cover data.
b. Modeled impacts over the 24-hour PM_{10} NAAQS using BULKRN meteorological data are limited to a small area and limited period of time.
c. Modeled 24-hour PM_{10} NAAQS exceedances are limited to the winter season, where emissions and background levels are likely overestimated.
d. The model assumes maximum allowable operations/emissions.
e. The model assumes minimum allowable controls on emissions. The permit would require at least 93% control of maximum potential fugitive emissions, but the fugitive emissions may in fact be controlled by more than that, especially during winter and periods of precipitation.
f. Finally, 24-hour PM_{10} background concentrations represent the maximum 1st high (instead of the maximum 2nd high) which is on the higher end of the distribution.

DEQ's weight-of-evidence analyses show that, considering all the collective conservative layers of the modeling analyses, modeling efforts using both site-specific and alternative meteorological datasets show acceptable impacts. DEQ is highly confident that operation of the SGP will not cause or contribute to a violation of NAAQS. This is based on: (1) the submitted application materials and analyses; (2) DEQ's supplemental analyses; and (3) the assumption that the facility is constructed and operated as described in the application and limited by the PTC.

PRI later determined that the West End Development Rock Storage Facility will not be constructed. This change eliminated Scenario W5 as a potential operating scenario. Scenario W3 is now the scenario producing the highest modeled impacts, and NAAQS compliance is easily demonstrated when using temporally varying background PM_{10} values, which were obtained from onsite monitoring data. Results are presented in the *Modeling Review Attachment* to this memorandum.

4.1.5 DEQ's Sensitivity Analyses for a Lower Fugitive Road Dust Control Efficiency

Fugitive particulate emissions from roadways were estimated by the applicant to be controlled above 93%, which is an aggressive level of control. The high level of emission control was needed to demonstrate compliance with NAAQS. To investigate the effect of lower unpaved road emission control efficiency, DEQ performed a modeling simulation ("DEQ Run 2") where the control efficiency was set to

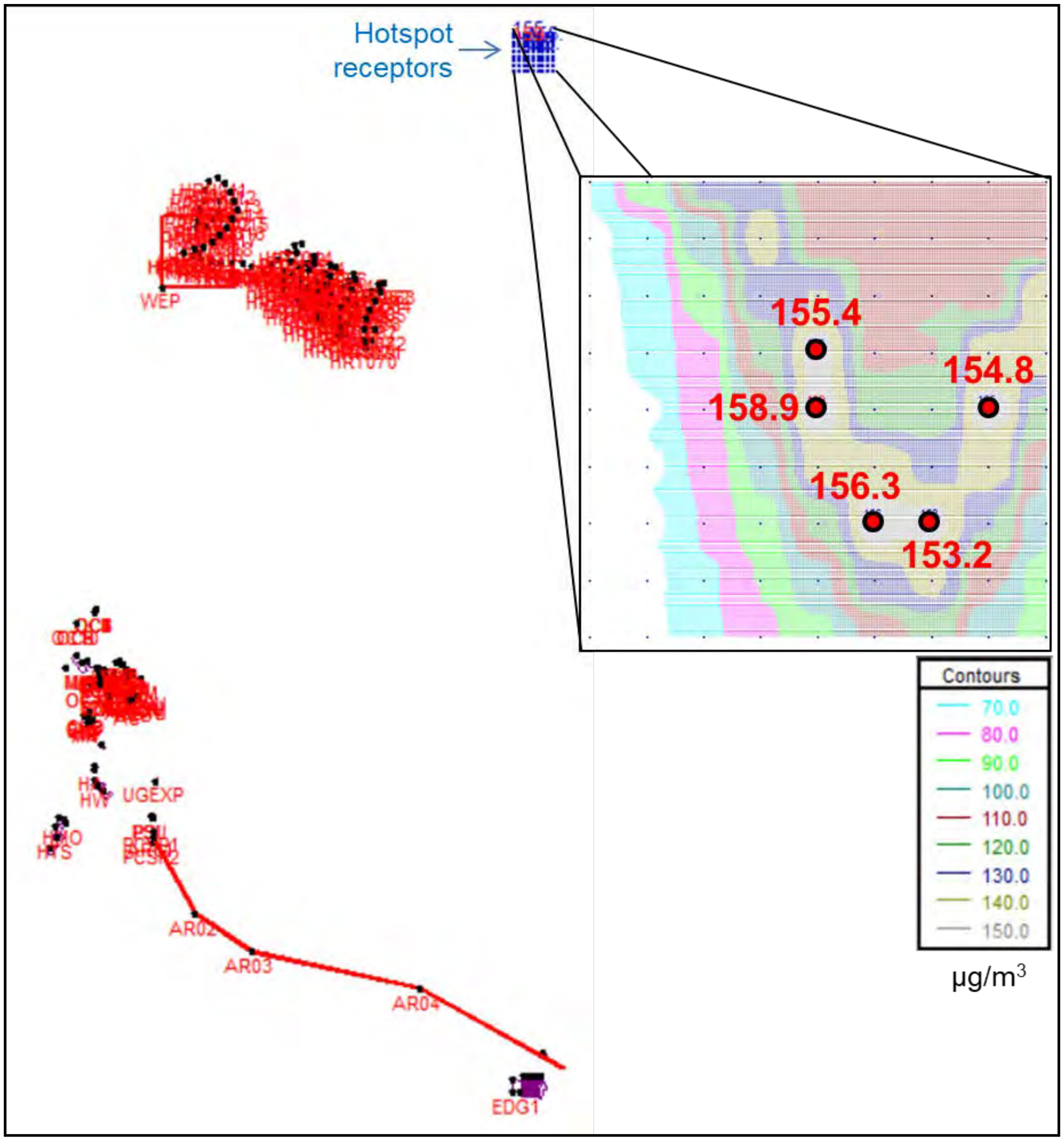
90%. The daily mining production rate was assumed to be 120,000 ton/day instead of 180,000 ton/day, but everything else was held constant. These adjustments lowered the daily modeled emission rates for WEP and WEDRSF, but increased the daily modeled emission rate for HR and the Access Road (ACCRD) (Table 32). Five receptors exceed the 24-hour PM_{10} NAAQS. Figure 15 shows the locations of these receptors.

Table 32. DAILY MINING ACTIVITY EMISSIONS USED IN DEQ'S SENSITIVITY ANALYSES FOR 24-HOUR PM_{10} (SCENARIO W5).

Mining Activity	Emissions (lb/day)[a] Applicant's Submittal	DEQ Run 2
WEP (West End Pit)	**885.54**	**879.54**
Open Pit Drilling	811.20	811.20
Material Loading	18.00	12.00
Dozing	54.20	54.20
Surface Exploration	2.15	2.14
WEPBL (West End Pit Blasting)	**334.38**	**334.38**
Open Pit Blasting	334.38	334.38
WEDRSF (West End Pit Development Rock Storage Facility)	**57.12**	**56.15**
Material Unloading	2.88	1.92
Dozing	54.20	54.20
Wind Erosion	0.04	0.03
HR (Haul Road)	**2,050.34**	**2,114.24**
Onsite Hauling	1,842.97	1,834.53
Grading	60.51	60.51
Water Truck Travel	146.86	219.20
ACCRD (Access Road)	**9.38**	**13.90**
Vehicle Travel	9.17	13.69
Grading	0.21	0.21
UGEXP (Underground Exploration)	**0.004**	**0.004**
Underground Exploration	0.004	0.004
Total	**3,336.76**	**3,398.21**

a. Pounds per day.

Figure 15. RESULTS FOR DEQ'S SENSITIVITY ANALYSES SHOWING HOTSPOT RECEPTORS THAT EXCEED 24-HOUR PM_{10} NAAQS, ASSUMING MINING PRODUCTION RATE OF 120,000 TONS PER DAY AND FUGITIVE ROAD DUST CONTROL EFFICIENCY OF 90% (SCENARIO W5, BULKRN METEOROLOGICAL DATA).



DEQ's sensitivity analyses suggest that a few hotspot receptors exceed the 24-hour PM_{10} NAAQS when the unpaved road control efficiency falls below 93% and the meteorological data processed with the BULKRN method is used. When the meteorological data processed without the BULKRN method is used, all the hotspot receptors demonstrate compliance with NAAQS at a 90% control efficiency and at both examined production levels:

- maximum impact at 120,000 ton per day: 73.9 μg/m³ + 37.0 μg/m³ = 110.9 μg/m³.
- maximum impact at 180,000 ton per day: 84.6 μg/m³ + 37.0 μg/m³ = 121.6 μg/m³.

While using alternative meteorological data processed without the BULKRN method safely demonstrates compliance with NAAQS, using site-specific BULKRN meteorological data does not. Therefore, DEQ's modeling team recommends that the permit require an aggressive implementation of measures to achieve above 93% control efficiency for fugitive particulate emissions from roadways.

4.2 Results for TAPs Impact Analyses

TAP analyses were extensively refined after the February/March public comment period, as described in the *TAP Addendum* submitted by Perpetua. DEQ's review of the *TAP Addendum* is provided in the DEQ *Modeling Review Attachment* to this memorandum.

5.0 Conclusions

The information submitted with the PTC application (including the *TAP Addendum*), combined with DEQ's air impact analyses and the assumption that the facility is constructed and operated as described in the application and limited by the PTC, demonstrated to DEQ's satisfaction that emissions from the Stibnite Gold Project in Valley County, Idaho will not cause or significantly contribute to a violation of any applicable ambient air quality standard or TAP increment.

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TAPs Addendum Modeling Review Attachment

1.0 Introduction and Summary

Perpetua Resources Idaho, Inc. (PRI) submitted the *Stibnite Gold Project (SGP) Permit to Construct Application TAP Addendum* (*TAP Addendum*), prepared by Air Sciences Inc. (Air Sciences) and submitted to DEQ on October 5, 2021. The TAP Addendum reassessed source applicability to Toxic Air Pollutant (TAP) permitting requirements, refined TAPs regulatory methods to demonstrate compliance with applicable TAP increments, revised and/or refined operations and operational parameters affecting TAP emissions, and refined TAP air impact analyses. The revisions and refinements made for the TAP Addendum also reduced PM_{10} and $PM_{2.5}$ emissions, and this effect is presented in this *TAPs Addendum Modeling Review Attachment* (*Modeling Review Attachment*).

2.0 Scope of TAPs Addendum

DEQ reevaluated TAPs compliance regulatory interpretations and impact assessment methods following the second public comment period of February 18, 2021, through March 19, 2021. Areas of revision in response to issues identified after the public comment period included:

- Revising source-specific TAP impact assessment applicability, primarily identifying what sources can be excluded because they are "covered" or "addressed" by a National Emissions Standard for Hazardous Air Pollutants (NESHAP) or New Source Performance Standard (NSPS).
- Refining regulatory methods used to demonstrate compliance with TAP increments.
- Refining TAP emission calculation methods and dispersion-affecting parameters.
- Reassessing TAP impacts resulting from revised and/or refined methods and data.
- Providing a best-estimate of actual TAP emissions that will occur from operation of the mine, and then comparing this to maximum permit-allowable emissions.

PRI and Air Sciences, PRI's permitting consultant, submitted the *TAP Addendum* on October 5, 2021.

3.0 Revised NESHAP/NSPS TAP Exclusion

DEQ and PRI reevaluated TAP source applicability after the second public comment period in response to expressed concerns regarding sources excluded as per *Idaho Air Rules* Section 210.20 (excluding sources that are "covered" or "addressed" by a NESHAP). TAP applicability is explained in greater detail in the main body of the DEQ Statement of Basis. As a result of the reevaluation, some additional sources were included in the TAP impact modeling analyses that were not previously. TAP sources from gold mining that were modeled in the final TAP analyses included: drilling, blasting, excavating, hauling, prill silos, rock dumps and storage piles, and tailings.

Air Sciences consulted with DEQ to refine TAP compliance demonstration methods from what was originally submitted in the application. The refinement was primarily needed to show compliance with the arsenic Acceptable Ambient Concentration of a Carcinogen (AACC). The revised methods are described in the submitted *TAP Addendum* and this DEQ *Modeling Review Attachment*.

4.0 TAPs Refined Compliance Demonstration Approach

PRI, in consultation with DEQ, used a highly refined TAPs analysis approach to demonstrate compliance with applicable TAP increments. This approach involved the following:

- AACC Adjustment for Toxic Air Pollutant Reasonably Available Control Technology (T-RACT) Utilization.
- TAP Emission Averaging Period.
- AACC Adjustment for the Operational Life of the Mine.

4.1 AACC Adjustment for T-RACT Utilization

Idaho Air Rules Section 210.12 allows TAP impacts of 10 times the AACC if the application demonstrates that T-RACT is used for the TAP emission sources. This represents a life-time cancer risk of 1-in-100,000. An adjustment cannot be made for non-carcinogenic TAPs listed in *Idaho Air Rules* Section 585.

Review of the T-RACT demonstration is performed by the DEQ permit writer and is described in the main body of the DEQ Statement of Basis.

4.2 TAP Emission Averaging Period

Annual average emissions of carcinogenic TAPs are typically used in the dispersion model to estimate maximum annual impacts. PRI refined the analyses by using source-specific emission rates that are representative of a 5-year averaging period. This approach is appropriate because carcinogenic impacts are of concern from a long-term exposure basis.

4.3 AACC Adjustment for the Operational Life of the Mine

AACCs were established based on a 1-in-1,000,000 cancer risk over a 70-year lifetime, as stated in *Idaho Air Rules* Section 006.125:

> ***Toxic Air Pollutant Carcinogenic Increments****. Those ambient air quality increments based on the probability of developing excess cancers over a seventy (70) year lifetime exposure to one (1) microgram per cubic meter (1 ug/m3) of a given carcinogen and expressed in terms of a screening emission level or an acceptable ambient concentration for a carcinogenic toxic air pollutant. They are listed in Section 586.*

PRI indicated the maximum life-of-mine will be 16 years. Life-time exposures to carcinogenic TAPs were refined by multiplying the maximum modeled annual impact by a ratio of 16/70. Section 5.7 of this *Modeling Review Attachment* provides more details on this adjustment for the project.

5.0 Refined TAP Emission Estimates and Modeling Methods/Parameters

This section describes changes made to TAP emission estimates and to methods/parameters used in the impact modeling analyses.

5.1 Operational Adjustments

PRI and Air Sciences proposed and committed to several operational adjustments to reduce actual and estimated TAP emissions:

- Installing and operating dust collection systems on drilling rigs (determined to be T-RACT).
- Capping the haul roads that are outside of the pits and development rock storage facilities (DRSFs) with clean (lower levels of arsenic) development rock (determined to be T-RACT).
- Eliminating the West End Development Rock Storage Facility, which eliminated the highest-emitting operational scenario W5.
- Limiting long-term mining production to an average of 135,000 tons/day for a 5-year rolling average.
- Constructing the Burntlog access road with offsite materials containing “background” levels of arsenic.
- Updating the bulldozing emission factor using the SGP site-specific silt content.

5.2 General Modeling Methods and Parameters

Modeling methods and parameters used in TAP impact analyses presented in the *TAP Addendum* are largely identical to those used in the previously submitted application. These include the air dispersion model used, meteorological data, terrain, building downwash, ambient air boundary, and receptors. TAP modeling was conducted for the 14 operational modeling scenarios, consistent with the NAAQS analyses. Modeling Scenario W5 was eliminated from the arsenic modeling, as discussed in Section 5.8 of this *Modeling Review Attachment*.

The meteorological dataset processed using McCall, Idaho, cloud cover data was used for analyses in the *TAP Addendum*. Impacts were not assessed using the dataset processed using the Bulk Richardson (BULKRN) method for boundary layer parameter calculations. EPA considers both methods to be acceptable. Although modeled impacts tend to be somewhat larger when using meteorological data processed by the BULKRN method, DEQ contends that the impact analyses are still largely conservative compared to actual impacts anticipated. Conservative aspects include: continual operation of the worst-case operational scenario; operation at maximum allowable rates for the averaging period; no reduction in winter-time emissions from fugitive sources, accounting for emission suppression effects of increased moisture.

5.3 TAP Modeling Applicability

Table 1 provides a comparison between applicable facility-wide maximum potential TAP emissions for the highest-emitting scenario (W3) and TAP screening emission levels (ELs) from *Idaho Air Rules* Sections 585 (for non-carcinogens) and 586 (for carcinogens). Note that TAPs also classified as HAPs emitted from sources "addressed" or "covered" by NSPS or NESHAP were not required to be evaluated for compliance with TAP increments in accordance with *Idaho Air Rules* Section 210.20. Furthermore, PRI has determined that the West End Development Rock Storage Facility will not be constructed. This change eliminated Modeling Scenario W5 (the highest-emitting scenario described in the main body of the DEQ *Modeling Review Memorandum*) as a potential operating scenario. After eliminating Modeling Scenario W5, it was determined that Modeling Scenario W3 is the highest-emitting scenario for all TAPs.

Table 1. TAP MODELING APPLICABILITY DETERMINATION (HIGHEST-EMITTING MODELING SCENARIO: W3).

HAP/TAP	Emissions (lb/hr)			EL (lb/hr)		Determination
	(a)	(b)	Total	(c)	(d)	
1,3-Butadiene	--	--	--	--	2.4E-5	EL not exceeded
3-Methylchloranthrene	--	4.5E-8	4.5E-8	--	2.5E-6	EL not exceeded
Acetaldehyde	--	--	--	--	3.0E-3	EL not exceeded
Acrolein	--	--	--	1.7E-2	--	EL not exceeded
Antimony	1.9E-2	1.6E-6	1.9E-2	3.3E-2	--	EL not exceeded
Arsenic	5.4E-1	8.2E-6	5.4E-1	--	1.5E-6	Carcinogenic EL exceeded
Benzene	--	5.3E-5	5.3E-5	--	8.0E-4	EL not exceeded
Benzo(a)pyrene[e]	--	3.0E-8	2.9E-7	--	2.0E-6	EL not exceeded
Benz(a)anthracene[e]	--	4.5E-8				
Benzo(b)fluoranthene[e]	--	4.5E-8				
Benzo(k)fluoranthene[e]	--	4.5E-8				
Chrysene[e]	--	4.5E-8				
Dibenzo(a,h)anthracene[e]	--	3.0E-8				
Indenol(1,2,3-cd)pyrene[e]	--	4.5E-8				
Beryllium	2.6E-3	3.5E-7	2.6E-3	--	2.8E-5	Carcinogenic EL exceeded
Biphenyl	--	--	--	1.0E-1	--	EL not exceeded
Cadmium	4.1E-4	2.8E-5	4.4E-4	--	3.7E-6	Carcinogenic EL exceeded
Carbon disulfide	1.4E-2	--	1.4E-2	2.0E+0	--	EL not exceeded
Chromium	7.3E-3	4.8E-5	7.4E-3	3.3E-2	--	EL not exceeded
Chromium (VI)	--	3.4E-7	3.4E-7	--	5.6E-7	EL not exceeded
Cobalt	3.3E-3	4.8E-6	3.26E-3	3.3E-3	--	EL not exceeded
Cyanide	4.5E-1	--	4.5E-1	3.3E-1	--	Non-carcinogenic EL exceeded
Dichlorobenzene	--	3.1E-5	3.1E-5	3.0E+1	--	EL not exceeded
Formaldehyde	--	1.9E-3	1.9E-3	--	5.1E-4	Carcinogenic EL exceeded
Hexane	--	4.6E-2	4.6E-2	1.2E+1	--	EL not exceeded
Hydrogen Chloride	--	--	--	5.0E-2	--	EL not exceeded
Manganese	2.4E-1	1.9E-4	2.4E-1	6.7E-2	--	Non-carcinogenic EL exceeded
Naphthalene	--	1.6E-5	1.6E-5	3.3E+0	--	EL not exceeded
Nickel	1.6E-3	5.6E-5	1.7E-3	--	2.7E-5	Carcinogenic EL exceeded
Phenol	--	--	--	1.3E+0	--	EL not exceeded
Phosphorus	5.3E-1	9.3E-5	5.3E-1	7.0E-3	--	Non-carcinogenic EL exceeded
Selenium	3.3E-4	6.2E-7	3.3E-4	1.3E-2	--	EL not exceeded
Toluene	--	8.8E-5	8.8E-5	2.5E+1	--	EL not exceeded
Xylene	--	--	--	2.9E+1	--	EL not exceeded
Aluminum	5.8E+1	6.5E-1	5.9E+1	6.7E-1	--	Non-carcinogenic EL exceeded
Barium	6.5E-1	6.8E-3	6.6E-1	3.3E-2	--	Non-carcinogenic EL exceeded
Calcium Carbonate	1.1E+1	2.2E+0	1.4E+1	6.7E-1	--	Non-carcinogenic EL exceeded
Calcium Oxide	--	7.0E-1	7.0E-1	1.3E-1	--	Non-carcinogenic EL exceeded
Copper	4.1E-3	5.3E-4	4.6E-3	6.7E-2	--	EL not exceeded
Cyclohexane	--	1.0E-3	1.0E-3	7.0E+1	--	EL not exceeded
Hydrogen Sulfide	--	9.0E-1	9.0E-1	9.3E-1	--	EL not exceeded
Iron	1.5E+1	2.1E-1	1.5E+1	6.7E-2	--	Non-carcinogenic EL exceeded
Molybdenum	8.1E-4	4.7E-4	1.3E-3	3.3E-1	--	EL not exceeded
Pentane	--	1.2E-1	1.2E-1	1.2E+2	--	EL not exceeded
Silver	4.1E-4	4.1E-4	8.2E-4	7.0E-3	--	EL not exceeded
Sulfuric Acid	--	2.0E+0	2.0E+0	6.7E-2	--	Non-carcinogenic EL exceeded

Table 1. TAP MODELING APPLICABILITY DETERMINATION (HIGHEST-EMITTING MODELING SCENARIO: W3).						
HAP/TAP	**Emissions (lb/hr)**			**EL (lb/hr)**		**Determination**
	(a)	(b)	**Total**	(c)	(d)	
Thallium	8.1E-3	5.2E-4	8.7E-3	7.0E-3	--	Non-carcinogenic EL exceeded
Uranium	8.1E-3	5.2E-4	8.7E-3	1.3E-2	--	EL not exceeded
Vanadium	2.3E-2	8.4E-4	2.4E-2	3.0E-3	--	Non-carcinogenic EL exceeded
Trimethyl Benzene	--	1.1E-2	1.1E-2	8.2E+0	--	EL not exceeded
Tungsten	8.1E-3	5.2E-4	8.7E-3	3.3E-1	--	EL not exceeded
Zinc	2.9E-2	2.2E-3	3.1E-2	6.7E-1	--	EL not exceeded

a. Total HAP/TAP emissions for EL evaluation from mining (i.e., pits, blasting, haul roads, stockpiles and DRSF, tailings storage facility, access road, and underground exploration) and leaching. Emissions from sources covered/addressed by NSPS/NESHAP are not included in the evaluation for modeling applicability.

b. Total HAP/TAP emissions for EL evaluation from processing and production (i.e., ore processing [crushers and transfer, prill silos], ore concentration and refining [autoclave, electrowinning cells and pregnant solution tank, retort, furnace, carbon kiln], process heating [POX boiler, carbon regeneration kiln, propane vaporizer, solution heater], lime production [limestone crushers, screens, mill, transfers, lime kiln, kiln feed, lime mill, pebble lime silo, lime silos, lime mill crushing], aggregate production [portable crushers, screens, transfers], concrete production [central mixer, cement silos, aggregate bin], HVAC [heaters], emergency power [emergency generators, fire pump], fuel storage [gasoline fuel and tanks]). Emissions from sources covered/addressed by NSPS/NESHAP are not included in the evaluation for modeling applicability.

c. Non-carcinogenic EL from *Idaho Air Rules* Section 585.

d. Carcinogenic EL from *Idaho Air Rules* Section 586.

Table 1 shows that the SGP facility-wide potential TAP emissions exceed the respective EL for arsenic, beryllium, cadmium, cyanide, formaldehyde, manganese, nickel, phosphorus, aluminum, barium, calcium carbonate, calcium oxide, iron, sulfuric acid, thallium, and vanadium. Therefore, modeling was required for these 16 TAPs (11 non-carcinogenic and five carcinogenic TAPs) to demonstrate compliance with Acceptable Ambient Concentrations of Non-Carcinogens (AACs) and AACCs.

5.4 TAP Modeled Emission Rates

Table 2 lists the source-specific modeled emission rates for all 11 non-carcinogenic TAPs that required modeling (worst-case modeling scenario for all non-carcinogenic TAPs: W5). Table 3 lists the source-specific modeled emission rates for all five carcinogenic TAPs that required modeling (worst-case impacts for arsenic are associated with modeling scenario W2; worst-case impacts for all other carcinogenic TAPs are associated with modeling scenario W1). Note that all source-specific emission rates listed in Tables 2 and 3 were extracted by DEQ's modeling staff from the submitted modeling input files.

The total modeled emission rates for all non-carcinogenic TAPs are equal to the total facility-wide HAP/TAP emissions as stated in the permitting emissions inventory (excluding sources addressed by NSPS/NESHAP), evaluated at 180,000 T/day (see last two rows of Table 2). However, for carcinogenic TAPs, modeling was performed using an emission inventory that included T-RACT controls, long-term mining production limits, and other emission inventory refinements, as described in Section 4.0 of this *Modeling Review Attachment* (see last three rows of Table 3).

Table 2. MODELED EMISSION RATES FOR NON-CARCINOGENIC TAPS (WORST-CASE MODELING SCENARIOS).												
Type of Source	**Source ID**	**ALUM[a] (lb/hr)[b]**	**BARI[c] (lb/hr)**	**CACA[d] (lb/hr)**	**CAOX[e] (lb/hr)**	**CYAN[f] (lb/hr)**	**IRON[g] (lb/hr)**	**MANG[h] (lb/hr)**	**PHOS[i] (lb/hr)**	**SULF[j] (lb/hr)**	**THAL[k] (lb/hr)**	**VANA[l] (lb/hr)**
Point Sources	LS1L	2.33E-04	1.50E-06	0	7.63E-03	0	1.07E-04	2.44E-06	1.34E-06	0	5.16E-08	1.60E-07
	MILLS2L	2.33E-04	1.50E-06	0	7.63E-03	0	1.07E-04	2.44E-06	1.34E-06	0	5.16E-08	1.60E-07
	AC	2.31E-05	2.31E-05	2.31E-05	0	0	2.31E-05	0	0	2.03E+00	2.31E-05	2.31E-05
	ACB	0	3.06E-06	0	0	0	0	2.64E-07	0	0	0	1.60E-06
	ACS1L	9.32E-04	5.98E-06	0	3.05E-02	0	4.27E-04	9.76E-06	5.36E-06	0	2.06E-07	6.39E-07
	ACS2L	9.32E-04	5.98E-06	0	3.05E-02	0	4.27E-04	9.76E-06	5.36E-06	0	2.06E-07	6.39E-07
	ACS3L	9.32E-04	5.98E-06	0	3.05E-02	0	4.27E-04	9.76E-06	5.36E-06	0	2.06E-07	6.39E-07
	ACS4L	4.66E-04	2.99E-06	0	1.53E-02	0	2.13E-04	4.88E-06	2.68E-06	0	1.03E-07	3.20E-07
	CKD	9.59E-05	9.59E-05	9.59E-05	0	0	9.59E-05	0	0	0	9.59E-05	9.59E-05
	CKB	0	9.73E-06	0	0	0	0	8.40E-07	0	0	0	5.08E-06
	EW	9.59E-05	9.59E-05	9.59E-05	0	0	9.59E-05	0	0	0	9.59E-05	9.59E-05
	MR	9.59E-05	9.59E-05	9.59E-05	0	0	9.59E-05	0	0	0	9.59E-05	9.59E-05
	MF	9.59E-05	9.59E-05	9.59E-05	0	0	9.59E-05	0	0	0	9.59E-05	9.59E-05
	EDG1	0	0	0	0	0	0	0	0	0	0	0
	EDG2	0	0	0	0	0	0	0	0	0	0	0
	EDG3	0	0	0	0	0	0	0	0	0	0	0
	EDFP	0	0	0	0	0	0	0	0	0	0	0
	PV	0	4.31E-07	0	0	0	0	3.73E-08	0	0	0	2.25E-07
	HS	0	2.16E-05	0	0	0	0	1.86E-06	0	0	0	1.13E-05
	H1M	0	1.73E-05	0	0	0	0	1.49E-06	0	0	0	9.02E-06
	H2M	0	1.73E-05	0	0	0	0	1.49E-06	0	0	0	9.02E-06
	HM	0	1.73E-05	0	0	0	0	1.49E-06	0	0	0	9.02E-06
	HAC	0	1.08E-06	0	0	0	0	9.31E-08	0	0	0	5.64E-07
	HR	0	1.08E-06	0	0	0	0	9.31E-08	0	0	0	5.64E-07
	HA	0	1.08E-06	0	0	0	0	9.31E-08	0	0	0	5.64E-07
	HMO	0	2.16E-06	0	0	0	0	1.86E-07	0	0	0	1.13E-06
	HTS	0	8.63E-06	0	0	0	0	7.45E-07	0	0	0	4.51E-06
	HW	0	1.29E-05	0	0	0	0	1.12E-06	0	0	0	6.76E-06
	PSL	0	0	0	0	0	0	0	0	0	0	0
	CS1L	0	0	0	0	0	0	8.01E-07	0	0	0	0
	CS2L	0	0	0	0	0	0	8.01E-07	0	0	0	0
	LS6	3.19E-03	2.05E-05	3.88E-02	0	0	1.46E-03	0	0	0	7.06E-07	2.19E-06
	LSBM	4.30E-02	2.76E-04	5.22E-01	0	0	1.97E-02	0	0	0	9.51E-06	2.95E-05
	LS9	7.54E-04	4.84E-06	9.16E-03	0	0	3.45E-04	0	0	0	1.67E-07	5.17E-07
	LK	2.07E-02	1.33E-04	2.51E-01	0	0	9.47E-03	0	0	0	4.58E-06	1.42E-05
	LKC	0	9.51E-05	0	0	0	0	0	0	0	0	4.97E-05
	LCR	6.43E-03	4.12E-05	0	2.11E-01	0	2.94E-03	0	0	0	1.42E-06	4.41E-06
	LSL	1.40E-04	8.99E-07	0	4.59E-03	0	6.41E-05	0	0	0	3.10E-08	9.60E-08

Table 2. MODELED EMISSION RATES FOR NON-CARCINOGENIC TAPS (WORST-CASE MODELING SCENARIOS).

Type of Source	Source ID	ALUM[a] (lb/hr)[b]	BARI[c] (lb/hr)	CACA[d] (lb/hr)	CAOX[e] (lb/hr)	CYAN[f] (lb/hr)	IRON[g] (lb/hr)	MANG[h] (lb/hr)	PHOS[i] (lb/hr)	SULF[j] (lb/hr)	THAL[k] (lb/hr)	VANA[l] (lb/hr)
Area Sources	WEP	5.59E+00	6.29E-02	1.10E+00	0	0	1.43E+00	2.35E-02	5.11E-02	0	7.87E-04	2.20E-03
	UGEXP	2.49E-05	2.80E-07	4.91E-06	0	0	6.38E-06	1.05E-07	2.28E-07	0	3.50E-09	9.81E-09
	TSF	0	0	0	0	2.32E-01	0	0	0	0	0	0
Line Sources	AR01	2.02E-02	2.28E-04	3.99E-03	0	0	5.18E-03	8.52E-05	1.85E-04	0	2.85E-06	7.98E-06
	AR02	1.56E-02	1.75E-04	3.07E-03	0	0	3.99E-03	6.55E-05	1.42E-04	0	2.19E-06	6.13E-06
	AR03	3.93E-02	4.43E-04	7.75E-03	0	0	1.01E-02	1.66E-04	3.60E-04	0	5.54E-06	1.55E-05
	AR04	3.77E-02	4.25E-04	7.43E-03	0	0	9.66E-03	1.59E-04	3.45E-04	0	5.31E-06	1.49E-05
Volume Sources	WEPBL	1.90E+00	2.14E-02	3.75E-01	0	0	4.88E-01	8.01E-03	1.74E-02	0	2.68E-04	7.50E-04
	WEDRSF	8.58E-01	9.66E-03	1.69E-01	0	0	2.20E-01	3.61E-03	7.85E-03	0	1.21E-04	3.38E-04
	OC1	1.04E-02	1.17E-04	2.04E-03	0	0	2.65E-03	0	0	0	1.46E-06	4.08E-06
	OC2	1.04E-02	1.17E-04	2.04E-03	0	0	2.65E-03	0	0	0	1.46E-06	4.08E-06
	OC3	1.04E-02	1.17E-04	2.04E-03	0	0	2.65E-03	0	0	0	1.46E-06	4.08E-06
	OC4	1.04E-02	1.17E-04	2.04E-03	0	0	2.65E-03	0	0	0	1.46E-06	4.08E-06
	OC5	1.04E-02	1.17E-04	2.04E-03	0	0	2.65E-03	0	0	0	1.46E-06	4.08E-06
	OC6	1.04E-02	1.17E-04	2.04E-03	0	0	2.65E-03	0	0	0	1.46E-06	4.08E-06
	OC7	8.87E-02	1.00E-03	1.75E-02	0	0	2.28E-02	0	0	0	1.25E-05	3.50E-05
	OC8	1.04E-02	1.17E-04	2.04E-03	0	0	2.65E-03	0	0	0	1.46E-06	4.08E-06
	OC9	4.90E-02	5.52E-04	9.66E-03	0	0	1.26E-02	0	0	0	6.90E-06	1.93E-05
	OC10	4.90E-02	5.52E-04	9.66E-03	0	0	1.26E-02	0	0	0	6.90E-06	1.93E-05
	OC11	4.90E-02	5.52E-04	9.66E-03	0	0	1.26E-02	0	0	0	6.90E-06	1.93E-05
	OC12	9.80E-02	1.10E-03	1.93E-02	0	0	2.51E-02	0	0	0	1.38E-05	3.86E-05
	OC13	1.14E-02	1.29E-04	2.25E-03	0	0	2.93E-03	0	0	0	1.61E-06	4.51E-06
	LS1U	1.13E-03	7.25E-06	0	3.70E-02	0	5.18E-04	1.18E-05	6.50E-06	0	2.50E-07	7.75E-07
	MILLS2U	1.13E-03	7.25E-06	0	3.70E-02	0	5.18E-04	1.18E-05	6.50E-06	0	2.50E-07	7.75E-07
	ACS1U	2.17E-03	1.39E-05	0	7.10E-02	0	9.94E-04	2.27E-05	1.25E-05	0	4.80E-07	1.49E-06
	ACS2U	2.17E-03	1.39E-05	0	7.10E-02	0	9.94E-04	2.27E-05	1.25E-05	0	4.80E-07	1.49E-06
	ACS3U	2.17E-03	1.39E-05	0	7.10E-02	0	9.94E-04	2.27E-05	1.25E-05	0	4.80E-07	1.49E-06
	ACS42U	2.17E-03	1.39E-05	0	7.10E-02	0	9.94E-04	2.27E-05	1.25E-05	0	4.80E-07	1.49E-06
	PSU	0	0	0	0	0	0	0	0	0	0	0
	CS1U	0	0	0	0	0	0	8.01E-07	0	0	0	0
	CS2U	0	0	0	0	0	0	8.01E-07	0	0	0	0
	CAL	1.56E-02	1.00E-04	0	0	0	7.14E-03	0	0	0	3.45E-06	1.07E-05
	CAU	1.56E-02	1.00E-04	0	0	0	7.14E-03	0	0	0	3.45E-06	1.07E-05
	CM	0	0	0	0	0	0	2.59E-05	8.22E-06	0	0	0
	PCSP1	1.41E-02	9.06E-05	1.72E-01	0	0	6.47E-03	0	0	0	3.12E-06	9.69E-06
	PCSP2	1.41E-02	9.06E-05	1.72E-01	0	0	6.47E-03	0	0	0	3.12E-06	9.69E-06
	LS1	3.19E-03	2.05E-05	3.88E-02	0	0	1.46E-03	0	0	0	7.06E-07	2.19E-06
	LS2	5.75E-03	3.69E-05	6.98E-02	0	0	2.63E-03	0	0	0	1.27E-06	3.94E-06
	LS3	2.66E-02	1.71E-04	3.23E-01	0	0	1.22E-02	0	0	0	5.88E-06	1.82E-05

Table 2. MODELED EMISSION RATES FOR NON-CARCINOGENIC TAPS (WORST-CASE MODELING SCENARIOS).												
Type of Source	**Source ID**	**ALUM[a] (lb/hr)[b]**	**BARI[c] (lb/hr)**	**CACA[d] (lb/hr)**	**CAOX[e] (lb/hr)**	**CYAN[f] (lb/hr)**	**IRON[g] (lb/hr)**	**MANG[h] (lb/hr)**	**PHOS[i] (lb/hr)**	**SULF[j] (lb/hr)**	**THAL[k] (lb/hr)**	**VANA[l] (lb/hr)**
	LS4	5.75E-03	3.69E-05	6.98E-02	0	0	2.63E-03	0	0	0	1.27E-06	3.94E-06
	LS5	2.66E-02	1.71E-04	3.23E-01	0	0	1.22E-02	0	0	0	5.88E-06	1.82E-05
	LS7	3.19E-03	2.05E-05	3.88E-02	0	0	1.46E-03	0	0	0	7.06E-07	2.19E-06
	LS8	3.19E-03	2.05E-05	3.88E-02	0	0	1.46E-03	0	0	0	7.06E-07	2.19E-06
	LS10	7.54E-04	4.84E-06	9.16E-03	0	0	3.45E-04	0	0	0	1.67E-07	5.17E-07
	LS11	6.29E-03	4.03E-05	7.63E-02	0	0	2.88E-03	0	0	0	1.39E-06	4.31E-06
	LS12	7.54E-04	4.84E-06	9.16E-03	0	0	3.45E-04	0	0	0	1.67E-07	5.17E-07
	LSU	1.40E-05	8.99E-08	0	4.59E-04	0	6.41E-06	0	0	0	3.10E-09	9.60E-09
	MILLTANKS	0	0	0	0	2.21E-01	0	0	0	0	0	0
	HRT001-HRT072[m]	2.62E-01	2.95E-03	5.16E-02	0	0	6.71E-02	1.10E-03	2.40E-03	0	3.69E-05	1.03E-04
	HRN001-HRN022[m]	2.62E-01	2.95E-03	5.16E-02	0	0	6.71E-02	1.10E-03	2.40E-03	0	3.69E-05	1.03E-04
Total Modeled Rates		***3.37E+01***	***3.79E-01***	***8.76E+00***	***6.96E-01***	***4.53E-01***	***8.69E+00***	***1.39E-01***	***3.03E-01***	***2.03E+00***	***5.17E-03***	***1.39E-02***
Total Emission Rates at 180,000 T/day[n]		***3.37E+01***	***3.79E-01***	***8.76E+00***	***6.96E-01***	***4.53E-01***	***8.69E+00***	***1.39E-01***	***3.03E-01***	***2.03E+00***	***5.17E-03***	***1.39E-02***

a. Aluminum (worst-case modeling scenario: W5).
b. Pounds per hour.
c. Barium (worst-case modeling scenario: W5).
d. Calcium carbonate (worst-case modeling scenario: W5).
e. Calcium oxide (worst-case modeling scenario: W5).
f. Cyanide (worst-case modeling scenario: W5).
g. Iron (worst-case modeling scenario: W5).
h. Manganese (worst-case modeling scenario: W5).
i. Phosphorus (worst-case modeling scenario: W5).
j. Sulfuric acid (worst-case modeling scenario: W5).
k. Thallium (worst-case modeling scenario: W5).
l. Vanadium (worst-case modeling scenario: W5).
m. The Haul Road was represented in the model as a series of volume sources. The emission rates listed in this table represent each individual volume source.
n. Total emission rates at 180,000 tons per day were derived from Worksheet "TblA" in the emission inventory dated October 5, 2021. The total emission rates in this row represent all facility-wide HAP/TAP emission sources from mining, leaching, and processing and production (excluding emissions from sources "addressed" or "covered" by NSPS/NESHAP).

Table 3. MODELED EMISSION RATES FOR CARCINOGENIC TAPS (WORST-CASE MODELING SCENARIOS).						
Type of Source	**Source ID**	**ARSE[a] (lb/hr)[b]**	**BERY[c] (lb/hr)**	**CADM[d] (lb/hr)**	**FORM[e] (lb/hr)**	**NICK[f] (lb/hr)**
Point Sources	LS1L	1.14E-08	3.96E-10	1.24E-10	0	2.47E-09
	MILLS2L	1.14E-08	3.96E-10	1.24E-10	0	2.47E-09
	AC	0	0	0	0	0
	ACB	1.28E-07	7.66E-09	7.02E-07	4.79E-05	1.34E-06
	ACS1L	4.55E-08	1.58E-09	4.94E-10	0	9.89E-09
	ACS2L	4.55E-08	1.58E-09	4.94E-10	0	9.89E-09
	ACS3L	4.55E-08	1.58E-09	4.94E-10	0	9.89E-09
	ACS4L	2.27E-08	7.91E-10	2.47E-10	0	4.94E-09
	CKD	0	0	0	0	0
	CKB	4.07E-07	2.44E-08	2.24E-06	1.52E-04	4.27E-06
	EW	0	0	0	0	0
	MR	0	0	0	0	0
	MF	0	0	0	0	0
	EDG1	0	0	0	0	0
	EDG2	0	0	0	0	0
	EDG3	0	0	0	0	0
	EDFP	0	0	0	0	0
	PV	1.80E-08	1.08E-09	9.91E-08	6.76E-06	1.89E-07
	HS	9.01E-07	5.41E-08	4.96E-06	3.38E-04	9.46E-06
	H1M	7.84E-07	4.71E-08	4.31E-06	2.94E-04	8.24E-06
	H2M	7.84E-07	4.71E-08	4.31E-06	2.94E-04	8.24E-06
	HM	7.84E-07	4.71E-08	4.31E-06	2.94E-04	8.24E-06
	HAC	4.90E-08	2.94E-09	2.70E-07	1.84E-05	5.15E-07
	HR	4.90E-08	2.94E-09	2.70E-07	1.84E-05	5.15E-07
	HA	4.90E-08	2.94E-09	2.70E-07	1.84E-05	5.15E-07
	HMO	9.80E-08	5.88E-09	5.39E-07	3.68E-05	1.03E-06
	HTS	3.92E-07	2.35E-08	2.16E-06	1.47E-04	4.12E-06
	HW	5.88E-07	3.53E-08	3.24E-06	2.21E-04	6.18E-06
	PSL	0	0	0	0	0
	CS1L	2.90E-08	3.33E-09	0	0	2.86E-07
	CS2L	2.90E-08	3.33E-09	0	0	2.86E-07
	LS6	0	0	0	0	0
	LSBM	0	0	0	0	0
	LS9	0	0	0	0	0
	LK	0	0	0	0	0
	LKC	0	0	0	0	0
	LCR	0	0	0	0	0
	LSL	0	0	0	0	0
Area Sources	WEP	9.40E-03	4.51E-05	7.04E-06	0	2.82E-05
	UGEXP	2.34E-07	1.12E-09	1.75E-10	0	7.01E-10
	TSF	0	0	0	0	0
Line Sources	AR01	7.12E-07	9.12E-07	1.42E-07	0	5.70E-07
	AR02	5.48E-07	7.01E-07	1.10E-07	0	4.38E-07
	AR03	1.38E-06	1.77E-06	2.77E-07	0	1.11E-06
	AR04	1.33E-06	1.70E-06	2.65E-07	0	1.06E-06

Table 3. MODELED EMISSION RATES FOR CARCINOGENIC TAPS (WORST-CASE MODELING SCENARIOS).

Type of Source	Source ID	ARSE[a] (lb/hr)[b]	BERY[c] (lb/hr)	CADM[d] (lb/hr)	FORM[e] (lb/hr)	NICK[f] (lb/hr)
Volume Sources	WEPBL	1.79E-02	8.57E-05	1.34E-05	0	5.36E-05
	FDRSF	4.23E-03	[redacted]			
	STKP	[redacted]	2.72E-05	4.25E-06	0	1.70E-05
	OC1	0	0	0	0	0
	OC2	0	0	0	0	0
	OC3	0	0	0	0	0
	OC4	0	0	0	0	0
	OC5	0	0	0	0	0
	OC6	0	0	0	0	0
	OC7	0	0	0	0	0
	OC8	0	0	0	0	0
	OC9	0	0	0	0	0
	OC10	0	0	0	0	0
	OC11	0	0	0	0	0
	OC12	0	0	0	0	0
	OC13	0	0	0	0	0
	LS1U	5.51E-08	1.92E-09	5.99E-10	0	1.20E-08
	MILLS2U	5.51E-08	1.92E-09	5.99E-10	0	1.20E-08
	ACS1U	2.21E-07	7.67E-09	2.40E-09	0	4.79E-08
	ACS2U	2.21E-07	7.67E-09	2.40E-09	0	4.79E-08
	ACS3U	2.21E-07	7.67E-09	2.40E-09	0	4.79E-08
	ACS42U	1.10E-07	3.84E-09	1.20E-09	0	2.40E-08
	PSU	0	0	0	0	0
	CS1U	2.90E-08	3.33E-09	0	0	2.86E-07
	CS2U	2.90E-08	3.33E-09	0	0	2.86E-07
	CAL	0	0	0	0	0
	CAU	0	0	0	0	0
	CM	2.03E-06	0	4.86E-09	0	1.70E-06
	PCSP1	0	0	0	0	0
	PCSP2	0	0	0	0	0
	LS1	0	0	0	0	0
	LS2	0	0	0	0	0
	LS3	0	0	0	0	0
	LS4	0	0	0	0	0
	LS5	0	0	0	0	0
	LS7	0	0	0	0	0
	LS8	0	0	0	0	0
	LS10	0	0	0	0	0
	LS11	0	0	0	0	0
	LS12	0	0	0	0	0
	LSU	0	0	0	0	0
	MILLTANKS	0	0	0	0	0

Table 3. MODELED EMISSION RATES FOR CARCINOGENIC TAPS (WORST-CASE MODELING SCENARIOS).						
Type of Source	**Source ID**	**ARSE[a] (lb/hr)[b]**	**BERY[c] (lb/hr)**	**CADM[d] (lb/hr)**	**FORM[e] (lb/hr)**	**NICK[f] (lb/hr)**
Volume Sources	HRF001-HRF055[g]	1.03E-03				
	HRQ001-HRQ049[g]	1.03E-03				
	HRR001-HRR006[g]	1.03E-03				
	HRN001-HRN022[g]	1.03E-03	9.27E-06	1.45E-06	0	5.80E-06
	HRB001-HRB003[g]	1.03E-03				
	HRP001-HRP057[g]		9.27E-06	1.45E-06	0	5.80E-06
	HRO001-HRO002[g]	1.03E-03	9.27E-06	1.45E-06	0	5.80E-06
Total Modeled Rates		***1.73E-01***	***9.15E-04***	***1.71E-04***	***1.89E-03***	***6.27E-04***
Total T-RACT Emission Rates[h]		***1.73E-01***	***9.1E-04***	***1.7E-04***	***1.9E-03***	***6.3E-04***
Total Emission Rates at 180,000 T/day[i]		***4.03E-01***	***1.36E-03***	***2.40E-04***	***1.89E-03***	***9.04E-04***

a. Arsenic (worst-case modeling scenario: W2).
b. Pounds per hour.
c. Beryllium (worst-case modeling scenario: W1).
d. Cadmium (worst-case modeling scenario: W1).
e. Formaldehyde (worst-case modeling scenario: W1).
f. Nickel (worst-case modeling scenario: W1).
g. The Haul Road was represented in the model as a series of volume sources. The emission rates listed in this table represent each individual volume source.
h. Total T-RACT emission rates – calculated based on T-RACT controls, long-term mining production limits, and other emission inventory refinements, as described in Section 4.0 of this *Modeling Review Attachment* – are derived from Tables B-W2 (for Arsenic) and B-W1 (for Beryllium, Cadmium, Formaldehyde, and Nickel) in Appendix B of the *TAP Addendum*.
i. Total emission rates at 180,000 tons per day were derived from Worksheet "TblA" in the emission inventory dated October 5, 2021. The total emission rates in this row represent all facility-wide HAP/TAP emission sources from mining, leaching, and processing and production (excluding emissions from sources "addressed" or "covered" by NSPS/NESHAP).

5.5 Cyanide Modeling Emission Source Parameters

Modeling analyses for cyanide introduced two new emission sources that were not previously evaluated by DEQ: tailings storage facility (model ID: TSF) and mill tanks (model ID: MILLTANKS).

1. The tailings storage facility was modeled by Air Sciences as a surface-based (zero release height above ground-level and zero initial vertical dimension) AREA source. The easterly and northerly lengths were calculated as square-root of the TSF area (easterly length = northerly length = $\sqrt{1{,}338{,}158\ square\ meters}$ = 1,157 meters).

2. The mill tanks were grouped and modeled by Air Sciences as a single VOLUME source. The tanks sit on the ground, so the release height was set to the average tank height of 12.2 meters (40 feet). The initial lateral dispersion (σ_y) was calculated as the equivalent diameter of the combined (18) tank area divided by the single VOLUME source coefficient of 4.3:

$$\sigma_{y(MILLTANKS)} = \frac{Equivalent\ diameter}{4.3} = \frac{\sqrt{\Sigma(d)^2}}{4.3} = 42.8\ feet$$

The individual tank diameters (d) are: two tanks at 40 feet, four tanks at 52 feet, six tanks at 54 feet, and six tanks at 20 feet.

DEQ typically requires that tailings storage facilities be modeled as an AREAPOLY source with an outline that follows the contour of the emission source, and that mill tanks be represented in the model as individual volume sources; but, given that the maximum modeled concentration for cyanide is safely below the AAC (0.08%), DEQ's modeling team accepted the modeling analysis submitted by Air Sciences and concluded that it confidently demonstrates that the cyanide AAC will not be exceeded.

5.6 Deposition Modeling

Air Sciences applied particle deposition algorithms in the impact modeling for particulate TAPs. The particulate deposition parameters used in the NAAQS compliance analysis were derived for PM_{10} and $PM_{2.5}$ (see Tables 22 and 23 in the main body of the DEQ *Modeling Review Memorandum*). Dust-related metal TAP emissions include total particulates (all size fractions of particulate matter [PM] up to PM_{30}). Therefore, the deposition parameters for PM were calculated using the same methodology and EPA references used for PM_{10} and $PM_{2.5}$ in the NAAQS compliance demonstration analyses. The PM deposition parameters are provided below in Table 4. The same density values were used as in the previous TAPs modeling analysis. However, an additional deposition characterization bin was added to better handle deposition of 10 µm to 30 µm particulates; mass fractions were adjusted accordingly.

Table 4. PARTICULATE MATTER DEPOSITION PARAMETERS BY SOURCE CATEGORY.

Source Category	Parameter	PM				
		Bin 1	Bin 2	Bin 3	Bin 4	Bin 5
Haul Roads	Bin Upper Diameter (µm)	2.50	10.00	30.00	--	--
	Mass Fraction	0.02	0.23	0.75	--	--
	Mass Mean Diameter (µm)	2.50	10.00	30.00	--	--
	Density (g/cm^3) (YPP, HFP, WEP DR average)	2.46	2.46	2.46	--	--
Material Handling (Ore, DR, Limestone)	Bin Upper Diameter (µm)	2.50	5.00	10.00	30.00	--
	Mass Fraction	0.07	0.20	0.20	0.53	--
	Mass Mean Diameter (µm)	2.50	5.00	10.00	30.00	--
	Density (g/cm^3) (Ore)	Pit-specific, see Table 23[a].				
	Density (g/cm^3) (Ore and Waste)	Pit-specific, see Table 23.				
	Density (g/cm^3) (Limestone)	1.09	1.09	1.09	1.09	--
Baghouses	Bin Upper Diameter (µm)	2.50	6.00	10.00	30.00	--
	Mass Fraction	0.25	0.45	0.20	0.10	--
	Mass Mean Diameter (µm)	2.50	6.00	10.00	30.00	--
	Density (g/cm^3) (Ore)	Pit-specific, see Table 23.				
Diesel Engines	Bin Upper Diameter (µm)	1.00	2.50	6.00	10.00	30.00
	Mass Fraction	0.82	0.08	0.03	0.03	0.04
	Mass Mean Diameter (µm)	1.00	2.50	6.00	10.00	30.00
	Density (g/cm^3) (Diesel Combustion)	1.00	1.00	1.00	1.00	1.00
Heaters and Boilers	Bin Upper Diameter (µm)	1.00	2.50	6.00	10.00	30.00
	Mass Fraction	0.23	0.22	0.25	0.09	0.21
	Mass Mean Diameter (µm)	1.00	2.50	6.00	10.00	30.00
	Density (g/cm^3) (Propane Combustion)	1.24	1.24	1.24	1.24	1.24

Table 4. PARTICULATE MATTER DEPOSITION PARAMETERS BY SOURCE CATEGORY.						
Source Category	**Parameter**	**PM**				
		Bin 1	**Bin 2**	**Bin 3**	**Bin 4**	**Bin 5**
Lime Loading and Unloading (Quick, Pebble)	Bin Upper Diameter (µm)	2.50	10.00	30.00	--	--
	Mass Fraction	0.05	0.29	0.66	--	--
	Mass Mean Diameter	2.50	10.00	30.00	--	--
	Density (g/cm^3) (Quick)	0.44	0.44	0.44	--	--
	Density (g/cm^3) (Pebble)	0.96	0.96	0.96	--	--
Lime Unloading (Quick, Pebble)	Bin Upper Diameter (µm)	2.50	10.00	30.00	--	--
	Mass Fraction	0.09	0.49	0.42	--	--
	Mass Mean Diameter (µm)	2.50	10.00	30.00	--	--
	Density (g/cm^3) (Quick)	0.44	0.44	0.44	--	--
	Density (g/cm^3) (Pebble)	0.96	0.96	0.96	--	--
Cement and Aggregate Loading and Unloading	Bin Upper Diameter (µm)	2.50	10.00	30.00	--	--
	Mass Fraction	0.05	0.29	0.66	--	--
	Mass Mean Diameter (µm)	2.50	10.00	30.00	--	--
	Density (g/cm^3) (Cement)	1.44	1.44	1.44	--	--
	Density (g/cm^3) (Aggregate)	1.28	1.28	1.28	--	--
Prill Loading and Unloading	Bin Upper Diameter (µm)	2.50	10.00	30.00	--	--
	Mass Fraction	0.05	0.30	0.65	--	--
	Mass Mean Diameter (µm)	2.50	10.00	30.00	--	--
	Density (g/cm^3) (Prill)	0.84	0.84	0.84	--	--
Refining Processes	Bin Upper Diameter (µm)	1.00	2.50	6.00	10.00	30.00
	Mass Fraction	0.72	0.10	0.07	0.03	0.08
	Mass Mean Diameter (µm)	1.00	2.50	6.00	10.00	30.00
	Density (g/cm^3) (Diesel Combustion)	1.00	1.00	1.00	1.00	1.00
Portable Crushing and Screening Plant	Bin Upper Diameter (µm)	2.50	10.00	30.00	--	--
	Mass Fraction	0.05	0.32	0.63	--	--
	Mass Mean Diameter (µm)	2.50	10.00	30.00	--	--
	Density (g/cm^3) (YPP, HFP, WEP DR average)	2.46	2.46	2.46	--	--
Lime Kiln and Ball Mill	Bin Upper Diameter (µm)	2.50	10.00	30.00	--	--
	Mass Fraction (Kiln)	0.27	0.28	0.45	--	--
	Mass Fraction (Ball Mill)	0.30	0.54	0.16	--	--
	Mass Mean Diameter (µm)	2.50	10.00	30.00	--	--
	Density (g/cm^3)	1.09	1.09	1.09	--	--
Blasting and Drilling	Bin Upper Diameter (µm)	2.50	10.00	30.00	--	--
	Mass Fraction	0.03	0.49	0.48	--	--
	Mass Mean Diameter (µm)	2.50	10.00	30.00	--	--
	Density (g/cm^3) (Ore or DR)	Pit-specific, see Table 23.				
Dozing	Bin Upper Diameter (µm)	2.50	10.00	15.00	30.00	--
	Mass Fraction	0.11	0.08	0.06	0.75	--
	Mass Mean Diameter (µm)	2.50	10.00	15.00	30.00	--
	Density (g/cm^3) (DR)	Pit-specific, see Table 23.				

[a.] See Table 23 in the main body of the DEQ *Modeling Review Memorandum*.

5.7 Carcinogenic TAP Modeling Lifetime Exposure Adjustment

Maximum modeled concentrations for carcinogenic TAPs were adjusted to account for the life-of-mine production limits, which affects the lifetime exposure.

PRI evaluated the highest modeled annual carcinogenic TAP concentration from each of the 14 modeling scenarios for lifetime exposure as follows:

$$Lifetime\ exposure\ \left(\frac{\mu g}{m^3}\right) = \frac{Highest\ annual\ concentration\ \left(\frac{\mu g}{m^3}\right) \times 16\ (mine\ operation\ years)}{70\ (years, lifetime\ exposure)}$$

This equation assumes that the highest annual concentration from the 14 modeling scenarios is repeated for 16 years of mining operation. This was then averaged over 70 years to calculate the 70-year lifetime exposure.

PRI and Air Sciences contend that calculating lifetime exposure based on 16 years of mining operation is conservative. The annual emissions for carcinogenic TAP modeling are based on 135,000 tons/day (see Section 5.1 of this *Modeling Review Attachment*) and 365 days per year. Over 16 years, this equates to a potential mining production of 788.4 million tons:

$$\frac{135{,}000\ \left(\frac{tons}{day}\right) \times 365\ \left(\frac{days}{year}\right) \times 16\ years}{1{,}000{,}000\ \left(\frac{tons}{million\ ton}\right)} = 788.4\ million\ tons$$

The actual life-of-mine total production as described in the SGP *Refined Proposed Action* (*ModPRO2*) mine plan is only 402.86 million tons (Perpetua 2021), which is 51.1% of the potential life-of-mine production represented in the above equation and related emission evaluations.

5.8 Arsenic Compliance Demonstration for Modeling Scenarios W1-W4

To demonstrate compliance with the AACC for arsenic, PRI applied two additional operating limitations:

- The removal of Modeling Scenario W5 as a potential operating scenario
- Limiting the West End Pit's life-of-mine potential mining production to 50% of the total life-of-mine potential mining production of 788.4 million tons: 50% * 788.4 million tons = 394.2 million tons

PRI has determined that the West End Development Rock Storage Facility (DRSF) will not be constructed. This change eliminated Modeling Scenario W5 from the arsenic modeling evaluation. The remaining four West End Pit modeling scenarios (W1–W4) are evaluated using the 70-year lifetime exposure equation from Section 5.7 and adjusting for the proposed West End Pit life-of-mine production limit of 50% of the total production as follows:

$$LifeExpose_{Wi,j,n} = \left[\left(WEPExpose_{Wi,n}\right)(50\%) + \left(nonWEPExpose_{Sj,n}\right)(50\%)\right]\left[\frac{16\ year\ LOM}{70\ year\ exposure}\right]$$

where:

Wi	=	West End Pit scenario, where i = 1 to 4.
Sj	=	non West End Pit scenario, where j = B1, B2, H1, H2, H3, H4, Y1, Y2, and Y3.
n	=	specific receptor.
$LifeExpose_{Wi,j,n}$	=	lifetime exposure in µg/m^3 for West End Pit scenario i, non West End Pit scenario j, at receptor n.
$WEPExpose_{Wi,n}$	=	annual maximum impact in µg/m^3 for West End Pit scenario i at receptor n.
$nonWEPExpose_{Sj,n}$	=	annual maximum impact in µg/m^3 for non West End Pit scenario j at receptor n.
16 year LOM	=	maximum life-of-mine.
70 year exposure	=	Lifetime exposure used for development of AACCs in *Idaho Air Rules*.

The above equation was used to calculate the lifetime arsenic exposure from the West End Pit scenarios (W1–W4) on a receptor-by-receptor basis. Combining the concentrations from Modeling Scenarios W1–W4 with the highest concentration from the remaining non-West End Pit scenarios (B1, B2, H1, H2, H3, H4, Y1, Y2, or Y3) conservatively ensures that the maximum potential impacts from applicable sources are evaluated and remain below AACCs.

PRI contends that calculating lifetime arsenic exposure based on the proposed West End Pit life-of-mine production limit of 50% of the total production is conservative. The actual life-of-mine total production from the West End Pit as described in the ModPRO2 mine plan is only 198.26 million tons (Perpetua 2021), which is 50.3% of the proposed West End Pit life-of-mine production limit of 394.2 million tons.

6.0 Impact Results

TAP impact analysis results, as submitted in the *TAP Addendum* and as further assessed by DEQ, are discussed in this section. The effect of various operational refinements also reduced PM_{10} and $PM_{2.5}$ impacts, and this is discussed in Section 6.2.

6.1 TAP Impact Analyses Results

This section describes the revised TAP impact analyses and demonstrates that applicable TAP emissions resulting from operation of the SGP will not result in increased impacts that exceed AACs or AACCs.

6.1.1 Modeling Non-Carcinogenic TAPs

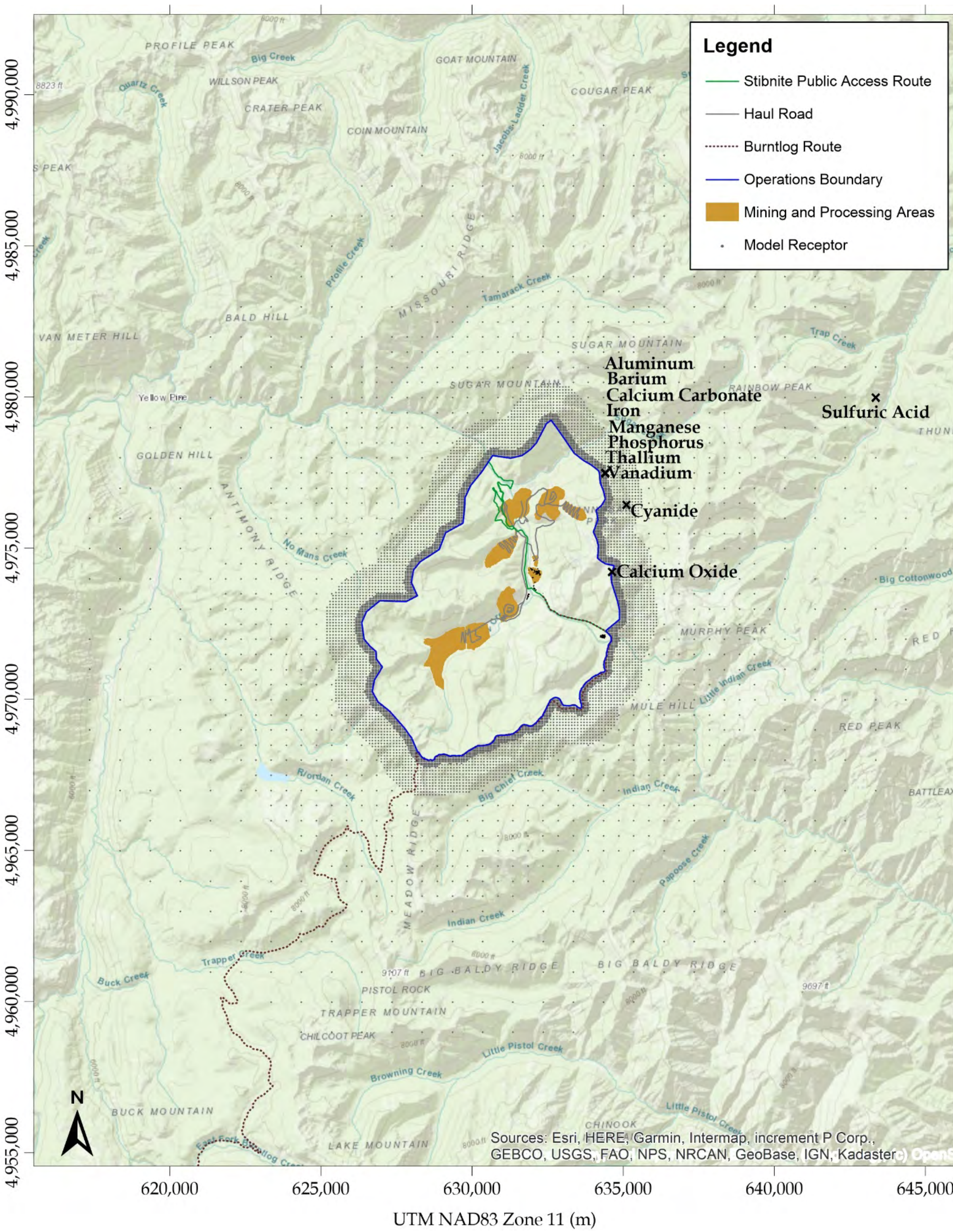
The non-carcinogenic TAPs subject to impact modeling requirements to demonstrate compliance with AACs of *Idaho Air Rules* Section 585 were modeled at the emission levels shown in Table 1 above. The maximum 24-hour modeled concentration for each of the 14 modeling scenarios demonstrates compliance with the applicable AAC, as summarized below in Table 5. PRI elected to include Scenario W5 in the modeling analysis for non-carcinogenic TAPs. Figure 1 illustrates the locations of the maximum impacts for each non-carcinogenic TAP.

Table 5. RESULTS FOR TAPS IMPACT ANALYSES FOR NON-CARCINOGENIC TAPS.					
Toxic Air Pollutant	**Averaging Time**	**Maximum Modeled Concentration ($\mu g/m^3$)[a]**	**Model Scenario**	**AAC[b] ($\mu g/m^3$)**	**Percent of AAC**
Aluminum	24-hour	6.17	W5	500	1.23%
Barium	24-hour	0.07	W5	25	0.28%
Calcium carbonate	24-hour	1.22	W5	500	0.24%
Calcium oxide	24-hour	0.15	All	100	0.15%
Cyanide	24-hour	0.20	All	250	0.08%
Iron	24-hour	1.58	W5	50	3.16%
Manganese	24-hour	0.03	W5	250	0.01%
Phosphorus	24-hour	0.06	W5	5	1.20%
Sulfuric acid	24-hour	0.41	All	50	0.82%
Thallium	24-hour	0.001	W5	5	0.02%
Vanadium	24-hour	0.002	W5	2.5	0.08%

a. Micrograms per cubic meter.

b. Acceptable Ambient Concentration of a Non-carcinogenic TAP.

Figure 1. SGP NON-CARCINOGENIC MAXIMUM TAP IMPACT LOCATIONS.



6.1.2 Modeling Carcinogenic TAPs

The carcinogenic TAPs subject to impact modeling requirements to demonstrate compliance with AACCs of *Idaho Air Rules* Section 586 were modeled using an emission inventory that includes the T-RACT controls, long-term mining production limits, and other emission inventory refinements, as described in Section 4.0 and 5.0 of this *Modeling Review Attachment*.

The maximum modeled impact for each of the 14 modeling scenarios demonstrated compliance with the T-RACT AACC, as summarized below in Table 6. The SGP maximum concentrations were adjusted to account for the life-of-mine production limits, which affect the lifetime exposure, and to account for the elimination of Modeling Scenario W5. See Sections 5.7 and 5.8 of this *Modeling Review Attachment* for more detail. The locations of the maximum impacts for each carcinogenic TAP are presented in Figure 2. Arsenic concentrations are considerably lower in areas away from the location of maximum impact as shown in Figure 3.

Table 6. RESULTS FOR TAPS IMPACT ANALYSES FOR CARCINOGENIC TAPS.

Toxic Air Pollutant	Averaging Time	Maximum Modeled Lifetime Exposure Concentration ($\mu g/m^3$)[a,b]	Model Scenario	AACC[c] ($\mu g/m^3$)	T-RACT[d] AACC	Percent of T-RACT AACC
Arsenic	Annual	0.00095	W2	0.00023	0.0023	41.30%
Beryllium	Annual	0.00001	W1	0.0042	0.042	0.02%
Cadmium	Annual	0.000002	W1	0.00056	0.0056	0.04%
Formaldehyde	Annual	0.00007	W1	0.077	0.77	0.01%
Nickel	Annual	0.00001	W1	0.042	0.42	<0.01%

a. Micrograms per cubic meter.
b. The lifetime exposure concentrations are based on the proposed restrictions discussed in Sections 5.7 and 5.8 of this *Modeling Review Attachment*.
c. Acceptable Ambient Concentration of a Carcinogenic TAP.
d. Toxic Air Pollutant Reasonably Available Control Technology allows the AACCs to be increased by a factor of ten per *Idaho Air Rules* Section 210.12(b).

Figure 2. SGP CARCINOGENIC MAXIMUM TAP IMPACT LOCATIONS.

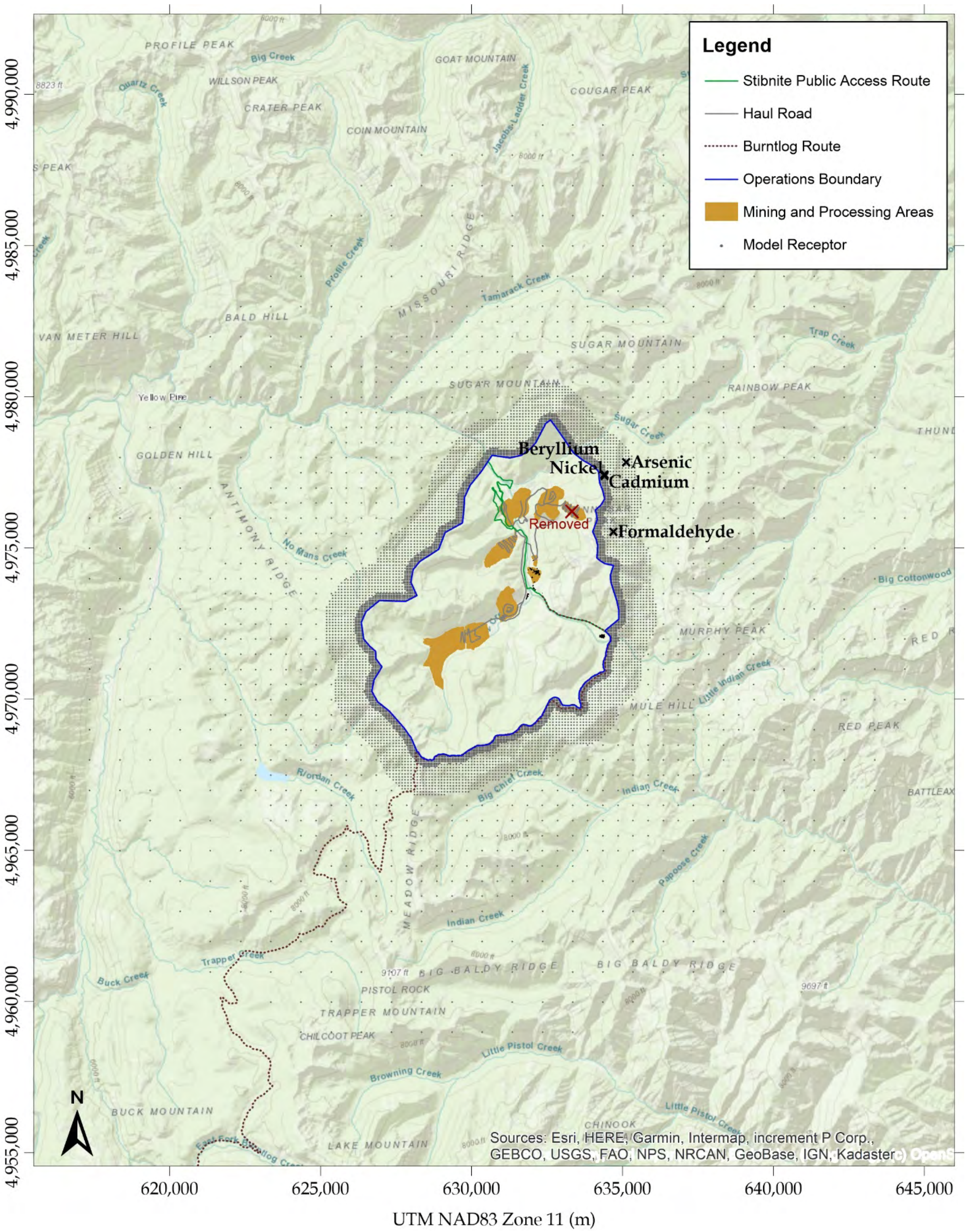
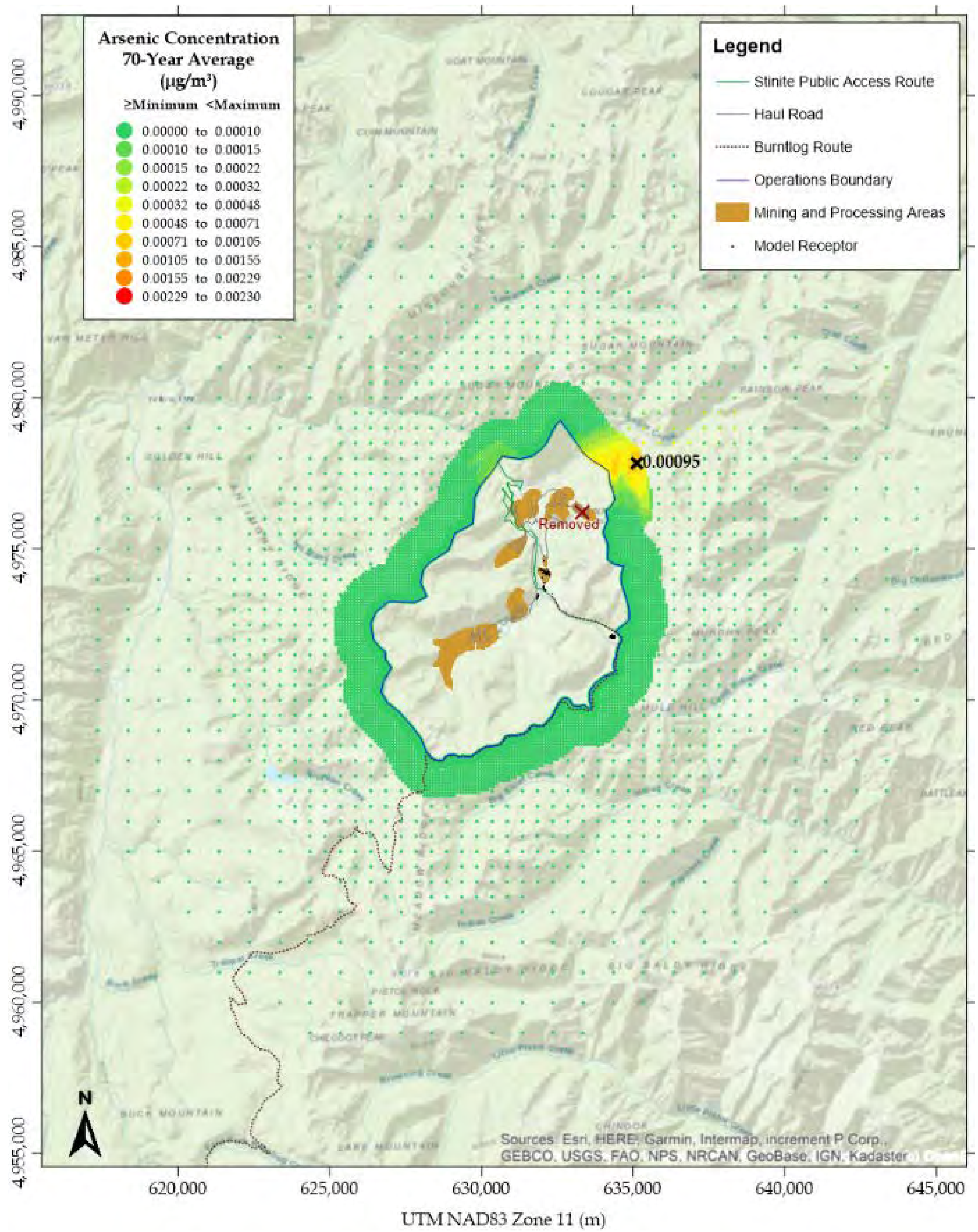


Figure 3. SGP CONTOURS OF LIFETIME ARSENIC IMPACTS.



6.2 *Effect of Changes to Modeled PM_{10} Results*

PRI has determined that the West End Development Rock Storage Facility will not be constructed. This change eliminated Modeling Scenario W5 as a potential operating scenario. In Section 4.1.4 in the main body of the DEQ *Modeling Review Memorandum,* DEQ identified PM_{10} NAAQS exceedances at four hotspot receptors when using the BULKRN meteorological dataset for Modeling Scenario W5 (the highest PM_{10} impact modeling scenario). When Modeling Scenario W5 is removed, the highest modeled impacts are predicted to occur for Modeling Scenario W3, which represents the transport of development rock from the West End Pit to the Hangar Flats Development Rock Storage Facility.

Table 7 presents results for the cumulative NAAQS impact analyses for Scenario W3. Results still exceed the 24-hour PM_{10} NAAQS even when Modeling Scenario W5 is eliminated. However, there is only one hotspot receptor exceeding NAAQS. The modeled violation is also predicted to occur during winter. This is a critical consideration because during winter, not only are fugitive emissions minimized because of the higher moisture content of material handled or driven over, but background concentrations in such remote areas are also generally much lower because of the absence of wildfires and dust-generating sources.

Table 7 also lists the results when using temporally varying backgrounds, instead of a single-value background, in the cumulative NAAQS impact analysis (using the "SEASON" and "MONTH" options in AERMOD). The highest daily average PM_{10} concentrations measured at Stibnite for every season and month in 2014 were used as inputs in the model. Table 7 shows that the SGP facility *safely* demonstrates compliance with the 24-hour PM_{10} NAAQS when temporally varying backgrounds (both seasonal and monthly) are used instead of the single-value background. Summing modeled design values with a single-value background that is on the upper end of the distribution results in a very conservative estimate of total impacts. DEQ strongly believes that using temporally varying backgrounds that respect seasonality is appropriate for the SGP facility, and that using the highest value in the period interval is very conservative.

TABLE 7. RESULTS FOR 24-HOUR PM_{10} CUMULATIVE NAAQS IMPACT ANALYSES FOR MODELING SCENARIO W3.

Backgrounds Scenario	Max. Conc.[a] ($\mu g/m^3$)[b]	Model Scenario	Back. Conc.[c] ($\mu g/m^3$)	Total Conc.[d] ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Percent of NAAQS
Single-Value Background	116.9	W3	34.0	150.9[e]	150	100.6%
Seasonally Varying Backgrounds	123.5[f]	W3	*Seasonal*	123.5[f]		82.3%
Monthly Varying Backgrounds	123.5[f]	W3	*Monthly*	123.5[f]		82.3%

a. Max. Conc. = maximum modeled design concentration.
b. Micrograms per cubic meter.
c. Back. Conc. = background concentration.
d. Total Conc. = total (modeled + background) concentration.
e. One hotspot receptor exceeds NAAQS.
f. The maximum modeled design concentration already incorporates the seasonal and monthly background values.

The time series plot in Figure 4 and the box-and-whiskers plot in Figure 5 illustrate the variability in daily average PM_{10} concentrations collected at the Stibnite Site in 2014. Figures 4 and 5 confirm that the highest concentrations from the modeled and monitored datasets do *not* occur simultaneously. Highest modeled impacts are predicted to occur during winter while the highest background concentrations were measured at Stibnite during summer. Therefore, the summation method, where total impacts are calculated by summing modeled design values with a background concentration that is also consistent in form with the regulatory design value, results in a very conservative estimate of the total impact for comparison to NAAQS. DEQ concludes that use of temporally varying (i.e., seasonal and monthly) backgrounds for SGP is justified. DEQ is highly confident that operation of the SGP will not cause or contribute to a violation of NAAQS.

PM_{10} and $PM_{2.5}$ NAAQS compliance was previously demonstrated prior to refinements and adjustments proposed in the submitted *TAP Addendum*. The main body of the DEQ *Modeling Review Memorandum* discussed and considered results from both modeling with meteorological data processed using the BULKRN method and modeling with data processed using cloud cover data, and DEQ concluded that NAAQS compliance was demonstrated with a high degree of confidence. The adjustments and refinements described in the *TAP Addendum* further increase DEQ's confidence in NAAQS compliance.

Figure 4. TIME SERIES OF DAILY AVERAGE PM_{10} CONCENTRATIONS MEASURED AT STIBNITE IN 2014.

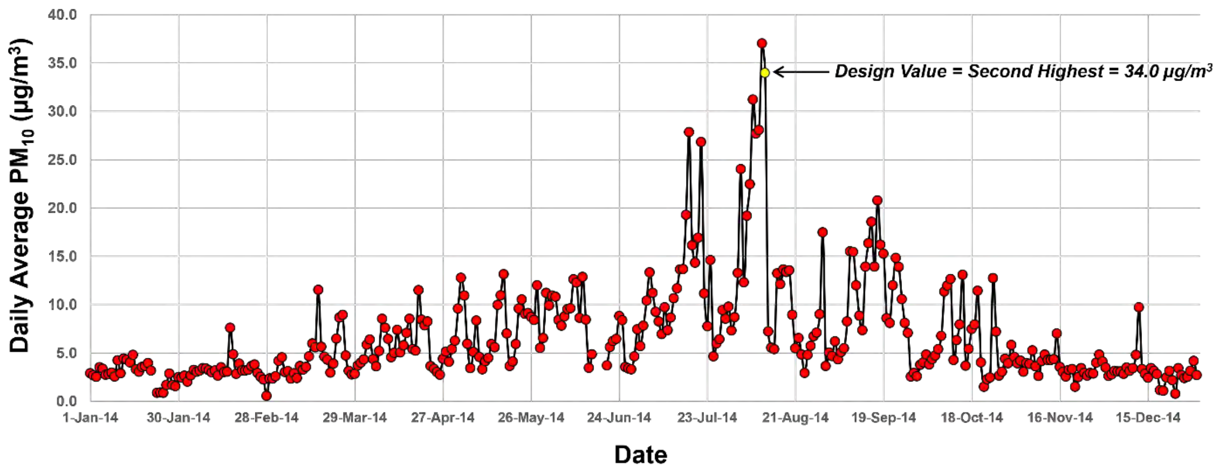
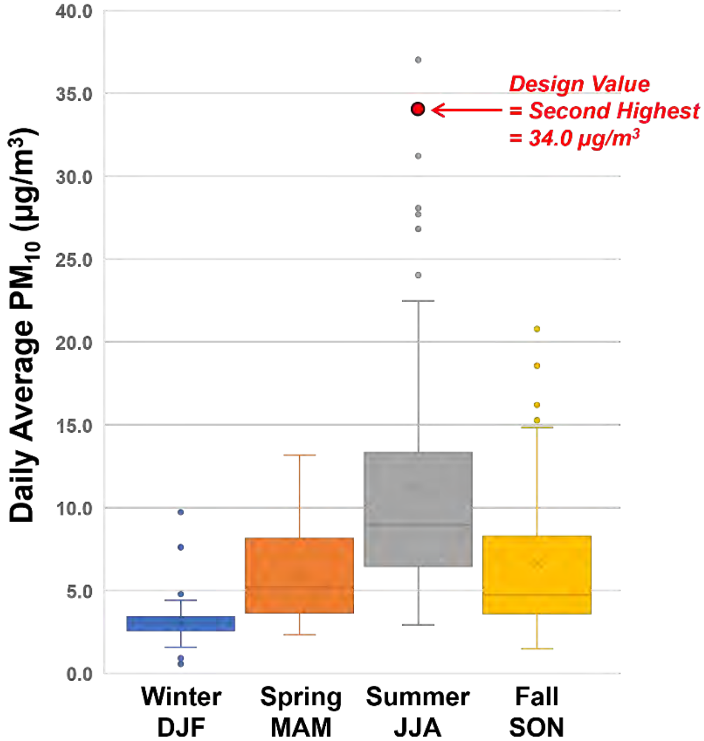


Figure 5. BOX-AND-WHISKERS PLOT FOR SEASONAL PM_{10} BACKGROUND CONCENTRATIONS MEASURED AT STIBNITE IN 2014.



In Figure 5 the middle line of each box represents the median. The "x" in the box represents the mean. The bottom and the top lines of the box represent the 1st quartile (25th percentile) and the 3rd quartile (75th percentile), respectively. The whiskers extend to the minimum and maximum values not considered outliers. Outliers are plotted individually.

7.0 Conclusions

This section provides conclusions of the *TAP Addendum* and DEQ's review of the *TAP Addendum*.

7.1 Conclusions of Revised TAP Analyses

The revised and refined TAP analyses:

- Revised TAP-applicable sources at the SGP facility.
- Proposed additional emission control measure and adjusted operations to reduce TAP emissions.
- Refined the approach used to demonstrate compliance with TAP regulations.

The submitted application, with the adjustments and refinements to analyses as described in the *TAP Addendum*, demonstrated to DEQ's satisfaction that the emissions of applicable TAPs will not result in impacts to ambient air that exceed TAP increments of *Idaho Air Rules* Section 585 and 586.

7.2 Effects of Adjustments/Revisions on NAAQS Compliance Demonstrations

The submitted application, prior to the *TAP Addendum*, demonstrated compliance with NAAQS to DEQ's satisfaction; and the operational measures proposed in the *TAP Addendum* will only further reduce estimated emissions. Eliminating Modeling Scenario W5 impacts, with the elimination of the West End Development Rock Storage Facility, affects the 24-hour PM_{10} impact modeling analysis for SGP. Modeling Scenario W3 is now the scenario producing the highest modeled impacts, and NAAQS compliance is easily demonstrated when using temporally varying background PM_{10} values, which were obtained from onsite monitoring data.

7.3 Conservatism of Permitting Analyses

Emissions and locations from which emissions occur are highly dynamic at mining facilities. This presents unique challenges for permit development because permits must include limits and operational requirements that ensure air quality standards are not violated. Permitting rules require that air impacts be assessed using maximum potential emissions as limited by either the capacity of the unit/operation or as limited by enforceable permit provisions. A permit where actual emissions are nearly representative of maximum allowable emissions, through imposing permit limits, would be exceedingly complex and require overly burdensome monitoring and record-keeping requirements. To avoid this, applicants typically calculate allowable emissions and perform impact analyses based on simplistic operational scenarios that largely overstate emissions estimated to occur from the facility.

PRI and Air Sciences have asserted that the submitted emission estimates, operational scenarios, and air impact analyses associated with the permit application greatly overstate best-estimated values. This point is evident when comparing the permit application materials and analyses with those presented in ModPRO2, PRI's revised mine plan and associated impacts. ModPRO2 is used in support of the Environmental Impact Statement (EIS).

Reference

Perpetua. 2021. "ModPRO2 Mine Plan." *File: Midas Stibnite Mine Plan and Equipment Schedule (10Feb21).xlsx.* Email from R. McCluskey, Perpetua Resources Inc., to E. Memon, Air Sciences Inc., February 11.

APPENDIX C – FACILITY DRAFT COMMENTS

The following comments were received from the facility on August 3 and 13, 2020:

Editorial proposed changes were provided in a redlined version of the draft permit. Each non-editorial proposed change was addressed in the following comments. DEQ agreed with and incorporated the redlined editorial corrections that were not individually addressed in the following (non-editorial) comments below.

Facility Comment #1: Condition 1.2, Table 1.1, and Condition 3.2, Table 3.1: Please remove the control efficiency values listed for haul roads (93.3%) and enclosures (80%). It appears that these percentages are provided for descriptive purposes only. As such, this information would more appropriately be provided in the Statement of Basis only. In addition, it does not appear that Idaho mining PTCs typically contain control efficiency values for fugitive sources. Alternatively, the following language may be added to Condition 1.2, "Control equipment information and maximum process rate information is provided for information only unless also included in specific enforceable permit conditions."

DEQ Response:

Permit Conditions 1.2 and 3.2 were revised for clarification to include a statement that the information in the tables is provided for informational purposes.

Proposed control efficiencies were left unchanged. Although control efficiencies are included for informational purposes, this information serves as an important reference when observing and characterizing emissions as required by the permit. The specified control efficiencies were relied upon in estimating and modeling emissions and are one of many important parameters which form the basis of this permit.

Facility Comment #2: Condition 1.2, Table 1.1, Hauling, and Condition 2.5, 2nd and 17th Bullets: Please remove the Maximum Process Rate of "490,000 mi/mo" and related monitoring obligation. The mining excavation rate is already limited to 180,000 T/day, which directly impacts vehicle miles traveled. At this limit, all hauling scenarios were modeled to capture the maximum-case hauling distances, which included a hauling mileage of 16,415 mi/day (492,465 mi/30 days or 508,880 mi/31 days). The maximum-case mileage far exceeds the peak production total actual annual hauling mileage of 1.4 million mi/yr (116,700 mi/mo). Therefore, a mileage limit is not necessary to limit emissions, and recording miles daily adds unnecessary and burdensome monitoring.

DEQ Response:

Permit Conditions 1.2 and 2.6 (renumbered) were revised to remove the explicit mileage limit. As supported by the emission estimates, hauling operations and associated emissions are constrained by the daily production limit and the proposed vehicle fleet characteristics.

Although all conditions that affect roadway conditions should be considered when determining water and suppressant application rates and frequency, it is left to the permittee to determine and define within the FDCP the site-specific parameters most critical to ensuring successful control of fugitive emissions. An effective FDCP will require active monitoring on the part of the permittee to determine the appropriate frequencies and amounts of water and dust suppressant applications sufficient to achieve the target 93.3% reduction in haul road emissions. Monitoring of vehicle mileage is one option that may need to be considered.

Facility Comment #3:

Condition 1.2, Table 1.1, Prill Silos, and Conditions 3.8 and 3.17: Please revise the Maximum Process Rate of "608/month" to "200 T/day." The daily rate was used for the 24- hour PM_{10} and 24-hour $PM_{2.5}$ modeling. See Appendix B, pages 11, 12, and 15 of the June 23, 2020, PTC Application (Application). No other criteria pollutants or toxic air pollutants (TAP) are emitted by these insignificant sources. The Application also requested a 7,300 T/yr limit. However, it has come to our attention that an annual limit of 9,000 T/yr is needed. This change has essentially no effect on the annual emission inventory for annual $PM_{2.5}$ modeling. The $PM_{2.5}$ emission change from increasing the annual throughput from 7,300 T/yr to 9,000 T/yr (an increase of 0.00005 g/s) is less than five-thousandth of a percent of the total $PM_{2.5}$ emissions.

DEQ Response:

Permit Condition 1.2 was revised to reflect the requested daily and annual rates.

Annual emission estimates were updated in the statement of basis to reflect the increase in annual silo material loading and unloading rates from 7,300 to 9,000 T/yr. Based on a supplemental modeling analysis performed by DEQ, in which the Prill Silos Loading (PSL) and Prill Silos Unloading (PSU) were each modeled with adjusted annual $PM_{2.5}$ emission rates, the model impacts reported did not change.

Facility Comment #4:

Condition 1.2, Table 1.1, Autoclave (AC) and Electrowinning Cells: Please remove "and as limited by Subpart EEEEEEE" from the Maximum Process Rate. Subpart EEEEEEE does not contain any process rate limits. This subpart only provides emission limits, and control and monitoring requirements as noted in Condition 4.2, Table 4.1, and Conditions 4.18 and 4.19.

DEQ Response:

Permit Condition 1.2 was updated as requested to remove references to Subpart EEEEEEE. As indicated, process emissions rather than process maximum rates are limited by this subpart.

Because federally-applicable requirements will be explicitly incorporated into the required Tier I permit, high-level references and incorporation by reference were considered sufficient within the PTC.

Facility Comment #5:

Condition 1.2, Table 1.1, POX Boiler, and Condition 4.4: Please replace the Maximum Process Rate of "1 hr/day and 30 hr/yr" with "operation is limited to AC start-up only." The boiler is used only for starting up the AC. Once the AC is running, the boiler is turned off; however, a start-up will be longer than 1 hour. AC start-ups are expected to require up to 10 hours of POX Boiler firing, and there may be as many as three start-ups per year. Limiting operation only to start-up provides flexibility and reflects the proposed operating scenario. Midas will continue to monitor boiler operating hours during AC start-up, per Condition 4.17.

DEQ Response:

Permit Condition 1.2 was updated as requested to reflect operation during autoclave startup only. Based on a supplemental modeling analysis performed by DEQ, operation as described does not change reported model impacts.

Facility Comment #6:

Condition 1.2, Table 1.1, PFR Shaft Lime Kiln Combustion: Please replace "20.5" with "22.0 MMBtu/hr." See page 93 of the Application.

DEQ Response:

Permit Condition 1.2 was updated to reflect the correct heat input capacity for the Parallel Flow Regenerative Shaft Kiln.

Facility Comment #7:

Condition 1.2, Table 1.1, SAG Mill and AC Lime Silos: The Maximum Process Rate of "169 T/day and 52,337 T/yr" only applies to LS-L/U, LK, and LCR. The SAG Mill and AC Lime Silos (6 storage silos) have a combined Maximum Process Rate of 70,000 T/yr of lime.

DEQ Response:

Permit Condition 1.2 was revised to reflect the correct maximum process rates, including the combined daily and annual loading and unloading rates from all six silos.

Facility Comment #8:

Condition 1.2, Table 1.1, Concrete Production, and Condition 5.8: Please replace the Maximum Process Rate of "80 T/day and 60,000 T/yr (cement + aggregate)" with "2,480 T/day and 560,000 T/yr of (cement + aggregate)." See page 47 of the Application. Also, the Central Mixer capacity is 120 T/hr (20 T/hr of cement plus 100 T/hr of aggregate).

DEQ Response:

Permit Condition 1.2 was revised to reflect the correct maximum daily and annual process rates, when considering both cement and aggregate inputs.

Facility Comment #9:

Condition 1.2, Table 1.1, Concrete Production, Central Mixer Loading, and Conditions 5.1 and 5.2: Please revise the control description to match the control options listed in AP-42 and the Application (page 7 and Appendix B page 11).

DEQ Response:

Permit Condition 1.2 was revised to reflect the variety of control equipment options described in AP-42 that were considered in the development of emission factors for central mix plants.

Facility Comment #10:

Condition 2.4: Please replace the facility-wide inspection frequency with "monthly." A monthly inspection rate is typical for large mining operations and consistent with other Idaho mining PTCs.

DEQ Response:

For clarification, this frequency was revised from once each shift to once every 12 hours. Daily inspection was considered reasonable and adequate based on the size and scale of proposed ore processing, ore concentration and refining operations. A frequency of once every 12 hours ensures that both daytime and nighttime operations will be observed, to confirm that sufficient fugitive dust control measures are applied as assumed in demonstrations of compliance with NAAQS on a 24-hour basis. Frequent inspection of fugitive sources, in particular haul roads from which the contribution to $PM_{10}/PM_{2.5}$ modeled impacts was greatest, is necessary to ensure that the target 93.3% reduction in haul road emissions is consistently achieved.

Facility Comment #11:

Condition 2.5, 1st Paragraph: IDAPA 58.01.01.799 applies to nonmetallic mineral processing plants. Thus, clarifying language should be added: "IDAPA 58.01.01.799 applies to fugitive dust sources at the limestone crushing plant and aggregate production plant."

DEQ Response:

Permit Condition 2.6 (renumbered) was updated to clarify that IDAPA 58.01.01.799 specifies best management practices specifically applicable to emission sources at the lime production and aggregate production plants.

Although the requirements in this rule are specific to these sources, the FDCP is to address the control of fugitive emissions from all fugitive sources (facility-wide). Additional discussion is also provided below (response to Comment #14).

Facility Comment #12:

Condition 2.5, 1st Bullet: Please replace "to 20 miles per hour or lower if appropriate" with "in accordance with the FDCP." The Application did not propose a 20 miles per hour speed limit, and certain haul road sections may be driven at higher speeds while emissions are minimized.

DEQ Response:

Permit Condition 2.6 was revised to remove the explicit vehicle speed limit. As supported by the emission estimates, hauling operations and associated emissions are constrained by the daily production limit and the proposed vehicle fleet characteristics.

Although all conditions that affect roadway conditions should be considered in controlling emissions, it is left to the permittee to determine safe and appropriate vehicle speeds onsite, and to define these site-specific parameters within the FDCP to ensure successful control of fugitive emissions. An effective FDCP will require active monitoring on the part of the permittee to ensure that the target 93.3% reduction in haul road emissions is achieved. Monitoring to ensure that appropriate vehicle speeds are observed is one option that may need to be considered.

Facility Comment #13:

Condition 2.5, 2nd Bullet: Please remove this bullet as discussed in Condition 1.2, Table 1.1, Hauling, above.

DEQ Response:

Permit Condition 2.6 was revised to remove the explicit mileage limit as discussed above (response to Comment #2).

Facility Comment #14:

Condition 2.5; 3rd, 4th, 5th, 7th, 13th, 15th Bullets: Each of these bullets require some action if fugitive PM emissions are observed to exceed 20% or leaving a roadway in the case of haul roads. However, the periods that trigger corrective action in these bullets are inconsistent with each other. IDAPA 58.01.01.650 does not impose a trigger for action, other than the requirement to take reasonable precautions. While the visible emissions rule IDAPA 58.01.01.625 does not suit fugitive emission observations, for comparison, that rule states, "for a period or periods aggregating more than ***three*** minutes in any 60-minute period." The Draft Permit states, "for a period or periods aggregating more than ***one*** minute in any 60- minute period." If IDEQ prefers to establish a threshold for dust mitigation action, then the following period would be acceptable to Midas Gold:

- Whenever visible fugitive PM emissions exceed 20% for more than two consecutive minutes (4th, 5th, 7th bullets)
- Whenever visible fugitive PM emissions are observed leaving a roadway for more than two consecutive minutes (3rd bullet). Note that this would also apply to the 13th and 15th bullets, but Midas Gold is proposing to remove these conditions.

DEQ Response:

Permit Condition 2.6 was revised and Permit Condition 2.5 added to clarify the intended requirements. The FDCP applies facility-wide to all fugitive emission sources, and while IDAPA 58.01.01.799 includes requirements specific to the lime production and aggregate production plants, it was considered reasonable to apply best management practices for haul roads on a facility-wide basis.

Control strategy triggers specific to unpaved haul roads, transfer points, screening operations, crushers, grinding mills, and building vents are specified in IDAPA 58.01.01.799 – Nonmetallic Mineral Processing Plant Fugitive Dust Best Management Practice. A progressive control strategy is outlined wherein when defined triggers are exceeded, successive control strategies are employed until fugitive dust control is achieved.

Although these requirements are specifically applicable to the lime production and aggregate production plants as noted, in the case of haul roads, it was considered that the emission sources dedicated to nonmetallic and metallic mineral processing and to mining operations are similar enough in practice to justify applying the haul road control strategy trigger to all such hauling operations (facility-wide). Similar to the responses above, compliance with such reasonable precautions helps to ensure conservatism in estimates of emissions from unpaved roadways and to justify the aggressive dust control efficiencies applied to these estimates.

To distinguish it as a requirement separate from recommended control strategies, the control trigger level was separated into a new permit condition (Permit Condition 2.5), and Permit Conditions 2.4 and 2.6 were updated as appropriate to reference the new permit condition.

Facility Comment #15:

Condition 2.5, 4th Bullet: Please add language to address upstream water sprays that provide downstream control via moisture carryover.

DEQ Response:

Permit Condition 2.6 (renumbered) was revised to clarify that water sprays provide moisture carryover for downstream control.

Facility Comment #16:

Condition 2.5, 6th Bullet: There are no plans to apply water or chemical to the "mine working face." Please revise to, "Apply appropriate dust control at the initial point of material handling to suppress dust throughout the material handling process, as necessary."

DEQ Response:

Permit Condition 2.6 (renumbered) was revised as requested to remove the example control measure. Although this specific example of a reasonable control measure was removed and use of this measure may not be planned, it remains the responsibility of the permittee to implement reasonable precautions as necessary to prevent fugitive emissions (Permit Condition 2.1).

Facility Comment #17:

Condition 2.5, 13th Bullet: Please remove "Whenever visible fugitive PM emissions are observed leaving a roadway during inspection or valid complaint (Permit Condition 2.3), the adequacy of water and dust suppressant application rates should be evaluated." These requirements are already addressed elsewhere:

- The Condition 2.5, 3rd bullet addresses the dust mitigation action whenever visible PM emissions are observed leaving a roadway.
- The Condition 2.5, 20th bullet addresses the periodic evaluation of the FDCP, including dust suppressant application rates.
- The Condition 2.3 addresses valid complaints.

DEQ Response:

Permit Condition 2.6 (renumbered) was revised and Permit Condition 2.5 added. Trigger levels for dust mitigation were revised as discussed above (response to Comment #14). Annual evaluation was considered adequate as minimum frequency for formal evaluation of the FDCP to ensure timely incorporation of updates, and requirements to respond to citizen complaints were adequately addressed in Permit Condition 2.3, and these permit conditions were revised accordingly. Control measures utilized in response to any fugitive dust complaints received (e.g., any change to dust suppressant application rates) over the annual period should be taken into consideration during each such evaluation.

Facility Comment #18:

Condition 2.5, 14th Bullet: Please remove this bullet. Chemical suppressant application will be based on the manufacturer's recommendations and periodic inspections of fugitive dust, not atmospheric conditions.

DEQ Response:

Permit Condition 2.6 (renumbered) was revised as requested to remove the specific requirement to evaluate ambient temperature, humidity and wind speed conditions onsite.

Although all conditions that affect roadway conditions should be considered when determining water and suppressant application rates and frequency, it is left to the permittee to determine and define within the FDCP the site-specific parameters most critical to ensuring successful control of fugitive emissions. An effective FDCP will require active monitoring on the part of the permittee to determine the appropriate frequencies and amounts of water and dust suppressant applications sufficient to achieve the target 93.3% reduction in haul road emissions. Monitoring of ambient conditions may need to be considered.

Facility Comment #19:

Condition 2.5, 15th Bullet: Please remove this bullet, as it is a repeat of the 2nd sentence of the 13th bullet.

DEQ Response:

Permit Condition 2.6 (renumbered) was revised as requested to remove this bullet. Trigger levels were separated into a new permit condition and annual evaluation of the FDCP required as discussed above (responses to Comments #14 and #17).

Facility Comment #20:

Condition 2.5, 17th Bullet: Please remove this bullet as discussed in Condition 1.2, Table 1.1, Hauling, above.

DEQ Response:

Permit Condition 2.6 (renumbered) was revised as requested to remove the explicit mileage limit and associated monitoring as discussed above (response to Comment #2). Although monitoring of mileage is no longer required by the permit, active monitoring of conditions affecting haul roads should be considered when determining appropriate water and suppressant application rates.

Facility Comment #21:

Condition 2.5, 18th Bullet: Please remove this bullet as the 10th bullet already requires that "Chemical dust suppressants shall be applied consistent with manufacturer's instructions and recommendations" and the 16th bullet already requires that "At least once per day during operation, monitor and record the frequency of application and application rates for water and suppressant controls."

DEQ Response:

Permit Condition 2.6 (renumbered) was revised as requested to remove requirements for water spray calibration inspection beyond compliance with manufacturer's specifications. Adequacy of fugitive dust controls and associated equipment calibrations shall be determined by inspection at least once per day.

In addition, due to the similarity of the 16th bullet referenced above and Permit Condition 2.2, these were both combined by moving the daily frequency requirement into Permit Condition 2.2 and removal of this bullet.

Facility Comment #22:

Condition 2.5, 20th Bullet: Please add "and evaluate effectiveness of practices including dust suppressant application rates."

DEQ Response:

Permit Condition 2.6 (renumbered) was revised as requested to add the language referencing evaluation of the effectiveness of practices.

Facility Comment #23:

Condition 2.5, 20th Bullet: Please replace "every six-months" with "every year." Annual review is more typical for the mining industry. Also, it does not appear that Idaho mining PTCs typically require a six-month review of FDCPs.

DEQ Response:

Permit Condition 2.6 (renumbered) was revised as requested to require annual evaluation of the FDCP as discussed above (response to Comment #17)

Facility Comment #24:

Condition 2.9: Please replace "each shift" with "each month" and add "including any stack, vent, or functionally equivalent opening" after "potential sources of visible emissions" to clarify which sources are subject to this condition. It does not appear that Idaho mining PTCs typically contain a visible emission inspection frequency for each shift.

DEQ Response:

Permit Condition 2.10 (renumbered) was reduced to a frequency of once per day from once per shift to facilitate inspection of point sources during daylight hours. As discussed above (response to Comment #10), monthly inspection was considered insufficient due to the continuous nature of operations (24 hours per day, 7 days per week).

Facility Comment #25:

Condition 2.11: Please revise "and 22" to "and knowledgeable of procedures of Method 22" language to reflect that there is no certification for Method 22.

DEQ Response:

Permit Condition 2.12 (renumbered) was revised as requested to clarify that the certification requirement applies only to Method 9.

Facility Comment #26:

Condition 2.21, NSPS 40 CFR 60, Subpart LL: Please remove "OC8." Conveyor drops to stockpiles are not subject to Subpart LL.

DEQ Response:

Permit Condition 2.22 (renumbered) was revised as requested to remove reference to the coarse ore stockpile feed transfer to stockpile (OC8).

Conveyor belt transfer points subject to Subpart LL as defined in 40 CFR 60.381 do not include where the metallic mineral is transferred to a stockpile.

Facility Comment #27:

Condition 2.23: Please add the citation "40 CFR 70.3(c)(2)" to specify that the Tier I operating permit is required only for the emission units that cause the source to be subject to the part 70 program.

DEQ Response:

The citation in Permit Condition 2.24 (renumbered) was abbreviated to reflect only IDAPA 58.01.01.313.01.b. Procedures and requirements for Tier I Operating Permits are established in IDAPA 58.01.01.300–399, and the appropriate reference was cited in incorporating the deadline to apply for a Tier I operating permit. All underlying PTC conditions in this permit, for all emission sources comprising the facility, will be incorporated into the Tier I operating permit.

Facility Comment #28:

Condition 2.24, Table 2.1, Pollutant: Please replace "PM" with "PM_{10}" as this is the pollutant that is required to be tested in the Draft Permit (Condition 4.3).

DEQ Response:

Permit Condition 2.25 (renumbered) was revised to reflect the correct pollutant (PM_{10}) as limited by the permit.

Facility Comment #29:

Condition 2.24, Table 2.1, Test Method: Please add Method 201A for PM_{10}.

DEQ Response:

Permit Condition 2.25 (renumbered) was revised as requested to include reference to approved EPA Reference Method 201A for measurement of PM_{10} emissions.

Facility Comment #30:

Condition 2.24, Table 2.1, Additional Requirements: Please revise the PM Additional Requirements to: "Particulate matter (PM) including condensable PM as defined in IDAPA 58.01.01.006, with an aerodynamic diameter less than or equal to a nominal 10 micrometers for PM_{10}, and less than or equal to a nominal 2.5 micrometers for $PM_{2.5}$" to make it consistent with the rest of the Draft Permit.

DEQ Response:

Permit Condition 2.25 (renumbered) was revised as requested to include the complete descriptions for $PM_{2.5}$ and PM_{10}.

Facility Comment #31:

Condition 3.2, Table 3.1: Please revise as discussed in Condition 1.2, Table 1.1, above.

DEQ Response:

Permit Conditions 1.2 and 3.2 were revised for clarification to include a statement that the information in the tables is provided for informational purposes, as discussed above (response to Comment #1).

Facility Comment #32:

Condition 3.8 and 3.17: Please revise as discussed in Condition 1.2, Table 1.1, Prill Silos, above.

DEQ Response:

Permit Condition 3.8 and 3.16 (renumbered) were revised as requested to reflect the proposed daily and annual rates, as discussed above (response to Comment #3).

Facility Comment #33:

Condition 3.11: Please remove this condition. The crushers will be controlled by water sprays. No emission control credit was taken for the buildings, which will likely have door and vent openings.

DEQ Response:

Permit Conditions 3.10 (renumbered) and 5.11 were revised to remove the requirement to enclose these processes within a building. Consistent with the controls identified in Table 3.1 and Table 5.1, only credit for the use of water spray and moisture carryover controls were relied upon for reductions within emission estimates for these processes.

Facility Comment #34:

Condition 4.2, Table 4.1: Please revise as follows:

- Carbon bed pressure drop is a maximum limit (O&M)
- Carbon bed inlet gas temperature is a maximum limit (Subpart EEEEEEE)
- Baghouse pressure is a maximum limit (O&M)

DEQ Response:

Permit Condition 4.2 was revised to reflect the corrections noted for these monitoring parameters.

Facility Comment #35:

Condition 4.3, Table 4.2: Please remove footnote (c) from NO_x, CO, VOC, and SO_2 as there is no testing required for these pollutants.

DEQ Response:

No change was made to the permit. This standard footnote is applied generally to all pound-per-hour emission limits. Although source testing was not required in the permit for NO_x, CO, VOC, and SO_2 emissions from ore concentration and refining process equipment, it remains that credible evidence can be used to show compliance or noncompliance with these established emission limits, and alteration or removal is not supported.

Facility Comment #36:

Condition 4.4: Please revise as discussed in Condition 1.2, Table 1.1, POX Boiler, above.

DEQ Response:

Permit Condition 4.4 was revised as requested to limit operation of the POX Boiler to autoclave start-up operation only.

Facility Comment #37:

Condition 4.11 through 4.16: Please remove “and in accordance with IDAPA 58.01.01.210.21.” The rule states, “Additional procedures and requirements to demonstrate and ensure actual and continuing compliance may be required by the Department in the permit to construct.” Conditions 4.11 through 4.16 establish procedures or requirements regarding compliance, and therefore it is not necessary to cite this rule. Including the citation suggests that there are more requirements than stated in the PTC, but any additional requirements are to be in the PTC according to the rule text.

DEQ Response:

Permit Conditions 4.11 through 4.16 were revised as requested to remove reference to Section 210.21. These citations were replaced with the correct citation of Section 210.08.c, consistent with establishing TAP emission limits.

Permit Condition 4.11 through 4.16 were revised, with Section 210.21 citations replaced with the correct citation of Section 210.08.c, consistent with establishing emission limits when controlled ambient concentrations is used to demonstrate preconstruction compliance with TAP AAC or AACC.

Facility Comment #38:

Condition 4.28: Please add carbon filter monitoring requirements.

DEQ Response:

Permit Condition 4.28 was revised as requested to add monitoring of inlet gas stream temperature and pressure drop across the carbon filter to ensure compliance with O&M specifications.

Facility Comment #39:

Conditions 5.1 and 5.2: Please revise as discussed in Condition 1.2, Table 1.1, Concrete Production, Central Mixer Loading, above.

DEQ Response:

Permit Conditions 5.1 and 5.2 were revised to reflect the variety of control equipment options described in AP-42 that were considered in the development of emission factors for central mix plants, as discussed above (response to Comment #9).

Facility Comment #40:

Condition 5.3: Please remove footnote (c) as there are no testing requirements for these pollutants.

DEQ Response:

No change was made to the permit. This standard footnote is applied generally to all pound-per-hour emission limits even if testing is not required, as discussed above (response to Comment #35).

Facility Comment #41:

Condition 5.8: Please revise as discussed in Condition 1.2, Table 1.1, Concrete Production, above.

DEQ Response:

Permit Condition 5.8 was revised to reflect the correct maximum daily and annual process rates, as discussed above (response to Comment #8).

Facility Comment #42:

Condition 5.11: Please remove this condition. The crushers will be controlled by water sprays. No emission control credit was taken for the building, which will likely have openings.

DEQ Response:

Permit Condition 5.11 was revised as requested to remove the requirement to enclose these processes within a building, as discussed above (response to Comment #33).

Facility Comments in Redlined Permit and DEQ Response:

In addition to the comments specifically addressed above, many of the remaining recommended corrections identified and descriptive language suggested in the redlined permit were incorporated (except as noted in the comments above), with minor editorial changes made for clarification. One noted exception concerns the lime, aggregate, and concrete production plant emission limits in Table 5.2. An effort was made to separately identify each activity and to establish the limits consistent with the emission estimates provided in the emissions inventory for each.

Facility Comments in Redlined Statement of Basis and DEQ Response:

In addition to the comments specifically addressed above, many of the remaining recommended corrections identified and descriptive language suggested in the redlined statement of basis were also incorporated (except as noted in the comments above), with minor editorial changes made for clarification. There were a few exceptions noted:

- Discussion of facility classification (comments relating to "synthetic minor" and "natural minor") was left to the appropriate "Facility Classification" section. Where concerns were noted, a reference to this section was included.
- Language addressing any conflict with federal NSPS/NESHAP requirements was not included in the "Toxic Air Pollutant Emissions" section, as it was addressed elsewhere in the appropriate "Permit Conditions Review" section.
- Although an updated Access Management Plan is required by the permit, the initial and relevant Stibnite Road Access Management Plan was retained for reference and appended to this statement of basis.
- The source ID corrections were removed from the "NSPS Applicability" section and were left for explicit identification in the permit (Permit Condition 2.22).
- As discussed above, although applicable requirements are cited, the scope and intent of the FDCP is to address the control of emissions from all fugitive emission sources facility-wide. And although the permit does not include requirements to enclose processes within buildings as requested, this is still recommended where prudent to do so.

Facility Comments in Redlined Modeling Review Memorandum:

The recommended corrections identified and descriptive language suggested in the redlined modeling review memorandum were also incorporated, with minor editorial changes made for clarification. Results from a culpability analysis were also added. There were a few exceptions noted pertaining to the following suggested verbiage for Section 4.1.5:

"DEQ's sensitivity analyses suggest that a few hotspot receptors exceed the 24-hour PM_{10} NAAQS when the unpaved road control efficiency falls below 93% and the meteorological data processed with the BULKRN method is used. However, all the hotspot receptors demonstrate compliance with NAAQS at a 90% control efficiency when using the meteorological data processed without the BULKRN method, and at both examined production levels:

- *maximum impact at 120,000 ton per day – 73.9 $\mu g/m^3$ + 37.0 $\mu g/m^3$ = 110.9 $\mu g/m^3$.*
- *maximum impact 180,000 ton per day – 84.6 $\mu g/m^3$ + 37.0 $\mu g/m^3$ = 121.6 $\mu g/m^3$.*

As previously stated, meteorological data processing with and without BULKRN are both considered acceptable regulatory options by EPA. Therefore, this demonstrates that emissions resulting from a lower unpaved road control efficiency (even potentially less than 90%) do not cause or contribute to a NAAQS violation. Nonetheless, the permit requires an aggressive implementation of measures to control fugitive particulate emissions from roadways."

DEQ Response:

DEQ disagrees with the suggested modification. Because meteorological data processing with and without BULKRN are both considered acceptable regulatory options by EPA, an argument can be made that modeling simulations using both meteorological datasets (especially for site-specific BULKRN meteorological data) must demonstrate compliance with NAAQS. Furthermore, EPA recommended using data processed with the BULKRN method since it utilizes more of the site-specific data collected. DEQ's sensitivity analyses suggest that 93.3% control efficiency is a very critical assumption for demonstrating 24-hour PM_{10} NAAQS compliance when using the BULKRN meteorological data and when modeled emissions are more-closely representative of typical daily mining production rates for a high-production period. Therefore, DEQ's modeling team maintains that this critical assumption (above 93.3% control efficiency for unpaved road dust) needs to be highlighted in Section 4.1.5 of the modeling memo. DEQ ***strongly disagrees*** with the facility's comment that "emissions resulting from a lower unpaved road control efficiency (even potentially less than 90%) do not cause or contribute to a NAAQS violation."

The highlighted discussion in Section 4.1.5 now reads:

"DEQ's sensitivity analyses suggest that a few hotspot receptors exceed the 24-hour PM_{10} NAAQS when the unpaved road control efficiency falls below 93% and the meteorological data processed with the BULKRN method is used. When the meteorological data processed without the BULKRN method is used, all the hotspot receptors demonstrate compliance with NAAQS at a 90% control efficiency and at both examined production levels:

- *maximum impact at 120,000 ton per day: 73.9 $\mu g/m^3$ + 37.0 $\mu g/m^3$ = 110.9 $\mu g/m^3$.*
- *maximum impact at 180,000 ton per day: 84.6 $\mu g/m^3$ + 37.0 $\mu g/m^3$ = 121.6 $\mu g/m^3$.*

While using alternative meteorological data processed without the BULKRN method safely demonstrates compliance with NAAQS, using site-specific BULKRN meteorological data does not. Therefore, DEQ's modeling team recommends that the permit require an aggressive implementation of measures to achieve above 93% control efficiency for fugitive particulate emissions from roadways."

In addition to the changes enumerated above, DEQ performed a culpability analysis for 24-hour PM_{10}. Results for the culpability analyses are added in Section 4.1.4 of the modeling memo (all succeeding table numbers have been updated):

"Table 30 shows the ten highest-ranked modeled 24-hour PM_{10} impacts from each emission source group. Note that for 24-hour PM_{10}, the design value is the second-highest 24-hour average concentration in a given year. Therefore, the second-high modeled value for source group ALL (121.5 $\mu g/m^3$) was summed with the background concentration for comparison to NAAQS.

Table 30. TEN HIGHEST-RANKED MODELED 24-HOUR PM_{10} IMPACTS IN $\mu g/m^3$ FROM DIFFERENT SOURCE GROUPS (SCENARIO W5, BULKRN METEOROLOGICAL DATA).

Rank	ALL[a]	WEP[b]	WEPBL[c]	WEDRSF[d]	HR[e]	ACCRD[f]	UGEXP[g]	PRCSPT[h]	PRCSVOL[i]
1ST	142.2	102.5	2.27	1.02	52.1	7.26E-03	1.00E-05	0.24	0.23
2ND	121.5	89.3	1.94	0.98	51.0	6.41E-03	1.00E-05	0.23	0.20
3RD	113.4	78.1	1.83	0.96	49.6	5.31E-03	1.00E-05	0.22	0.13
4TH	110.1	77.0	1.73	0.93	49.4	3.39E-03	1.00E-05	0.20	0.10
5TH	108.5	76.9	1.62	0.90	46.1	3.39E-03	1.00E-05	0.18	0.09
6TH	107.7	75.7	1.57	0.85	45.5	3.22E-03	1.00E-05	0.17	0.08
7TH	105.7	73.3	1.49	0.84	43.4	3.21E-03	0	0.16	0.08
8TH	105.6	72.3	1.30	0.77	42.9	2.91E-03	0	0.15	0.08
9TH	101.5	71.4	1.28	0.77	41.8	2.87E-03	0	0.15	0.08
10TH	99.8	71.2	1.23	0.76	41.8	2.56E-03	0	0.15	0.08

a. ALL = all emission sources
b. WEP = West End Pit
c. WEPBL = West End Pit Blasting
d. WEDRSF = West End Pit Development Rock Storage Facility
e. HR = Haul Road
f. ACCRD = Access Road
g. UGEXP = Underground Exploration
h. PRCSPT = Process & Ancillary Point Sources
i. PRCSVOL = Process & Ancillary Volume Sources

Given a background of 37.0 μg/m^3 and a NAAQS of 150 μg/m^3, the critical modeled concentration threshold for any 24-hour PM_{10} NAAQS violation is therefore 113.0 μg/m^3. Table 30 shows that the third-high modeled value for source group ALL (113.4 μg/m^3) barely exceeds NAAQS. Fourth-high (and lower-ranked) modeled impacts, when added to the background concentration, are below NAAQS.

As discussed earlier in this section, HR Onsite Hauling, WEP Open Pit Drilling, and WEP Blasting are the three largest components of the total daily PM_{10} emissions. Therefore, it is not surprising that HR, WEP, and WEPBL are associated with the highest modeled concentrations among all source groups.

To investigate the potential culpability of each source group to the modeled 24-hour PM_{10} NAAQS violation, DEQ performed a culpability analysis using the MAXIFILE output option in AERMOD. The MAXIFILE option provides the receptor location and date of an impact. DEQ performed two MAXIFILE runs. In the first MAXIFILE simulation, the model was run using source group ALL. A threshold value (113.0 μg/m^3) equal to the NAAQS minus background was set. The output file provided a list of the receptors where the NAAQS is exceeded. In the second MAXIFILE simulation, the model was run using only the receptors identified by the first MAXIFILE run. Source groups were included in the second modeling simulation. A threshold value equal to the 24-hour PM_{10} SIL (5.0 μg/m^3) was set. The output file provided a date stamp for any day when a source group exceeds the SIL and potentially contributes to a violation of the NAAQS. A significant contribution to a NAAQS violation would be predicted to occur if the date stamps for source group ALL (from the first MAXIFILE run) and for a specific source group (from the second MAXIFILE run) matched.

DEQ's culpability analyses confirm that emission source groups HR and WEP are culpable for the 24-hour PM_{10} NAAQS exceedances. The date stamps indicate NAAQS violations during the winter season (January 6, January 15, and December 23). We show next that when modeled emissions are more-closely representative of typical daily mining production rates for a high-production period (everything else held constant), the SGP facility is able to demonstrate compliance with 24-hour PM_{10} NAAQS at those few receptors showing a potential violation when using meteorological data processed with the BULKRN method. We also discuss next the implication of NAAQS violations occurring during the winter season."

Air Quality

PERMIT TO CONSTRUCT

Permittee	Midas Gold Idaho, Inc.
Permit Number	P-2019.0047
Project ID	62288
Facility ID	085-00011
Facility Location	Forest Service Roads NF-374 and NF-412 Stibnite, Idaho 83611

Permit Authority

This permit (a) is issued according to the "Rules for the Control of Air Pollution in Idaho" (Rules), IDAPA 58.01.01.200–228; (b) pertains only to emissions of air contaminants regulated by the State of Idaho and to the sources specifically allowed to be constructed or modified by this permit; (c) has been granted on the basis of design information presented with the application; (d) does not affect the title of the premises upon which the equipment is to be located; (e) does not release the permittee from any liability for any loss due to damage to person or property caused by, resulting from, or arising out of the design, installation, maintenance, or operation of the proposed equipment; (f) does not release the permittee from compliance with other applicable federal, state, tribal, or local laws, regulations, or ordinances; and (g) in no manner implies or suggests that the Idaho Department of Environmental Quality (DEQ) or its officers, agents, or employees assume any liability, directly or indirectly, for any loss due to damage to person or property caused by, resulting from, or arising out of design, installation, maintenance, or operation of the proposed equipment. Changes in design, equipment, or operations may be considered a modification subject to DEQ review in accordance with IDAPA 58.01.01.200–228.

Date Issued DRAFT July 14, 2020

Morrie Lewis, Permit Writer

Mike Simon, Stationary Source Manager

Contents

1 Permit Scope

Purpose

1.1 This is an initial permit to construct (PTC) for ore processing, ore concentration and refining, and ancillary equipment at the Stibnite Gold Project (SGP).

Regulated Sources

1.2 Table 1.1 lists all sources of regulated emissions in this permit.

Table 1.1 Regulated Sources

Source ID No.	Source	Control Equipment	Maximum Process Rate
Mining			
	Drilling activities	Reasonable control and Fugitive Dust Control Plan (FDCP)	1,200 holes/day
	Blasting activities	Reasonable control & FDCP	2 blasts/day
	Excavating and hauling activities	Reasonable control & FDCP – Chemical suppression and water sprays ~~Control efficiency: 93.3% for PM/PM_{10}~~ (haul roads)	180,000 T/day and ~~490,000 mi/mo (combined mileage of all haul trucks)~~
Ore Processing			
OC1	~~Conveyor –~~Loader Transfer of Ore to Grizzly	Reasonable control & FDCP – Water sprays and moisture carryover	25,000 T/day
OC2	~~Conveyor –~~Grizzly to Apron Feeder		
OC3	Conveyor – Apron Feeder to Dribble		
OC4	Conveyor – Apron Feeder to Grizzly		
OC5	Conveyor – Dribble to Grizzly		
OC6	~~Conveyor –~~Grizzly to Primary Crusher or Coarse Ore Stockpile Feed		
OC7	Primary Crusher	Reasonable control & FDCP – Water sprays and moisture carryover	
OC8	Conveyor – Coarse Ore Stockpile Feed Transfer to Stockpile		
OC9	~~Conveyor –~~Stockpile Transfer to Reclaim Conveyors	Reasonable control & FDCP – Below-grade of storage piles ~~Control efficiency: 80% for PM/PM_{10}~~	27,600 T/day
OC10	Conveyor – Reclaim Conveyors to Feed Conveyor		
OC11	Conveyor – Feed Transfer to	Reasonable control & FDCP – Enclosure ~~Control efficiency: 80% for PM/PM_{10}~~	
OC12	Pebble Crusher	Reasonable control & FDCP – Water sprays and moisture carryover	
OC13	~~Conveyor –~~Pebble Discharge to Feed		
PS	(2) Prill Silos #1-2 Maximum capacity: 100 T (each)	Loading – None Unloading – None	~~608 T/month~~200 T/day; 9,000 T/yr (combined)

Source ID No.	Source	Control Equipment	Maximum Process Rate
Ore Concentration and Refining			
AC	Autoclave (AC)	Wet Scrubber (WS1)	6,960 T/day~~, and as limited by Subpart EEEEEEE~~
EW	Electrowinning Cells and Pregnant Solution Tank	Shared Carbon Filter (CA2) Type: sulfur-impregnated activated carbon Form: granulated	100 gpm~~, and as limited by Subpart EEEEEEE~~
MR	Mercury Retort	Condenser Carbon Filter (CA3) Type: sulfur-impregnated activated carbon Form: granulated	1,000 lb/batch and 21 T/yr
MF	Induction Melting Furnace	Baghouse (BH2) Carbon Filter (CA4) Type: sulfur-impregnated activated carbon Form: granulated	
CKD	Carbon Regeneration Kiln (Drum)	Wet Scrubber (WS2) Carbon Filter (CA1) Type: sulfur-impregnated activated carbon Form: granulated	7.2 T/day
Sb2	Antimony Bagging	Baghouse (BH1)	108 T/day, or as limited by source testing
Process Heating			
Sb1	Sb Dryer Maximum capacity: 2.72 MMBtu/hr Fuel: propane	None	not applicable (n/a)
ACB	POX Boiler Maximum capacity: 17 MMBtu/hr Fuel: propane	None	~~1 hr/day and 30 hr/yr~~ operation is limited to AC startup only
CKB	Carbon Regeneration Kiln (Burners) Maximum capacity: 2.255 MMBtu/hr Fuel: propane	None	n/a
PV	Propane Vaporizer Maximum capacity: 0.1 MMBtu/hr Fuel: propane	None	n/a
HS	Strip Circuit Solution Heater Maximum capacity: 5 MMBtu/hr Fuel: propane	None	n/a
LKC	PFR Shaft Lime Kiln Combustion Maximum capacity: ~~20.5~~22.0 MMBtu/hr (each) Fuel: propane	None	n/a

Source ID No.	Source	Control Equipment	Maximum Process Rate
Lime Production			
LS1	Conveyor – Limestone transfer to Primary Crusher Hopper	None	1,130 T/day
LS2	SAG Mill Primary Crusher Maximum capacity: 1,130 T/day	None	
LS3	Primary Screen	None	
LS4	SAG Mill Secondary Crusher	None	
LS5	Secondary Screen	None	
LS6	Conveyor – Limestone to Ball Mill Feed Bin	None	
LSBM	Limestone Ball Mill	Baghouse (BH3)	
LS7	Conveyor – Limestone to Ball Mill Feed	None	
LS8	Conveyor – Ball Mill Feed to Ball Mill	None	
LS9	Conveyor – Limestone to Kiln Feed Bin	None	267 T/day
LS10	Conveyor – Limestone to Lime Kiln Feed	None	
LS11	Fines Screen	None	
LS12	Conveyor – Kiln Feed to PFR Shaft Lime Kiln	None	
LS-L/U	Bucket Elevator – Pebble Lime Silo Loading Pebble Lime Silo discharge to Lime Slaker	Loading – Bin Vent Filter Unloading – Wet Scrubber (WS3)	169 T/day and 52,377 T/yr
LK	Parallel Flow Regenerative Shaft Kiln	Baghouse (BH4)	
LCR	Lime Mill Crusher	Baghouse (BH5)	
LS1-L/U	Lime Silo #1 Maximum capacity: 250 T/day	Loading – Bin Vent Filter Unloading – None	70,000 T/yr (combined)
MillS2-L/U	Lime Silo #2 Maximum capacity: 250 T/day	Loading – Bin Vent Filter Unloading – None	
ACS1	AC Lime Silo #1 Maximum capacity: 1,000 T/day	Loading – Bin Vent Filter Unloading – None	
ACS2	AC Lime Silo #2 Maximum capacity: 1,000 T/day	Loading – Bin Vent Filter Unloading – None	
ACS3	AC Lime Silo #3 Maximum capacity: 1,000 T/day	Loading – Bin Vent Filter Unloading – None	
ACS4	AC Lime Silo #4 Maximum capacity: 500 T/day	Loading – Bin Vent Filter Unloading – None	

Source ID No.	Source	Control Equipment	Maximum Process Rate
Aggregate Production			
PCSP1	Portable Crushing and Screening Plant 1 Crushers, screens, and conveyors	Reasonable control & FDCP – water sprays and moisture carryover	2,000 T/day (aggregate)
PCSP2	Portable Crushing and Screening Plant 2 Crushers, screens, and conveyors	Reasonable control & FDCP – water sprays and moisture carryover	2,000 T/day (aggregate)
Concrete Production			
CM	Central Mixer Loading Maximum capacity: 120 T/hr	Reasonable control & FDCP – ~~Water sprays and moisture carryover, and~~ Controls may ~~also~~ include water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, central duct collection systems, etc.	~~80~~ 2,480 T/day and 560,000 T/yr (cement + aggregate)
CS1-L/U	Cement/Shotcrete Silo #1 Maximum capacity: 80 T	Loading – Bin Vent Filter Unloading – None	
CS2-L/U	Cement/Shotcrete Silo #2 Maximum capacity: 80 T	Loading – Bin Vent Filter Unloading – None	
CA-L/U	Aggregate Bin Maximum capacity: 2,400 T	Loading – None Unloading – None	
Heating, Ventilation, and Air Conditioning (HVAC)			
H1M	Mine Air Heater #1 Maximum capacity: 4 MMBtu/hr Fuel: propane	None	n/a
H2M	Mine Air Heater #2 Maximum capacity: 4 MMBtu/hr Fuel: propane	None	n/a
HM	(4) Mill HVAC Heaters #1-4 Maximum capacity: 1.0 MMBtu/hr (each) Fuel: propane	None	n/a
HAC	Autoclave HVAC Heater Maximum capacity: 0.25 MMBtu/hr Fuel: propane	None	n/a
HR	Refinery HVAC Heater Maximum capacity: 0.25 MMBtu/hr Fuel: propane	None	n/a
HA	Admin HVAC Heater Maximum capacity: 0.25 MMBtu/hr Fuel: propane	None	n/a
HMO	(2) Mine Ops. HVAC Heaters Maximum capacity: 0.25 MMBtu/hr (each) Fuel: propane	None	n/a
HTS	(2) Truck Shop HVAC Heaters Maximum capacity: 1.0 MMBtu/hr (each) Fuel: propane	None	n/a
HW	(3) Warehouse HVAC Heaters Maximum capacity: 1.0 MMBtu/hr (each) Fuel: propane	None	n/a

Source ID No.	Source	Control Equipment	Maximum Process Rate
Emergency Power Generation and Fire Suppression			
EDG1	Camp Emergency Generator Date of construction: 2007 or later Maximum capacity: 1,000 bkW Maximum operation: 100 hr/yr (non-emergency) Fuel: ultra-low sulfur diesel (ULSD) Displacement: <10 L/cyl	EPA Tier 2 technologies	1 hr/day and 100 hr/yr
EDG2	Plant Emergency Generator #1 Date of construction: 2007 or later Maximum capacity: 1,000 bkW Maximum operation: 100 hr/yr (non-emergency) Fuel: ULSD Displacement: <10 L/cyl	EPA Tier 2 technologies	1 hr/day and 100 hr/yr
EDG3	Plant Emergency Generator #2 Date of construction: 2007 or later Maximum capacity: 1,000 bkW Maximum operation: 100 hr/yr (non-emergency) Fuel: ULSD Displacement: <10 L/cyl	EPA Tier 2 technologies	1 hr/day and 100 hr/yr
EDFP	Mill Fire Pump Date of construction: 2009 or later Maximum capacity: 200 bkW Maximum operation: 100 hr/yr (non-emergency) Fuel: ULSD Displacement: <10 L/cyl	None	1 hr/day and 100 hr/yr
Fuel Storage			
TG1–TG2	Mine Site Gasoline Tanks (#1 through #2) Maximum capacity: 5,000 gal each	Lids or other appropriate closure with gasketed seal and submerged filling	<100,000 gal/mo
TD3–TD10	Mine Site Diesel Tanks (#3 through #10)	Lids or other appropriate closure	n/a

2 Facility-Wide

Fugitive Dust

2.1 All reasonable precautions shall be taken to prevent particulate matter from becoming airborne in accordance with IDAPA 58.01.01.650-651. In determining what is reasonable, consideration will be given to factors such as the proximity of dust-emitting operations to human habitations and/or activities and atmospheric conditions which might affect the movement of PM. Some of the reasonable precautions include, but are not limited to, the following:

- Use, where practical, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads, or the clearing of land.
- Application, where practical, of asphalt, oil, water, or suitable chemicals to, or covering of dirt roads, material stockpiles, and other surfaces which can create dust.
- Installation and use, where practical, of hoods, fans, and fabric filters or equivalent systems to enclose and vent the handling of dusty materials. Adequate containment methods should be employed during sandblasting or other operations.
- Covering, when practical, open-bodied trucks transporting materials likely to give rise to airborne dusts.
- Paving of roadways and their maintenance in a clean condition, where practical.
- Prompt removal of earth or other stored material from streets, where practical.

2.2 The permittee shall monitor and maintain records of the frequency and the methods used (e.g., water, chemical dust suppressants) to reasonably control fugitive dust emissions.

2.3 The permittee shall maintain records of all fugitive dust complaints received. The permittee shall take appropriate corrective action as expeditiously as practicable after receipt of a valid complaint. The records shall include, at a minimum, the date that each complaint was received and a description of the following: the complaint, the permittee's assessment of the validity of the complaint, any corrective action taken, and the date the corrective action was taken.

2.4 The permittee shall conduct a facility-wide inspection of potential sources of fugitive emissions (e.g., stockpiles, transfer points, etc.) identified in the Fugitive Dust Control Plan (FDCP) at least once per ~~shift~~ month during daylight hours and under normal operating conditions to ensure that the methods used to reasonably control fugitive dust emissions are effective. If emissions are not being reasonably controlled, the permittee shall take corrective action as expeditiously as practicable. The permittee shall maintain records of the results of each fugitive dust emissions inspection. The records shall include, at a minimum, the date of each inspection and a description of the following: the permittee's assessment of the conditions existing at the time fugitive emissions were present (if observed), any corrective action taken in response to the fugitive dust emissions, and the date the corrective action was taken.

2.5 The permittee shall develop and maintain a Fugitive Dust Control Plan (FDCP) to ensure compliance with fugitive dust requirements (Permit Conditions 2.1–2.4) and fugitive dust best management practices in accordance with IDAPA 58.01.01.799. IDAPA 58.01.01.799 applies to fugitive dust sources at the limestone crushing plant and aggregate production plant. The permittee shall comply with the FDCP at all times. The requirements specified in the FDCP shall be incorporated by reference to this permit and shall be enforceable permit conditions. At a minimum, the FDCP shall contain a list of all potential sources of fugitive dust emissions, and a list of reasonable precautions to minimize fugitive dust emissions (Permit Condition 2.1), ~~and requirements to~~such as:

- Post and limit the maximum speed of haul trucks ~~to 20 miles per hour or lower if appropriate~~in accordance with the FDCP. Signs shall be posted along the haul route and placed so they are visible to vehicles entering and leaving the site of operations.

- ~~Limit vehicle miles traveled from all haul trucks (combined) to less than 490,000 miles per month.~~

- Apply water or suitable dust suppressant chemicals (e.g., magnesium chloride, calcium chloride) to disturbed areas, haul roads, equipment staging areas, parking areas, and storage piles during the dry season and at other times as necessary to control fugitive dust. Water ~~and~~ or dust suppressant should be applied to a haul road consistent with industry standards and whenever visible fugitive PM emissions are observed leaving a roadway for more than two consecutive minutes.~~a period or periods aggregating more than one minute in any 60-minute period.~~

- Apply water or suitable dust suppressant whenever visible fugitive PM emissions exceed 20% for more than two consecutive minutes from any transfer point, screening operation, or crushing operation identified in the FDCP and at other times as necessary to control fugitive dust. Transfer points include points where material (e.g., ore and rock, lime, aggregate, cement, etc.) is transferred to or from a belt conveyor, conveying system, bucket elevator, screening operation, or stockpile. Controls shall include manual water spray capability or installing, operating, and maintaining water spray bars at transfer points to wet the material for downstream control; moisture carryover. Controls shall also include limiting drop heights in truck loading, front-end loader dumping, and conveying operations to ensure a homogeneous flow of material.

- Apply water or suitable dust suppressant whenever visible fugitive PM emissions from wind erosion of any stockpile exceeds 20% opacity for more than two consecutive minutes~~a period or periods aggregating more than one minute in any 60-minute period~~, and at other times as necessary to control fugitive dust. Water may need to be applied to storage piles before and during truck loading, and when stockpiled ore and waste rock is not processed promptly in order to avoid drying and becoming airborne. Stockpile height should be limited to limit disturbance.

- Apply appropriate dust control at the initial point of material handling~~, such as the mine working face,~~ to suppress dust throughout the material handling process as necessary.

- Apply appropriate dust control whenever visible fugitive PM emissions exceed 20% for more than two consecutive minutes from any grinding mill building vent~~ or capture system stack~~.

- Apply crushed gravel to haul roads, equipment staging areas, and other areas as necessary to limit migration of fine sediment.

- Install wind fences or barriers around, place below grade, or enclose all storage piles, parking areas, and equipment staging areas as necessary to control fugitive dust. This is required for the Stockpile Transfer to Reclaim Conveyors (OC9), Reclaim Conveyors to Feed Conveyor (OC10), and Feed Transfer to conveyor (OC11).

- Develop specific criteria to determine when and what type of dust suppressant must be applied, and appropriate suppressant application rates. Chemical dust suppressants shall be applied consistent with manufacturer's instructions and recommendations.
- Develop specific criteria to determine when water must be applied, and appropriate water application rates.
- Develop and implement precautionary measures to address high-wind events, such as when average (sustained) wind speed is forecast to exceed 25 miles per hour.
- At least ~~twice~~ once per ~~day~~ month while haul trucks are transporting ore and/or rock, inspect active haul routes for visible fugitive PM emissions using the specified method and procedures (Permit Condition 2.4). ~~Whenever visible fugitive PM emissions are observed leaving a roadway during inspection or valid complaint (Permit Condition 2.3), the adequacy of water and dust suppressant application rates should be evaluated.~~
- ~~At least once per day during operation, monitor and record criteria relied upon to determine water and suppressant application rates and frequency, such as temperature, humidity, and wind speed.~~
-
- , monitor and record the frequency of application and application rates for water and suppressant controls.
- ~~Each month, monitor and record haul truck vehicle miles traveled.~~
- ~~At least once every six months, inspect each water and suppressant spray calibration to ensure adequate coverage and delivery rate and to ensure operation in accordance with manufacturer's recommendations.~~
- Provide training/orientation to all relevant employees regarding FDCP requirements, including the necessity of restricting public access. Visible emissions evaluations shall be conducted by the permittee's ~~own~~ employees who~~m~~ are certified visible emission observers.
- , evaluate FDCP requirements to identify additional requirements and evaluate effectiveness of practices, including dust suppressant application rates, as appropriate.

2.6 The permittee shall develop and maintain an Access Management Plan (AMP) that identifies the facility boundary and all primary and secondary access points, and clearly specifies measures used to discourage public access to the facility. The permittee shall comply with the measures identified in the AMP at all times. The measures specified in the AMP shall be incorporated by reference to this permit and shall be enforceable permit conditions. At a minimum, the AMP shall include requirements to:

- Observe all primary access points to the facility in an effort to discourage public access. Onsite personnel shall be available for this purpose during active mining and mineral processing operations. Public access to the facility may be monitored by the use of security escort vehicles or manned guardhouses, or sufficiently precluded by the use of locked gates, barriers, or equivalent measures. Primary access points include the North and South Security Gates.
- Post warning signs and periodically patrol secondary access points to the facility in an effort to discourage public access. Onsite personnel shall be available for this purpose. Plans shall

be described in the AMP, including identifying the access points monitored, the frequency of patrol, and measures employed to discourage access (e.g., locked gates, barriers, natural features, etc.). Secondary access points include secondary roadways and trails traversing the facility.

2.7 Copies of the FDCP and AMP shall be submitted to DEQ within 60 days of permit issuance at the address provided (Permit Condition 2.25), and shall remain onsite at all times. Any changes to the FDCP or the AMP shall be submitted to DEQ for review and comment within 15 days of the change.

Visible Emission

2.8 The permittee shall not discharge any air pollutant to the atmosphere from any point of emission for a period or periods aggregating more than three minutes in any 60-minute period which is greater than 20% opacity as determined by the test methods and procedures contained in IDAPA 58.01.01.625. These provisions shall not apply when the presence of uncombined water, nitrogen oxides, and/or chlorine gas is the only reason for the failure of the emission to comply with this permit condition.

2.9 The permittee shall conduct a facility-wide inspection of potential point sources of visible emissions; including any stack, vent, or functionally equivalent opening; each ~~shift~~month, during daylight hours and under normal operating conditions. Sources that are monitored using a continuous opacity monitoring system (COMS) are not required to comply with this permit condition. The inspection shall consist of a see/no see evaluation for each potential source of visible emissions. If any visible emissions are present from any point of emission, the permittee shall either:

- Take appropriate corrective action as expeditiously as practicable to eliminate the visible emissions. Within 24 hours of the initial see/no see evaluation and after the corrective action, the permittee shall conduct a see/no see evaluation of the emissions point in question. If the visible emissions are not eliminated, the permittee shall comply with the following; or

- Perform a Method 9 opacity test in accordance with the procedures outlined in IDAPA 58.01.01.625. A minimum of 30 observations shall be recorded when conducting the opacity test. If opacity is greater than 20% for a period or periods aggregating more than three minutes in any 60-minute period, the permittee shall take all necessary corrective action and report the exceedance in the annual compliance certification and in accordance with IDAPA 58.01.01.130-136.

2.10 The permittee shall maintain records of the results of each visible emission inspection and each opacity test when conducted. The records shall include, at a minimum, the date and results of each inspection and test and a description of the following: the permittee's assessment of the conditions existing at the time visible emissions are present (if observed), any corrective action taken in response to the visible emissions, and the date corrective action was taken.

2.11 The permittee shall have a certified opacity reader onsite at all times during operation of any regulated sources (in Table 1.1). The reader shall be certified in using the test methods and procedures of EPA Reference Methods 9 and ~~22~~knowledgeable of Method 22 procedures.

Process Weight

2.12 The permittee shall not emit PM to the atmosphere from any process or process equipment in excess of the amount shown by the equations in IDAPA 58.01.01.700-703.

- The ore processing; ore concentration and refining; lime production; aggregate production; concrete production; and process heating equipment (identified in Table 1.1) are process equipment as defined in IDAPA 58.01.01.006.

Odor

2.13 The permittee shall not allow, suffer, cause, or permit the emission of odorous gases, liquids, or solids into the atmosphere in such quantities as to cause air pollution in accordance with IDAPA 58.01.01.776.01.

2.14 The permittee shall maintain records of all odor complaints received. If the complaint has merit, the permittee shall take appropriate corrective action as expeditiously as practicable. The records shall include, at a minimum, the date that each complaint was received and a description of the following: the complaint, the permittee's assessment of the validity of the complaint, any corrective action taken, and the date the corrective action was taken.

Fuels

2.15 The permittee shall not sell, distribute, use, or make available for use any distillate fuel oil containing more than the following percentages of sulfur, in accordance with IDAPA 58.01.01.725:

- ASTM Grade 1 fuel oil - 0.3% by weight.
- ASTM Grade 2 fuel oil - 0.5% by weight.

2.16 The permittee shall maintain documentation of supplier verification of fuel oil sulfur content on an as-received basis to ensure compliance with fuel specifications (Permit Condition 2.15).

2.17 The maximum ~~combined~~ throughput of gasoline to the Gasoline Tanks (TG1, TG2) shall not exceed 100,000 gallons per month (gal/mo).

2.18 After startup, each month the permittee shall maintain records demonstrating compliance with gasoline throughput limits, by tracking either amounts loaded or amounts dispensed from each Gasoline Tank.

O&M Manual

2.19 Within 60 days after startup of any process equipment (Permit Condition 2.12), the permittee shall develop and maintain an Operation and Maintenance (O&M) manual to ensure compliance with emission limits (Permit Conditions 2.8, 2.12, 4.3, and 0) and the control equipment maintenance and operation general provision (Permit Condition 7.2). The O&M manual shall be a permittee-developed document based upon, but independent from, manufacturer-supplied operating manuals. The permittee shall operate control equipment in accordance with the O&M manual at all times. The requirements in the O&M manual shall be incorporated by reference to this permit and shall be enforceable permit conditions. At a minimum, the O&M manual shall include the following for all (Table 1.1):

- Identify the manufacturer, model, date of manufacture, and maximum capacity (as-built) for each regulated emission source assigned a source ID, and for each control device in the service of ore concentration and refining, lime production, and concrete production (in Table 1.1). For each wet scrubber, carbon filter, baghouse and bin vent filter cartridge control device, a copy of the vendor-supplied performance guarantee shall be included. For each engine, a copy of the EPA tier certification shall be included.
- Establish operating ranges for control equipment, based on manufacturer specifications and conditions measured during performance testing;

- Minimum pressure drop across each wet scrubber
- Minimum recirculation flow rate for each wet scrubber
- Maximum inlet gas stream temperature to each carbon filter
- ~~Minimum~~ Maximum pressure drop across each carbon filter
- Maximum pressure drop across each baghouse
- Minimum coolant flow rate in the mercury retort condenser

• Describe the procedures for proper operation, startup, and shutdown of control equipment, based on manufacturer specifications.

• Describe the schedule and procedures for routine inspection (Permit Condition 2.9), maintenance, repair, and replacement of control equipment.

  - See-no-see visible emissions inspection of each wet scrubber, carbon filter, baghouse, and bin vent shall be conducted at least once per month.
  - , the drum lining of the carbon regeneration kiln shall be visually inspected for structural damage and cracks.
  - The dates, times, and results from each inspection (as required by Permit Condition 2.10), corrective action, maintenance, repair, and replacement of control equipment shall be recorded at least once per month.
  - The replacement dates for each baghouse and bin vent filter cartridge and for each activated carbon filter medium shall be recorded ~~at least once per month~~for each replacement. For cartridges, records shall include the manufacturer and model. For carbon filters, records shall include the manufacturer, type, and form of medium added. Records shall also include any changes in supplier and other relevant information.
  - All carbon filter beds ~~from the mercury retort~~ shall be disposed of in an acceptable manner in compliance with all applicable state rules and federal regulations.

• Describe the schedule and procedures for corrective action that will be taken if visible emissions are present from wet scrubber (WS1, WS2, WS3), carbon filter (CA1, CA2, CA3, CA4), baghouse (BH1, BH2, BH3, BH4, BH5), or bin vent filter (LS, LS1, MillS2, ACS1, ACS2, ACS3, ACS4, CS1, CS2) control equipment at any time. Procedures should include how to determine whether filter cartridges are ruptured or are not appropriately secured in place, and how to determine whether the wet scrubber, condenser, and carbon filters are operating properly.

• Describe each monitoring device and methodology used to measure weights of materials to demonstrate compliance with each material throughput limit (Permit Conditions 3.5–3.8, 4.5–4.10, and 5.4–5.8). Procedures for proper installation, calibration, and maintenance shall be included.

2.20 ~~Copies of the~~ The O&M manual shall be submitted to DEQ within 60 days after initial startup of any ore processing, ore concentration and refining, lime production, or aggregate production emission source regulated by this permit (as identified in Table 1.1) at the address provided (Permit Condition 2.25), and shall remain onsite at all times. Any changes to the O&M manual shall be submitted to DEQ for review and comment within 15 days of the change.

Incorporation of Federal Requirements

2.21 Unless expressly provided otherwise, any reference in this permit to any document identified in IDAPA 58.01.01.107.03 shall constitute the full incorporation into this permit of that document for the purposes of the reference, including any notes and appendices therein. Documents include, but are not limited to:

- Standards of Performance for New Stationary Sources (NSPS) 40 CFR 60, Subpart A – General Provisions.
- NSPS 40 CFR 60, Subpart LL – Standards of Performance for Metallic Mineral Processing Plants. Each crusher (OC7, OC12), conveyor belt transfer point (~~OC1~~OC1–OC6, ~~OC8~~OC8–OC11, OC13), and truck unloading station (OC1) is an affected facility.
- NSPS 40 CFR 60, Subpart OOO – Standards of Performance for Nonmetallic Mineral Processing Plants. Each crusher (LS2, LS4), grinding mill (LSBM~~, OC12~~), screening operation (LS3, LS5, LS11), belt conveyor (LS6–LS10, LS12), and storage bin (LS1) is an affected facility.
- NSPS 40 CFR 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Each emergency generator engine and fire pump (EDG1, EDG2, EDG3, and EDFP) is an affected facility.
- National Emission Standards for Hazardous Air Pollutants for Source Categories (NESHAP) 40 CFR 63, Subpart A – General Provisions.
- NESHAP 40 CFR 63, Subpart EEEEEEE – National Emission Standards for Hazardous Air Pollutants: Gold Mine Ore Processing and Production Area Source Category. The collection of ore pretreatment processes including the autoclave (AC) and the carbon process including the carbon regeneration kiln (CKD), the electrowinning cells and pregnant solution tank (EW), the mercury retort (MR), and the induction melting furnace (MF) are affected facilities.
- NESHAP 40 CFR 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE). Each emergency generator engine and fire pump (EDG1, EDG2, EDG3, and EDFP) is an affected facility.
- NESHAP 40 CFR 63, Subpart CCCCCC – National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities. Each gasoline fuel storage tank (TG1, TG2) is an affected facility.

2.22 For permit conditions referencing or cited in accordance with any document incorporated by reference (including permit conditions identified as NSPS or NESHAP), should there be any conflict between the requirements of the permit condition and the requirements of the document, the requirements of the document shall govern, including any amendments to that regulation.

2.23 In accordance with IDAPA 58.01.01.313.01.b., 40 CFR 70.3(c)(2), and 40 CFR 63.11640(d), the permittee shall submit a complete application to DEQ at the address provided (Permit Condition 2.25) for an initial Tier I operating permit within 12 months of becoming a Tier I source.

Test Methods

2.24 Except as otherwise specified in this permit and in IDAPA 58.01.01.157.02, when testing is required the following test methods shall be used to measure pollutant emissions.

Table 2.1 Test Methods

Pollutant		Test Method	Additional Requirements
H_2SO_4		EPA Method 8	
PM_{10}		EPA Method 5 and 201A, and 202	PM, including condensable particulate as defined in IDAPA 58.01.01.006., with an aerodynamic diameter less than or equal to a nominal 10 micrometers for PM_{10}, and less than or equal to a nominal 2.5 micrometers for $PM_{2.5}$.
Opacity	point	EPA Method 9	For NSPS and NESHAP sources, use IDAPA 58.01.01.625 and Method 9. For other sources, use IDAPA 58.01.01.625 only.
	fugitive	EPA Method 22	Visible fugitive PM.

Notifications

2.25 All requests, reports, applications, submittals, certifications, and other communications required by this permit shall be submitted to:

Air Quality Permit Compliance
Department of Environmental Quality
Boise Regional Office
1445 N. Orchard St.
Boise, Idaho 83706

phone: (208) 373-0550
fax: (208) 373-0287

3 Mining and Ore Processing

3.1 Process Description

Conventional open-pit mining methods including drilling, blasting, excavating, and hauling will be used to extract ore and waste rock, termed development rock (DR). Hydraulic shovels and front-end loaders will be used to load ore and DR into haul trucks. DR will be used for construction, restoration, and backfilling, or hauled to dedicated development rock storage facilities (DRSF). Approximately 340 million tons of DR will be handled over the life of the mine.

The SGP will include three years of pre-mining development and construction activities, followed by an operating mine life of approximately 12 years. Mining will occur in three open pits: Yellow Pine Pit (YPP), Hangar Flats pit (HFP), and West End pit (WEP). Legacy tailings from the Meadow Creek valley (Bradley Tailings [BT]) will also be reclaimed and reprocessed. Surface exploration drilling will occur within the pits and underground within the Scout Prospect decline.

Ore will be hauled to the primary crusher area, where it will be fed directly into the crusher dump pocket or stockpiled. The ore crushing plant will be designed to operate at a maximum rate of 25,000 tons per calendar day (T/day). Approximately 100 million tons of ore will be mined from the three pits over the life of the project.

The metal-recovery process from ore will include conventional crushing and grinding, followed by froth-flotation circuits that will generate separate gold-silver and antimony-silver concentrates. The antimony-silver concentrate will be shipped offsite for refining, whereas additional onsite processing of the gold-silver concentrate will include pressure oxidation, carbon-in-leach circuits, and refining processes to recover gold and minor amounts of silver. The finely ground leftover ore material from the mineral-recovery process, termed tailings, will be neutralized, thickened, and transported via a pipeline to the tailings storage facility (TSF).

3.2 Control Device Descriptions

Table 3.1 Mining and Ore Processing Control Equipment

Emission Sources	Control Devices
Excavating and hauling activities	Chemical suppression and water sprays ~~Control efficiency: 93.3% for PM/PM_{10}~~ (haul roads)
Loader Transfer of Ore to Grizzly	Water sprays and moisture carryover
Grizzly to Apron Feeder	
Apron Feeder to Dribble	
Apron Feeder to Grizzly	
Dribble to Grizzly	
Grizzly to Primary Crusher or Coarse Ore Stockpile Feed	
Primary Crusher	Water sprays and moisture carryover
Coarse Ore Stockpile Feed Transfer to Stockpile	
Stockpile Transfer to Reclaim Conveyors	Below-grade of storage piles ~~Control efficiency: 80% for PM/PM_{10}~~
Reclaim Conveyors to Feed Conveyor	
Feed Transfer to	Enclosure ~~Control efficiency: 80% for PM/PM_{10}~~
Pebble Crusher	Water sprays and moisture carryover
Pebble Discharge to Feed	
(2) Prill Silos #1-2 Maximum capacity: 100 T (each)	None

Operating Limits

3.3 Drilling Limits

The permittee shall drill no more than 1,200 blast holes per day.

3.4 Blasting Limits

The permittee shall complete no more than 2 blasting operations per day.

3.5 Hauling and Excavating Limits

The permittee shall haul no more than 180,000 tons of ore and rock per day.

3.6 Primary Crusher Limit

The permittee shall process ore as the raw material in the primary crusher, and the maximum input to the primary crusher shall not exceed 25,000 T/day.

3.7 Pebble Crusher Limit

The permittee shall process ore as the raw material, and the maximum input to the pebble crusher shall not exceed 27,600 T/day.

3.8 Prill Loading Limit

The permittee shall not load in excess of ~~608 tons per month (T/mo)~~200 T/day nor 9,000 T/yr of prill (ammonium nitrate) to the prill silos.

3.9 Mining and Ore Processing Dust Control

The permittee shall control emissions from mining and ore processing emission sources (Table 3.1) in accordance with the Fugitive Dust Control Plan.

3.10 Ore Processing Equipment Water Sprays

The permittee shall install, maintain, and operate water sprays in accordance with the O&M manual (Permit Condition 2.19) to control PM emissions from each ore processing crusher and conveyor. Water sprays shall operate at all times when this equipment is operated to ensure compliance with Fugitive Dust requirements (Permit Conditions 2.1–2.5).

3.11 ~~Building Enclosures~~

~~The Primary Crusher (OC7) shall be fully enclosed within a building (Primary Crusher Building).~~

~~The Pebble Crusher (OC12) shall be fully enclosed within a building (Pebble Crusher Building).~~

Monitoring and Recordkeeping Requirements

3.12 Drilling Limits Monitoring

The permittee shall monitor and record the number of blast holes drilled per calendar day.

3.13 Blasting Limits Monitoring

The permittee shall monitor and record the number of blasting operations completed each calendar day.

3.14 Hauling and Excavating Limit Monitoring

The permittee shall monitor and record the amount of ore and rock transported on haul trucks each calendar day. The devices and methodologies used to measure weights shall be identified in O&M Manual.

3.15 Primary Crusher Limit Monitoring

The permittee shall monitor and record the tons of ore input to the crusher each calendar day (T/day). The devices and methodologies used to measure weights shall be identified in O&M Manual.

3.16 Pebble Crusher Limit Monitoring

The permittee shall monitor and record the tons of ore input to the pebble crusher each calendar day (T/day). The devices and methodologies used to measure weights shall be identified in O&M Manual.

3.17 Prill Loading Limit Monitoring

The permittee shall monitor and record the amount of prill loaded to the prill silos each calendar day (T/day). Annual material loading shall be determined by summing the monthly loading over the previous consecutive 12-month period. The devices and methodologies used to measure weights shall be identified in O&M Manual.

4 Ore Concentration and Refining

4.1 Process Description

The autoclave is a pressure oxidation (POX) vessel used to ~~extract gold from~~oxidize gold-silver concentrate at elevated temperature and pressure, in the presence of oxygen. Upon exiting the autoclave, the slurry is cooled in flash vessels, neutralized using lime and caustic soda prior to being sent to the vat leaching circuit for gold and silver recovery. ~~The autoclave discharges to flash vessels and a wet scrubber (WS1).~~ A dilute sodium cyanide solution is added to the leach tanks to dissolve the gold and silver from the ore.~~Slurry discharge from the flash vessels processes through basic ferric sulfate (BFS) re-leach tanks to stabilize the solids. The concentrate is then conditioned with lime before cyanide leaching.~~ Leached “pulp” is sent to multistage carbon-in-pulp (CIP) and/or carbon-in-leach (CIL) tanks, where gold is recovered via adsorption onto activated carbon~~carbon filters~~. The autoclave is located in the POX Building and the exhaust from autoclave passes through a wet scrubber (WS1).

~~Carbon filters~~Carbon loaded with gold ~~are~~ is removed and washed with acid, then stripped with a caustic solution. This mineral-bearing solution is sent to the electrowinning cells and pregnant solution tank (EW). The EW cells remove the gold from the solution by plating it onto cathodes consisting of stainless-steel plates with steel wool. The EW cell exhaust passes through a carbon adsorption column (CA2), where ~~any~~ remaining mercury vapor is adsorbed onto sulfur-impregnated activated carbon (SIAC)~~ before being emitted to the atmosphere~~. The stripped ~~carbon filters~~carbon must be periodically regenerated in the carbon regeneration kiln. Exhaust from the carbon regeneration kiln passes through a carbon adsorption bed (CA1), where ~~any~~ mercury is adsorbed onto SIAC~~ before being emitted to the atmosphere~~.

Gold concentrate is loaded into the mercury retort, where it is heated under vacuum to drive off mercury. The mercury retort exhaust passes through a shell-and-tube condenser to cool the exhaust and condense the mercury vapor into a liquid, which is collected by the mercury trap. The exhaust passes through a carbon adsorption column (CA3), where ~~any~~ remaining vapor mercury is adsorbed onto ~~sulfur-impregnated activated carbon (~~SIAC~~) before being emitted to the atmosphere~~.

After retorting, the gold concentrate is transferred to the electric induction melting furnace. Only retorted concentrate is melted in the furnace. The exhaust passes through a carbon adsorption column (CA4), where ~~any~~ remaining mercury vapor is adsorbed onto SIAC~~ before being emitted to the atmosphere~~. The electrowinning cells and pregnant solution tank, carbon regeneration kiln, mercury retort, and induction melting furnace are located in the Refinery Building.

4.2 Control Device Descriptions

Table 4.1 Ore Concentration and Refining Equipment Descriptions

Lime Production Plant Emissions Unit / Processes	Control Devices	Emission Points
Autoclave	Wet Scrubber (WS1) Minimum pressure drop and minimum recirculation flow rate monitoring established in accordance with Subpart EEEEEEE	Autoclave Wet Scrubber Stack
Electrowinning Cells and Pregnant Solution Tank	Shared Carbon Filter (CA2) ~~Minimum~~ Maximum Maximum pressure drop monitoring~~and~~ established in accordance with O&M ~~minimum~~ Maximum inlet gas stream temperature monitoring established in accordance with Subpart EEEEEEE	Electrowinning Cells and Pregnant Solution Tank Shared Carbon Filter Stack
Mercury Retort	Condenser Minimum coolant flow rate monitoring established in accordance with O&M Carbon Filter (CA3) Maximum Maximum pressure drop monitoring established in accordance with O&M Maximum inlet gas stream temperature monitoring established in accordance with Subpart EEEEEEE	Mercury Retort Carbon Filter Stack
Induction Melting Furnace	Baghouse (BH2) Maximum~~Minimum~~ pressure drop monitoring established in accordance with O&M Carbon Filter (CA4) Maximum Maximum pressure drop monitoring established in accordance with O&M Maximum inlet gas stream temperature monitoring established in accordance with Subpart EEEEEEE	Induction Melting Furnace Carbon Filter Stack
Carbon Regeneration Kiln	Wet Scrubber (WS2) Minimum pressure drop and minimum recirculation flow rate monitoring established in accordance with O&M Carbon Filter (CA1) Maximum Maximum pressure drop monitoring established in accordance with O&M Maximum inlet gas stream temperature monitoring established in accordance with Subpart EEEEEEE	Carbon Regeneration Kiln Carbon Filter Stack
Antimony Bagging	Baghouse (BH1) Maximum ~~Minimum~~ pressure drop monitoring established in accordance with O&M	Antimony Bagging Baghouse Stack

Emission Limits

4.3 Ore Concentration and Refining Equipment Emission Limits

Emissions from ore concentration and refining equipment stacks shall not exceed any corresponding emission rate limits (Table 4.2Table 4.1).

Table 4.2 Ore Concentration and Refining Emissions Limits [(a)]

Source Description	PM / PM_{10} / $PM_{2.5}$ [(b)]	NO_x	CO	VOC	SO_2	H_2SO_4
	lb/hr [(c)]	lb/hr [(c)]	lb/hr [(c)]	lb/hr [(c)]	lb/hr [(c)]	lb/hr [(c)]
Autoclave (AC)	5.08				0.65	2.03
Carbon regeneration kiln (CKD, CKB)	0.440.42	0.01	0.12	0.11		
Antimony Bagging (Sb2)	0.12					
Electrowinning cells and pregnant solution tank (EW)	0.07					
Mercury retort (MR)	0.01 [(d)]					
Induction melting furnace (MF)	2.84					

a) In absence of any other credible evidence, compliance is ensured by complying with permit operating, monitoring, and recordkeeping requirements.

b) Particulate matter (PM) including condensable PM as defined in IDAPA 58.01.01.006, with an aerodynamic diameter less than or equal to a nominal 10 micrometers for PM_{10}, and less than or equal to a nominal 2.5 micrometers for $PM_{2.5}$.

c) Pounds per hour, as determined by a test method prescribed by IDAPA 58.01.01.157, EPA reference test method, continuous emission monitoring system (CEMS) data, or DEQ-approved alternative.

d) For this emission limit, compliance may be demonstrated as measurement below detection limits, when addressed as part of a performance test protocol that is approved by DEQ.

Operating Limits

4.4 POX Boiler Operation

Operation of the POX Boiler shall be limited to the autoclave strat-up operation onlynot exceed 1 hour per calendar day and 30 hours per consecutive 12-month period.

4.5 Autoclave Input

The permittee shall process ore concentrate as the raw material in the autoclave, and the maximum input to the autoclave shall not exceed 6,960 T/day.

4.6 Mercury Retort Input

The permittee shall process precious metal concentrate as the raw material in the mercury retort, and the maximum input to the mercury retort shall not exceed 1,000 pounds per batch (lb/batch) and 21 T/yr.

Precious metal concentrate includes material loaded with precious metals produced by electrowinning, flotation and gravity separation, and other gold concentration or precipitation processes; and material collected from the wash-down of equipment and surfaces contacted with precious metals that have been concentrated through these concentration methods.

4.7 Induction Melting Furnace Input

The permittee shall process retorted concentrate as the raw material in the induction melting furnace, and the input to the induction melting furnace shall not exceed 1,000 lb/batch, and 21 T/yr. Retorted concentrate includes precious metal concentrate that has been retorted and dust collected from the baghouse and fume hood of the induction melting furnace.

4.8 Carbon Regeneration Kiln Input

The permittee shall process carbon filters as the raw material in the carbon regeneration kiln, and the maximum input to the carbon regeneration kiln shall not exceed 7.2 T/day.

4.9 Electrowinning Cells and Pregnant Solution Tank Throughput

The permittee shall process ~~ore and ore concentrate~~mineral-bearing solution as the raw materials in the electrowinning cells and pregnant solution tank, and the maximum throughput for the electrowinning cells and pregnant solution tank shall not exceed 100 gallons per minute (gpm).

4.10 Antimony Bagging Input

The maximum throughput through the antimony bagging process shall not exceed 108 T/day, or the maximum throughput established during performance testing when addressed as part of a performance test protocol that is approved by DEQ (Permit Condition 4.30).

4.11 Autoclave Wet Scrubber

The permittee shall install, maintain, and operate a wet scrubber (WS1) in accordance with the O&M manual (Permit Condition 2.19) and manufacturer's specifications. All emissions from the autoclave shall be ducted to the wet scrubber at all times to ensure compliance with autoclave emission limits (Table 4.2)~~ and in accordance with IDAPA 58.01.01.210.21~~.

4.12 Electrowinning Cells and Pregnant Solution Tank Shared Carbon Filter

The permittee shall install, maintain, and operate a carbon filter (CA2) in accordance with the O&M manual (Permit Condition 2.19) and consistent with manufacturer's recommendations. All emissions from the electrowinning cells and pregnant solution tank shall be ducted to a carbon filter at all times to ensure compliance with electrowinning cells and pregnant solution tank emission limits (Table 4.2)~~ and in accordance with IDAPA 58.01.01.210.21~~.

4.13 Mercury Retort Condenser and Carbon Filter

The permittee shall install, maintain, and operate a condenser and carbon filter (CA3) in series in accordance with the O&M manual (Permit Condition 2.19) and manufacturer's recommendations. All emissions from the mercury retort (MR) shall be ducted to the condenser and activated carbon filter at all times to ensure compliance with mercury retort emission limits (Table 4.2~~Table 4.1~~) ~~and in accordance with IDAPA 58.01.01.210.21~~.

- The MR shall be fully enclosed in the refinery building.
- The air pressure within the MR shall be maintained lower than the room air pressure such that air flows into the MR at all times when the MR is operating. The MR door shall be kept closed at all times during operation.
- The permittee shall not operate the MR unless the chilled water condenser is operating, carbon filter in place, and the condenser coolant flow rate~~exhaust gas temperature~~ is maintained within the range specified in the O&M manual.
- The condenser and carbon filter shall be maintained and operated in accordance with the O&M manual.
- All liquid mercury captured from the MR shall be stored in closed containers

4.14 Induction Melting Furnace Baghouse and Carbon Filter

The permittee shall install, maintain, and operate a baghouse (BH2) and carbon filter (CA4) in series in accordance with the O&M manual (Permit Condition 2.19) and manufacturer's recommendations. All emissions from the induction melting furnace shall be ducted to the baghouse and carbon filter at all times during operation to ensure compliance with induction melting furnace emission limits (Table 4.2)~~ and in accordance with IDAPA 58.01.01.210.21~~.

4.15 Carbon Regeneration Kiln Wet Scrubber and Carbon Filter

The permittee shall install, maintain, and operate a wet scrubber (WS2) and carbon filter (CA1) in series in accordance with the O&M manual (Permit Condition 2.19) and consistent with manufacturer's recommendations. All emissions from the carbon regeneration kiln shall be ducted to the wet scrubber and a carbon filter at all times to ensure compliance with carbon regeneration kiln drum emission limits (Table 4.2~~Table 4.1~~)~~ and in accordance with IDAPA 58.01.01.210.21~~.

4.16 Antimony Bagging Baghouse

The permittee shall install, maintain, and operate a baghouse (BH1) in accordance with the O&M manual (Permit Condition 2.19) and consistent with manufacturer's recommendations. All emissions from antimony bagging shall be ducted to the baghouse at all times to ensure compliance with antimony bagging emission limits (Table 4.2~~Table 4.1~~)~~ and in accordance with IDAPA 58.01.01.210.21~~.

Monitoring and Recordkeeping

4.17 POX Boiler Operation Monitoring

Each calendar month, the permittee shall monitor and record the operating hours of the POX Boiler, in hours per calendar month and in hours per consecutive 12-month period~~ to demonstrate with the POX Boiler Operation limits~~.

4.18 Autoclave Input Monitoring

Each day, the permittee shall monitor and record the material input to the autoclave in tons per day (T/day) to demonstrate compliance with the autoclave input limit. The devices and methodologies used to measure weights shall be identified in O&M Manual, and the device shall be installed in accordance with the requirements of NESHAP Subpart EEEEEEE.

4.19 Mercury Retort Input Monitoring

Each day, the permittee shall monitor and record the material input to the mercury retort in pounds per day (lb/day) to demonstrate compliance with the daily mercury retort input limit. ~~The devices and methodologies used to measure weights shall be identified in O&M Manual.~~The device and methodologies used to measure weights shall be in accordance with the requirements of NESHAP Subpart EEEEEEE.

Each month, the permittee shall monitor and record the material input to the mercury retort in tons per month (T/mo) and in tons per year (T/yr) to demonstrate compliance with the annual mercury retort input limit. Annual material input shall be determined by summing the monthly input over the previous consecutive 12-month period.

4.20 Induction Melting Furnace Input Monitoring

Each day, the permittee shall monitor and record the material input to the induction melting furnace in lb/day to demonstrate compliance with the daily induction melting furnace input limit. The devices and methodologies used to measure weights shall be identified in O&M Manual.

Each month, the permittee shall monitor and record the material input to the induction melting furnace in T/mo and in T/yr to demonstrate compliance with the annual induction melting furnace input limit. Annual material input shall be determined by summing the monthly input over the previous consecutive 12-month period.

4.21 Carbon Regeneration Kiln Input Monitoring

Each day, the permittee shall monitor and record the material input to the carbon regeneration kiln in tons per day (T/day) to demonstrate compliance with the carbon regeneration kiln input limit. The devices and methodologies used to measure weights shall be identified in O&M Manual.

4.22 Electrowinning Cells and Pregnant Solution Tank Throughput Monitoring

Each day, the permittee shall monitor and record the material throughput in the electrowinning cells and pregnant solution tank in gallons per minute (gpm) to demonstrate compliance with the Electrowinning Cells and Pregnant Solution Tank Throughput limit. The devices and methodologies used to measure weights shall be identified in O&M Manual.~~The device shall be installed in accordance with the requirements of NESHAP Subpart EEEEEEE.~~

4.23 Antimony Bagging Input Monitoring

Each day, the permittee shall monitor and record the material input to antimony bagging operations in tons per day (T/day) to demonstrate compliance with the antimony bagging input limit. The devices and methodologies used to measure weights shall be identified in O&M Manual.

4.24 Autoclave Wet Scrubber Monitoring

The permittee shall install, calibrate, maintain, and operate a device for monitoring the recirculation flow rate in the autoclave wet scrubber, and the pressure drop across the autoclave wet scrubber.

At least once per shift, the permittee shall monitor and record the recirculation flow rate and the pressure drop across the autoclave wet scrubber to ensure compliance with O&M specifications.

4.25 Electrowinning Cells and Pregnant Solution Tank Shared Carbon Filter Monitoring

The permittee shall install, calibrate, maintain, and operate a device for monitoring the inlet gas stream temperature to the carbon filter, and the maximum pressure drop across the carbon filter.

At least once per shift, the permittee shall monitor and record the inlet gas stream temperature and maximum pressure drop across the carbon filter for the electrowinning cells and pregnant solution tank to ensure compliance with O&M specifications.

4.26 Mercury Retort Condenser and Carbon Filter Monitoring

The permittee shall install, calibrate, maintain, and operate a device for monitoring the coolant flow rate in the condenser, a device for monitoring the inlet gas temperature to the carbon filter, maximum pressure drop across the carbon filter, and a device for monitoring the difference between the pressure inside the MR and the air pressure in the room.

At least once per shift, the permittee shall monitor and record the coolant flow rate to the condenser, and the inlet gas stream temperature and maximum pressure drop across the carbon filter for the mercury retort to ensure compliance with O&M specifications.

4.27 Induction Melting Furnace Baghouse and Carbon Filter Monitoring

The permittee shall install, calibrate, maintain, and operate a device for monitoring the pressure drop across the induction melting furnace baghouse, the inlet gas stream temperature to the carbon filter, and the maximum pressure drop across the carbon filter.

At least once per shift, the permittee shall monitor and record the pressure drop across the induction melting furnace baghouse, and the inlet gas stream temperature and maximum pressure drop across the carbon filter for the induction melting furnace to ensure compliance with O&M specifications.

4.28 Carbon Regeneration Kiln Wet Scrubber and Carbon Filter Monitoring

The permittee shall install, calibrate, maintain, and operate a device for monitoring the recirculation flow rate in the carbon regeneration kiln wet scrubber, ~~and~~ the pressure drop across the carbon regeneration kiln wet scrubber, the inlet gas stream temperature to the carbon filter, and the maximum pressure drop across the carbon filter.

At least once per shift, the permittee shall monitor and record the recirculation flow rate and the pressure drop across the carbon regeneration kiln wet scrubber, and the inlet gas stream temperature and maximum pressure drop across the carbon filter to ensure compliance with O&M specifications.

4.29 Antimony Bagging Baghouse Monitoring

The permittee shall install, calibrate, maintain, and operate a device for monitoring the pressure drop across the antimony bagging baghouse. At least once per shift, the permittee shall monitor and record the pressure drop across the antimony bagging baghouse to ensure compliance with O&M specifications.

Testing

4.30 Ore Concentration and Refining Equipment Performance Tests

Within 180 days after initial startup, performance testing shall be conducted to demonstrate compliance with the following Ore Concentration and Refining Equipment Emission Limits. The permittee shall conduct three separate test runs for each performance test using the appropriate test method (Permit Condition 2.24). The source test shall be conducted under "worst-case normal" conditions as required by IDAPA 58.01.01.157 and the General Provisions of this permit, and the source test report shall contain documentation that the test was conducted under these conditions.

- PM_{10} and H_2SO_4 in lb/hr from the Autoclave Wet Scrubber Stack
- PM_{10} in lb/hr from the Carbon Regeneration Kiln Carbon Filter Stack
- PM_{10} in lb/hr from the Antimony Bagging Baghouse Stack
- PM_{10} in lb/hr from the Electrowinning Cells and Pregnant Solution Tank Shared Carbon Filter Stack
- PM_{10} in lb/hr from the Mercury Retort Carbon Filter Stack

- PM_{10} in lb/hr from the Induction Melting Furnace Carbon Filter Stack

4.31 Ore Concentration and Refining Equipment Performance Tests Monitoring

The permittee shall monitor and record the following during each performance test:

- Material input rates for all ore concentration and refining process equipment (Permit Conditions 4.18, 4.19, 4.20, ~~and~~ 4.21, 4.22, and 4.23) during each test run, in tons.
- Control equipment monitoring relevant to the stack tested (Permit Condition 4.24, 4.25, 4.26, 4.27, 4.28, or 4.29), measured at least once ~~every 15 minutes~~ during each test run.
- The visible emissions observed for the stack tested during each test run, using the methods specified in IDAPA 58.01.01.625 (Permit Condition 2.8).

5 Lime, Aggregate, and Concrete Production

5.1 Process Description

The lime, aggregate, and cement batch plants produce raw materials necessary for mining and ore concentration and refining operations. Lime is used in ~~the lime slaking mill~~ore processing for pH control. Aggregate and cement are used in concrete production, with aggregate also used in road construction.

Lime production consists of a ~~central mix batch~~limestone crushing, screening, and grinding plant and lime storage silos. The ~~central mix batch plant~~limestone grinding process utilizes ~~water sprays and moisture carryover~~a baghouse to reduce emissions during processing. Each storage silo has a bin vent filter used to reduce PM emissions during silo loading.

Aggregate production consists of two portable crushing and screening plants~~ batch plant~~ and aggregate and cement storage silos. Each portable crushing and screening plant utilizes water sprays and moisture carryover to reduce emissions during processing. Each storage silo has a bin vent filter used to reduce PM emissions during silo loading.

Concrete production consists of a central mix batch plant and ~~lime~~ cement storage silos. The central mix batch plant utilizes controls that controls may include water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, central duct collection systems, etc. to reduce PM emissions during processing. Each storage silo has a bin vent filter used to reduce PM emissions during silo loading.

5.2 Control Device Descriptions

Table 5.1 Lime, Aggregate, and Concrete Production Equipment Descriptions

Lime Production Plant Emissions Unit / Processes		Control Devices	Emission Points
~~Central Mix Loading~~		~~Water sprays and moisture carryover, and may also include enclosures, hoods, curtains, shrouds, movable and telescoping chutes, central duct collection systems, etc.~~	~~Fugitive~~
AC Lime Silo #1, AC Lime Silo #2, AC Lime Silo #3, and AC Lime Silo #4	loading	Bin vent filters	AC Lime Silo #1 Stack, AC Lime Silo #2 Stack, AC Lime Silo #3 Stack, and AC Lime Silo #4 Stack
	unloading	None	Fugitive

Aggregate Production Plant Emissions Unit / Processes	**Control Devices**	
Portable Crushing and Screening Plant 1 Crushers, screens, and conveyors	Water sprays and moisture carryover	Fugitive
Portable Crushing and Screening Plant 2 Crushers, screens, and conveyors	Water sprays and moisture carryover	Fugitive
Concrete Production Plant Emissions Unit / Processes	**Control Devices**	
Central Mix	Controls Controls may include water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, central duct collection systems, etc.	Fugitive
Aggregate bin loading/unloading	None	~~Aggregate Bin Stack~~Fugitive
Cement/Shotcrete Silo #1 and Cement/Shotcrete Silo #2 loading	Bin vent filters	Cement/Shotcrete Silo #1 Stack, and Cement/Shotcrete Silo #2 Stack
unloading	None	Fugitive

Emission Limits

5.3 Lime, Aggregate, and Concrete Production Emission Limits

Emissions from the lime production plant stacks shall not exceed any emission rate limit in the following table.

Table 5.2 Lime, Aggregate, and Concrete Production Plant Emission Limits [a]

Source Description	PM [b]	PM_{10} [b]	$PM_{2.5}$ [b]	NO_x	CO	VOC	SO_2
	lb/hr ~~[c]~~	lb/hr ~~[c]~~	lb/hr ~~[c]~~	lb/hr ~~[c]~~	lb/hr ~~[c]~~	lb/hr ~~[c]~~	lb/hr ~~[c]~~
Lime Production							
Parallel Flow Regenerative Shaft Kiln (LK, LKC)	1.07	1.07	1.07	~~4.61~~4.82	~~4.85~~4.98	~~0.18~~0.19	~~0.37~~0.39
Limestone Ball Mill (LSBM)	1.90	1.60	0.57				
Lime Mill Crusher (LCR)	0.28	0.24	0.09				
~~Lime Mill screens and conveyors (LS2, LS4, LS3, LS5, LS11, LS1, LS6–LS10, LS12)~~	~~3.66~~	~~1.34~~	~~0.20~~				
Mill Lime Silo loading and unloading (LS1, MillS2)	~~0.06~~0.31	~~0.02~~0.15	~~0.01~~0.02				
AC Lime Silo loading and unloading (ACS1, ACS2, ACS3, ACS4)	~~0.12~~0.86	~~0.04~~0.39	~~0.01~~0.06				
Pebble Lime Silo loading (LS-L)	0.01	0.01	0.01				
Pebble Lime Silo unloading (LS-U)	0.001	0.001	0.001				
Crushers, screens, conveyors~~, silo unloading~~ (~~LSBM, LCR,~~ LS1– LS12)	~~6.00~~3.81	~~3.22~~1.39	~~0.87~~0.21				
Aggregate Production							
Portable Crushing and Screening Plant 1	0.63	0.23	0.03				
Portable Crushing and Screening Plant 2	0.63	0.23	0.03				
Concrete Production							
Central Mix Plant (CM, CS1, CS2, CA)	2.10	0.94	0.14				

a) In absence of any other credible evidence, compliance is ensured by complying with permit operating, monitoring, and recordkeeping requirements.

b) Particulate matter (PM) including condensable PM as defined in IDAPA 58.01.01.006 , with an aerodynamic diameter less than or equal to a nominal 10 micrometers for PM_{10}, and less than or equal to a nominal 2.5 micrometers for $PM_{2.5}$.

c) ~~Pounds per hour, as determined by a test method prescribed by IDAPA 58.01.01.157, EPA reference test method, continuous emission monitoring system (CEMS) data, or DEQ-approved alternative.~~

Operating Requirements

5.4 Primary Crusher Limit

The permittee shall process limestone as the raw material, and the maximum input to the ~~Semi-Autogenous Grinding (SAG) Mill~~ Primary Crusher shall not exceed 1,130 T/day.

5.5 Parallel Flow Regenerative Kiln Limit

The permittee shall process lime~~stone~~ as the raw material in the Parallel Flow Regenerative Kiln. The maximum output from the kiln shall not exceed 169 T/day and 52,377 T/yr.

5.6 Portable Crushing and Screening Plant 1 Input Limit

The permittee shall process aggregate as the raw material, and the maximum input to the Portable Crushing and Screening Plant 1 shall not exceed 2,000 tons per calendar day.

5.7 Portable Crushing and Screening Plant 2 Input Limit

The permittee shall process aggregate as the raw material, and the maximum input to the Portable Crushing and Screening Plant 2 shall not exceed 2,000 tons per calendar day.

5.8 Central Mix Input Limit

The permittee shall process cement and aggregate as the raw materials, and the maximum input to the central mix plant shall not exceed ~~80~~ 2,480 tons per calendar day and 5560,000 tons per 12-month period.

5.9 Lime, Aggregate, and Concrete Production Dust Control

The permittee shall control emissions from lime production, aggregate production, and concrete production emission sources (Table 5.1) in accordance with the Fugitive Dust Control Plan.

5.10 Portable Crushing and Screening Plant Water Sprays

The permittee shall install, maintain, and operate water sprays in accordance with the O&M manual (Permit Condition 2.19) to control PM emissions from each portable crushing and screening plant ~~and from Central Mix loading~~. Water sprays shall operate at all times when this equipment is operated to ensure compliance with Fugitive Dust requirements (Permit Conditions 2.1–2.5)

5.11 ~~Building Enclosures~~

~~The Limestone Ball Mill (LSBM) shall be fully enclosed within a building (Ball Mill Building) and all emissions from the limestone ball mill shall be ducted to the baghouse at all times to ensure compliance with limestone ball mill emission limits (Table 5.2).~~

~~The Lime Mill Crusher (LCR) shall be fully enclosed within a building (Lime Kiln Discharge Crusher Building) and all emissions from the lime mill crusher shall be ducted to the baghouse at all times to ensure compliance with lime mill crusher emission limits (Table 5.2).~~

5.12 Parallel Flow Regenerative Kiln Baghouse

The permittee shall install, operate, and maintain a baghouse system (BH4) in accordance with the O&M manual (Permit Condition 2.19) and consistent with manufacturer's recommendations. All emissions from the parallel flow regenerative kiln shall be ducted to the baghouse at all times to ensure compliance with parallel flow regenerative emission limits.

5.13 Limestone Ball Mill Baghouse

The permittee shall install, operate, and maintain a baghouse system (BH3) in accordance with the O&M manual (Permit Condition 2.19) and consistent with manufacturer's recommendations. All emissions from the limestone ball mill kiln shall be ducted to the baghouse at all times to ensure compliance with parallel flow regenerative emission limits (Table 5.2).

5.14 Lime Mill Crusher Baghouse

The permittee shall install, operate, and maintain a baghouse (BH5) in accordance with the O&M manual (Permit Condition 2.19) and consistent with manufacturer's recommendations.

5.15 Pebble Lime Silo Wet Scrubber

The permittee shall install, operate, and maintain a wet scrubber on the Pebble Lime Silo discharge (LS) in accordance with the O&M manual (Permit Condition 2.19) and consistent with manufacturer's recommendations. All emissions during discharge from the Pebble Lime Silo shall be ducted to the wet scrubber to ensure compliance with pebble lime silo emission limits (Table 5.2).

5.16 Silo Bin Vent Filters

The permittee shall install, operate, and maintain a bin vent filter on each silo (LS1, MillS2, ACS1, ACS2, ACS3, ACS4, LS, CS1, CS2) in accordance with the O&M manual (Permit Condition 2.19) and consistent with manufacturer's recommendations. All emissions during loading of each silo shall be ducted to the corresponding bin vent filter to ensure compliance with corresponding silo emission limits (Table 5.2).

Monitoring and Recordkeeping Requirements

5.17 Primary Crusher Monitoring

Each day, the permittee shall monitor and record the material input to the Primary Crusher in tons per calendar (T/day) to demonstrate compliance with the daily Primary Crusher Limit. The devices and methodologies used to measure weights shall be identified in O&M Manual.

5.18 Parallel Flow Regenerative Kiln Limit Monitoring

Each day, the permittee shall monitor and record the material output from the Parallel Flow Regenerative Kiln in tons per calendar day (T/day) to demonstrate compliance with the daily Parallel Flow Regenerative Kiln Limits. The devices and methodologies used to measure weights shall be identified in O&M Manual.

Each month, the permittee shall calculate and record the material output from the Parallel Flow Regenerative Kiln in tons per calendar month (T/mo) and in tons per consecutive 12-month period (T/yr) to demonstrate compliance with the annual Parallel Flow Regenerative Kiln Limit. Annual material output shall be determined by summing the monthly output over the previous consecutive 12-month period.

5.19 Portable Crushing and Screening Plant 1 Input Limit Monitoring

Each day, the permittee shall monitor and record the material input to the Portable Crushing and Screening Plant 1 plant in tons per calendar day (T/day) to demonstrate compliance with the daily Portable Crushing and Screening Plant 1 Input Limit. The devices and methodologies used to measure weights shall be identified in O&M Manual.

5.20 Portable Crushing and Screening Plant 2 Input Limit Monitoring

Each day, the permittee shall monitor and record the material input to the Portable Crushing and Screening Plant 2 plant in tons per calendar day (T/day) to demonstrate compliance with the daily Portable Crushing and Screening Plant 2 Input Limit. The devices and methodologies used to measure weights shall be identified in O&M Manual.

5.21 Central Mix Input Limit Monitoring

Each day, the permittee shall monitor and record the material input to the Central Mix Plant in tons per calendar day (T/day) to demonstrate compliance with the daily Central Mix Input Limit. The devices and methodologies used to measure weights shall be identified in O&M Manual.

Each month, the permittee shall calculate and record the material input to the central mix plant in tons per calendar month (T/mo) and in tons per consecutive 12-month period (T/yr) to demonstrate compliance with the annual Central Mix Input Limit. Annual material input shall be determined by summing the monthly input over the previous consecutive 12-month period.

5.22 Parallel Flow Regenerative Kiln Baghouse Monitoring

The permittee shall install, calibrate, maintain, and operate a device for monitoring the pressure drop across the parallel flow regenerative kiln baghouse. At least once per shift, the permittee shall monitor and record the pressure drop across the parallel flow regenerative kiln baghouse to demonstrate compliance with O&M specifications.

5.23 Limestone Ball Mill Baghouse Monitoring

The permittee shall install, calibrate, maintain, and operate a device for monitoring the pressure drop across the limestone ball mill baghouse. At least once per shift, the permittee shall monitor and record the pressure drop across the limestone ball mill kiln baghouse to demonstrate compliance with O&M specifications.

5.24 Lime Mill Crusher Baghouse Monitoring

The permittee shall install, calibrate, maintain, and operate a device for monitoring the pressure drop across the lime mill crusher baghouse. At least once per shift, the permittee shall monitor and record the pressure drop across the lime mill crusher kiln baghouse to demonstrate compliance with O&M specifications.

5.25 Pebble Lime Silo Wet Scrubber Monitoring

The permittee shall install, calibrate, maintain, and operate a device for monitoring the recirculation flow rate in the pebble lime silo wet scrubber, and the pressure drop across the pebble lime silo wet scrubber. At least once per shift, the permittee shall monitor and record the recirculation flow rate and the pressure drop across the pebble lime silo wet scrubber to demonstrate compliance with O&M specifications.

6 Engines

6.1 Process Description

Stationary internal combustion engines (ICE) for emergency power generation and fire suppression are essential to ensure safety and uninterrupted essential operations in case of unforeseen power failures or emergency situations. Portable diesel-fired light plant engines provide supplemental lighting as needed; these are not regulated by this permit and will be operated as nonroad engines defined in 40 CFR 1068.30.

6.2 Emergency Generator and Fire Pump Engine Operation

Operation of each emergency generator engine (EDG1, EDG2, EDG3) and each fire pump engine (EDFP) shall not exceed 1 hour per calendar day and 100 hours per consecutive 12-month period for non-emergency purposes.

6.3 Emergency Generator and Fire Pump Engine Operation Monitoring

Each calendar month, the permittee shall monitor and record the non-emergency operating hours of each emergency generator and fire pump engine, in hours per calendar month and in hours per consecutive 12-month period to demonstrate compliance with the emergency generator and fire pump engine operation limit.

6.4 Engines Subject to Regulation Notification

With the exception of the emergency generator and fire pump engines (identified in Table 1.1) and engines used to propel vehicles, notification shall be provided to DEQ if an engine (including any previously operated as a nonroad engine) will be operated onsite at a specific location beyond 12 months, and no longer meets criteria for regulation as a nonroad engine. Notification shall be provided as soon as practicable in advance of exceeding 12 months of operation at a single location and within 30 days after the engine ceases to meet the definition of nonroad engine in 40 CFR 1068.30.

- A nonroad engine may include engines that are portable or transportable, meaning designed to be and capable of being carried or moved from one location to another (e.g., portable light plant engines). Indicia of transportability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform.

- A portable or transportable internal combustion engine is not a nonroad engine if it remains or will remain at a location for more than 12 consecutive months, or a shorter period of time for an engine located at a seasonal source. A location is any single site at a building, structure, facility, or installation. Any engines (or engine) that replace(s) an engine at a location and is intended to perform the same or similar function as the engine(s) replaced are included in calculating the consecutive time period. Permitting requirements and emission standards may become applicable when an engine becomes a stationary source.

7 General Provisions

General Compliance

7.1 The permittee has a continuing duty to comply with all terms and conditions of this permit. All emissions authorized herein shall be consistent with the terms and conditions of this permit and the "Rules for the Control of Air Pollution in Idaho." The emissions of any pollutant in excess of the limitations specified herein, or noncompliance with any other condition or limitation contained in this permit, shall constitute a violation of this permit, the "Rules for the Control of Air Pollution in Idaho," and the Environmental Protection and Health Act (Idaho Code §39-101, et seq).

[Idaho Code §39-101, et seq.]

7.2 The permittee shall at all times (except as provided in the "Rules for the Control of Air Pollution in Idaho") maintain in good working order and operate as efficiently as practicable all treatment or control facilities or systems installed or used to achieve compliance with the terms and conditions of this permit and other applicable Idaho laws for the control of air pollution.

[IDAPA 58.01.01.211, 5/1/94]

7.3 Nothing in this permit is intended to relieve or exempt the permittee from the responsibility to comply with all applicable local, state, or federal statutes, rules, and regulations.

[IDAPA 58.01.01.212.01, 5/1/94]

Inspection and Entry

7.4 Upon presentation of credentials, the permittee shall allow DEQ or an authorized representative of DEQ to do the following:

- Enter upon the permittee's premises where an emissions source is located, emissions-related activity is conducted, or where records are kept under conditions of this permit;
- Have access to and copy, at reasonable times, any records that are kept under the conditions of this permit;
- Inspect at reasonable times any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under this permit; and
- As authorized by the Idaho Environmental Protection and Health Act, sample or monitor, at reasonable times, substances or parameters for the purpose of determining or ensuring compliance with this permit or applicable requirements.

[Idaho Code §39-108]

Construction and Operation Notification

7.5 This permit shall expire if construction has not begun within two years of its issue date, or if construction is suspended for one year.

[IDAPA 58.01.01.211.02, 5/1/94]

7.6 The permittee shall furnish DEQ written notifications as follows:

- A notification of the date of initiation of construction, within five working days after occurrence; except in the case where pre-permit construction approval has been granted then notification shall be made within five working days after occurrence or within five working days after permit issuance whichever is later;
- A notification of the date of any suspension of construction, if such suspension lasts for one year or more; and

- A notification of the initial date of achieving the maximum production rate, within five working days after occurrence - production rate and date.

[IDAPA 58.01.01.211.01, 5/1/94]

- A notification of the anticipated date of initial start-up of the stationary source or facility not more than sixty days or less than thirty days prior to such date; and
- A notification of the actual date of initial start-up of the stationary source or facility within fifteen days after such date.

[IDAPA 58.01.01.211.03, 5/1/94]

Performance Testing

7.7 If performance testing (air emissions source test) is required by this permit, the permittee shall provide notice of intent to test to DEQ at least 15 days prior to the scheduled test date or shorter time period as approved by DEQ. DEQ may, at its option, have an observer present at any emissions tests conducted on a source. DEQ requests that such testing not be performed on weekends or state holidays.

7.8 All performance testing shall be conducted in accordance with the procedures in IDAPA 58.01.01.157. Without prior DEQ approval, any alternative testing is conducted solely at the permittee’s risk. If the permittee fails to obtain prior written approval by DEQ for any testing deviations, DEQ may determine that the testing does not satisfy the testing requirements. Therefore, at least 30 days prior to conducting any performance test, the permittee is encouraged to submit a performance test protocol to DEQ for approval. The written protocol shall include a description of the test method(s) to be used, an explanation of any or unusual circumstances regarding the proposed test, and the proposed test schedule for conducting and reporting the test.

7.9 Within 60 days following the date in which a performance test required by this permit is concluded, the permittee shall submit to DEQ a performance test report. The report shall include a description of the process, identification of the test method(s) used, equipment used, all process operating data collected during the test period, and test results, as well as raw test data and associated documentation, including any approved test protocol.

[IDAPA 58.01.01.157, 4/5/00 and 4/11/15]

Monitoring and Recordkeeping

7.10 The permittee shall maintain sufficient records to ensure compliance with all of the terms and conditions of this permit. Monitoring records shall include, but not be limited to, the following: (a) the date, place, and times of sampling or measurements; (b) the date analyses were performed; (c) the company or entity that performed the analyses; (d) the analytical techniques or methods used; (e) the results of such analyses; and (f) the operating conditions existing at the time of sampling or measurement. All monitoring records and support information shall be retained for a period of at least five years from the date of the monitoring sample, measurement, report, or application. Supporting information includes, but is not limited to, all calibration and maintenance records, all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by this permit. All records required to be maintained by this permit shall be made available in either hard copy or electronic format to DEQ representatives upon request.

[IDAPA 58.01.01.211, 5/1/94]

Excess Emissions

7.11 The permittee shall comply with the procedures and requirements of IDAPA 58.01.01.130–136 for excess emissions due to start-up, shut-down, scheduled maintenance, safety measures, upsets, and breakdowns.

[IDAPA 58.01.01.130–136, 4/5/00]

Certification

7.12 All documents submitted to DEQ—including, but not limited to, records, monitoring data, supporting information, requests for confidential treatment, testing reports, or compliance certification—shall contain a certification by a responsible official. The certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document(s) are true, accurate, and complete.

[IDAPA 58.01.01.123, 5/1/94]

False Statements

7.13 No person shall knowingly make any false statement, representation, or certification in any form, notice, or report required under this permit or any applicable rule or order in force pursuant thereto.

[IDAPA 58.01.01.125, 3/23/98]

Tampering

7.14 No person shall knowingly render inaccurate any monitoring device or method required under this permit or any applicable rule or order in force pursuant thereto.

[IDAPA 58.01.01.126, 3/23/98]

Transferability

7.15 This permit is transferable in accordance with procedures listed in IDAPA 58.01.01.209.06.

[IDAPA 58.01.01.209.06, 4/11/06]

Severability

7.16 The provisions of this permit are severable, and if any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

[IDAPA 58.01.01.211, 5/1/94]

Statement of Basis

Permit to Construct No. P-2019.0047
Project ID 62288

Midas Gold Idaho, Inc.
Stibnite, Idaho

Facility ID 085-00011

Draft for Facility Review

July 14, 2020
Morrie Lewis
Permit Writer

The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01.et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
ANFO	ammonium nitrate/fuel oil
ASTM	American Society for Testing and Materials
bkW	brake kilowatt
BT	Bradley Tailings
Btu	British thermal units
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CAS No.	Chemical Abstracts Service registry number
CEMS	continuous emission monitoring systems
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CI	compression ignition
CMS	continuous monitoring systems
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent emissions
COMS	continuous opacity monitoring systems
DEQ	Department of Environmental Quality
DR	development rock
DRSF	development rock storage facilities
dscf	dry standard cubic feet
EF	emission factors
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
FDCP	Fugitive Dust Control Plan
FDRSF	Fiddle Development Rock Storage Facility
GACT	Generally Available Control Technology
gpm	gallons per minute
gr	grains (1 lb = 7,000 grains)
H_2SO_4	Sulfuric Acid gas
HAP	hazardous air pollutants
HFDRSF	Hangar Flats Development Rock Storage Facility
HFP	Hangar Flats Pit
Hg	mercury
hp	horsepower
hr/yr	hours per consecutive 12-calendar-month period
HVAC	heating, ventilation, and air conditioning
ICE	internal combustion engines
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometers
lb/hr	pounds per hour
lb/qtr	pound per quarter
LMP	lime manufacturing plant
Midas Gold	Midas Gold Idaho, Inc.
MACT	Maximum Achievable Control Technology
MMBtu	million British thermal units
MMscf	million standard cubic feet

NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NF	National Forest System road
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
NSPS	New Source Performance Standards
NSR	New Source Review
O&M	operation and maintenance
O_2	oxygen
PAH	polycyclic aromatic hydrocarbons
Pb	lead
PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
POM	polycyclic organic matter
POX	pressure oxidation
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
PW	process weight rate
RICE	reciprocating internal combustion engines
Rules	*Rules for the Control of Air Pollution in Idaho*
SAG	semi-autogenous grinding
scf	standard cubic feet
SCL	significant contribution limits
SGP	Stibnite Gold Project
SIP	State Implementation Plan
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO_2	sulfur dioxide
STKP	crusher stockpile
T/day	tons per calendar day
T/hr	tons per hour
T/yr	tons per consecutive 12-calendar-month period
TAP	toxic air pollutants
TSF	tailings storage facility
ULSD	ultra-low sulfur diesel
U.S.C.	United States Code
VOC	volatile organic compounds
WEDRSF	West End Development Rock Storage Facility
WEP	West End pit
YPDRSF	Yellow Pine Development Rock Storage Facility
YPP	Yellow Pine Pit
$\mu g/m^3$	micrograms per cubic meter

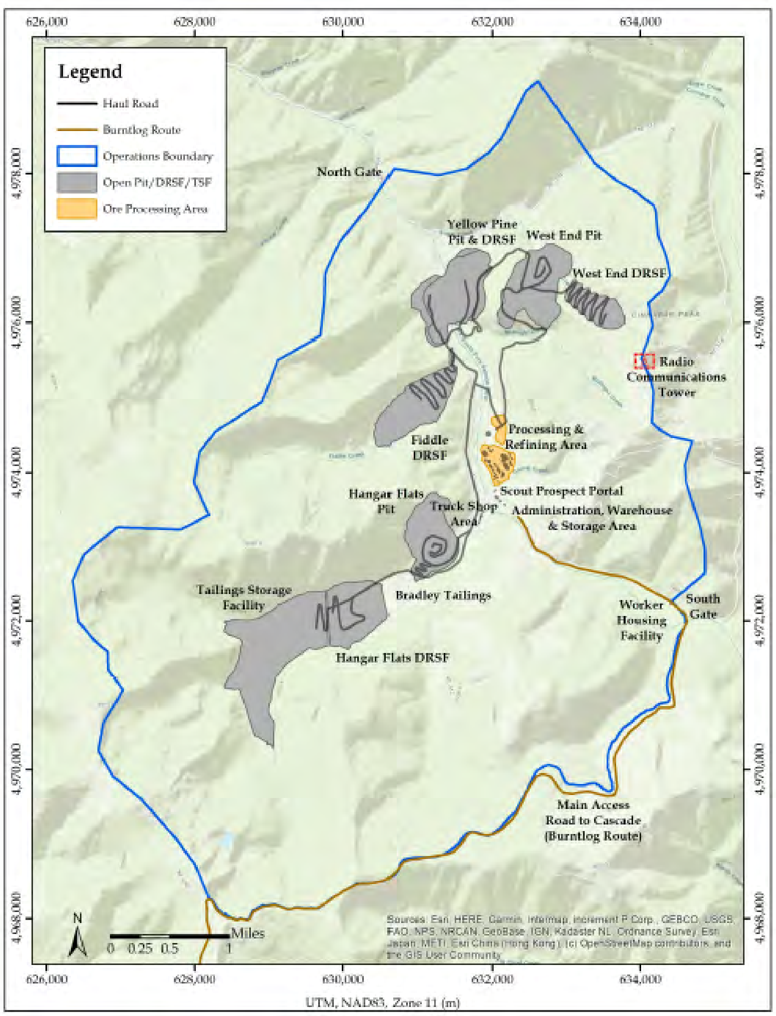
FACILITY INFORMATION

Description

Midas Gold Idaho, Inc. (Midas Gold) proposes to construct and operate the Stibnite Gold Project (SGP), consisting of conventional open-pit mining, ore preparation, and gold extraction operations.

SGP is to be located in Valley County at the intersection Forest Service roads NF-374 and NF-412 (Stibnite Road), approximately 10 miles east of Yellow Pine. The proposed Burntlog Route access road will provide year-round access to the site. The project comprises a combination of public national forest and private lands. The mining operations boundary within which public access will be excluded is defined in Figure 1. This operations boundary also defines the ambient air boundary used in all ambient air quality impact analyses.

Figure 1 PROJECT AREA OF OPERATIONS

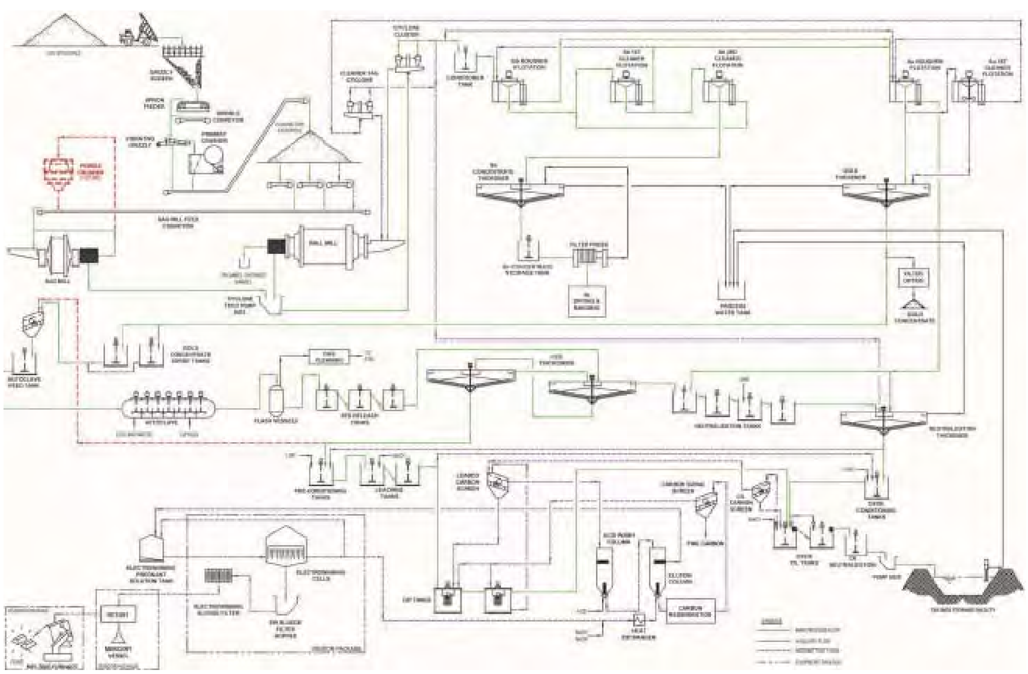


SGP will require the construction of significant infrastructure, including a power transmission line, a primary mine site access road, onsite haul roads, an ore processing facility, onsite workspaces, employee housing and recreation, water storage and distribution facilities, and sewage disposal facilities.

Conventional open-pit mining methods including drilling, blasting, excavating, and hauling will be used to extract ore and waste rock, termed development rock (DR). Hydraulic shovels and front-end loaders will be used to load ore and DR into haul trucks. DR will be used for construction, restoration, and backfilling, or hauled to the dedicated development rock storage facilities (DRSF). Approximately 340 million tons of DR will be handled over the life of the mine.

The SGP will include three years of pre-mining development and construction activities, followed by an operating mine life of approximately 12 years. Mining will occur in three open pits: Yellow Pine Pit (YPP), Hangar Flats pit (HFP), and West End pit (WEP). Although there will be overlap in mine development construction and operations, the general sequence of mining will be the YPP deposit, followed by the HFP and WEP deposits. Legacy tailings from the Meadow Creek valley (Bradley Tailings [BT]) will also be reclaimed and reprocessed during the initial project schedule. Surface exploration drilling will occur within the pits and within the Scout Prospect decline (underground exploration) throughout the mine operation period. Restoration and reclamation of other legacy mining features will occur prior to mining, throughout the life of the mine, and as part of the mine closure.

Figure 2 DIAGRAM OF PROCESS FLOWS



Ore will be hauled to the primary crusher area, where it will be fed directly into the crusher dump pocket or stockpiled. The ore crushing plant will be designed to operate at a maximum rate of 25,000 tons per calendar day (T/day). Approximately 100 million tons of ore will be mined from the three pits over the life of the project. The metal-recovery process from ore will include conventional crushing and grinding, followed by froth-flotation circuits that will generate separate gold-silver and antimony-silver concentrates. The antimony-silver concentrate will be shipped offsite for refining, whereas additional onsite processing of the gold-silver concentrate will include pressure oxidation, carbon-in-leach circuits, and refining processes to recover gold and minor amounts of silver. The finely ground leftover ore material from the mineral-recovery process, termed tailings, will be neutralized, thickened, and transported via a pipeline to the tailings storage facility (TSF). A diagram of ore processing and ore concentration and refining process flows is provided in Figure 2.

Permitting History

This is the initial PTC for a new facility, thus there is no permitting history.

Application Scope

This permit is the initial PTC for this facility.

The applicant has proposed to conduct mining operations and to install and operate ore processing, ore concentration and refining, and ancillary equipment:

- Drilling, blasting, excavating, and hauling operations;
- Ore processing operations (OC1–OC13, PS);
- Ore concentration and refining operations (AC, EW, MR, MF, CKD, Sb2);
- Process heating (Sb1, ACB, CKB, PV, HS, LKC);
- Lime production operations (LS1–LS12, LSBM, LS-L/U, LK, LCR, LS1-L/U, MillS2-L/U, ACS1–ACS4);
- Aggregate production operations (PCSP1, PCSP2);
- Concrete production operations (CM; CS1–CS2-L/U, CA-L/U);
- Heating, Ventilation, and Air Conditioning heaters (H1M–H2M, HM, HAC, HR, HA, HMO, HTS, HW);
- Emergency generator engines (EDG1–EDG3, EDFP); and
- Fuel storage (TG1–TG2, TD3—TD10).

Application Chronology

August 20, 2019	DEQ received an application and an application fee.
August 29 – September 13, 2019	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
September 19, 2019	DEQ determined that the application was incomplete.
October 4, 2019	DEQ received a preliminary response and supplemental information from the applicant, including a request to delegate authority of responsible official.
October 9, 2019	DEQ approved the request to delegate authority of responsible official.
October 15, 2019	DEQ met with the applicant to review and discuss the preliminary response.
October 22, 2019	DEQ determined that the application remained incomplete while the applicant prepared a response to remaining items previously identified

	(9/19/19), and included a summary of recommendations provided at the meeting (10/15/19).
November 8, 2019	DEQ requested additional information from the applicant via email, relating to items previously identified (9/19/19).
November 27, 2019	DEQ received supplemental information from the applicant, including a revised application with updated emission inventories and modeling analyses.
December 24, 2019	DEQ determined that the application was incomplete.
February 5, 2020	DEQ received supplemental information from the applicant, including a revised application with updated emission inventories and modeling analyses.
March 6, 2019	DEQ determined that the application was incomplete.
April 15, 2020	DEQ received supplemental information from the applicant, including updated modeling analyses.
May 15, 2020	DEQ determined that the application was complete.
July 6, 2020	DEQ made available the draft permit and statement of basis for peer and regional office review.
July 14, 2020	DEQ made available the draft permit and statement of basis for applicant review.
Month XX – Month XX, 2020	DEQ provided a public comment period on the proposed action.
Month XX, 2020	DEQ received the permit processing fee.
DRAFT	DEQ issued the final permit and statement of basis.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Information presented in Table 1 is for information purposes only and is unenforceable unless included in another permit condition.

Comment [A1]: Please update as per comments provided on the draft PTC.

Source ID No.	Source	Control Equipment	Maximum Process Rate
Mining			
	Drilling activities	Reasonable control and Fugitive Dust Control Plan (FDCP)	1,200 holes/day
	Blasting activities	Reasonable control & FDCP	2 blasts/day
	Excavating and hauling activities	Reasonable control & FDCP – Chemical suppression and water sprays Control efficiency: 93.3% for PM/PM_{10} (haul roads)	180,000 T/day and 490,000 mi/mo (combined mileage of all haul trucks)
Ore Processing			
OC1	Conveyor – Loader Transfer of Ore to Grizzly	Reasonable control & FDCP – Water sprays and moisture carryover	25,000 T/day
OC2	Conveyor – Grizzly to Apron Feeder		
OC3	Conveyor – Apron Feeder to Dribble		
OC4	Conveyor – Apron Feeder to Grizzly		
OC5	Conveyor – Dribble to Grizzly		
OC6	Conveyor – Grizzly to Primary Crusher or Coarse Ore Stockpile Feed		
OC7	Primary Crusher	Reasonable control & FDCP – Water sprays and moisture carryover	
OC8	Conveyor – Coarse Ore Stockpile Feed Transfer to Stockpile		
OC9	Conveyor – Stockpile Transfer to Reclaim Conveyors	Reasonable control & FDCP – Below-grade storage piles Control efficiency: 80% for PM/PM_{10}	27,600 T/day
OC10	Conveyor – Reclaim Conveyors to SAG Mill Feed Conveyor		
OC11	Conveyor – SAG Mill Feed Transfer to SAG Mill	Reasonable control & FDCP – Enclosure Control efficiency: 80% for PM/PM_{10}	
OC12	Pebble Crusher	Reasonable control & FDCP – Water sprays and moisture carryover	
OC13	Conveyor – Pebble Discharge to SAG Mill Feed		
PS	(2) Prill Silos #1-2 Maximum capacity: 100 T (each)	Loading – None Unloading – None	608 T/month (combined)
Ore Concentration and Refining			
AC	Autoclave (AC)	Wet Scrubber (WS1)	6,960 T/day, and as limited by Subpart EEEEEEE
EW	Electrowinning Cells and Pregnant Solution Tank	Shared Carbon Filter (CA2) Type: sulfur-impregnated activated carbon Form: granulated	100 gpm, and as limited by Subpart EEEEEEE
MR	Mercury Retort	Condenser Carbon Filter (CA3) Type: sulfur-impregnated activated carbon Form: granulated	1,000 lb/batch and 21 T/yr
MF	Induction Melting Furnace	Baghouse (BH2) Carbon Filter (CA4) Type: sulfur-impregnated activated carbon Form: granulated	
CKD	Carbon Regeneration Kiln (Drum)	Wet Scrubber (WS2) Carbon Filter (CA1) Type: sulfur-impregnated activated carbon Form: granulated	7.2 T/day
Sb2	Antimony Bagging	Baghouse (BH1)	108 T/day, or as limited by source testing

Source ID No.	Source	Control Equipment	Maximum Process Rate
Lime Production			
LS1	Conveyor – Limestone to Primary Crusher Hopper	None	1,130 T/day
LS2	SAG Mill Primary Crusher Maximum capacity: 1,130 T/day	None	
LS3	Primary Screen	None	
LS4	SAG Mill Secondary Crusher	None	
LS5	Secondary Screen	None	
LS6	Conveyor – Limestone to Ball Mill Feed Bin	None	
LSBM	Limestone Ball Mill	Baghouse (BH3)	
LS7	Conveyor – Limestone to Ball Mill Feed	None	
LS8	Conveyor – Ball Mill Feed to Ball Mill	None	
LS9	Conveyor – Limestone to Kiln Feed Bin	None	267 T/day
LS10	Conveyor – Limestone to Lime Kiln Feed	None	
LS11	Fines Screen	None	
LS12	Conveyor – Kiln Feed to PFR Shaft Lime Kiln	None	
LS-L/U	Bucket Elevator – Pebble Lime Silo Loading Pebble Lime Silo discharge to Lime Slaker	Loading – Bin Vent Filter Unloading – Wet Scrubber (WS3)	169 T/day and 52,377 T/yr
LK	Parallel Flow Regenerative Shaft Kiln	Baghouse (BH4)	
LCR	Lime Mill Crusher	Baghouse (BH5)	
LS1-L/U	SAG Mill Lime Silo #1 Maximum capacity: 250 T	Loading – Bin Vent Filter Unloading – None	
MillS2-L/U	SAG Mill Lime Silo #2 Maximum capacity: 250 T	Loading – Bin Vent Filter Unloading – None	
ACS1	AC Lime Silo #1 Maximum capacity: 1,000 T	Loading – Bin Vent Filter Unloading – None	
ACS2	AC Lime Silo #2 Maximum capacity: 1,000 T	Loading – Bin Vent Filter Unloading – None	
ACS3	AC Lime Silo #3 Maximum capacity: 1,000 T	Loading – Bin Vent Filter Unloading – None	
ACS4	AC Lime Silo #4 Maximum capacity: 500 T	Loading – Bin Vent Filter Unloading – None	

Source ID No.	Source	Control Equipment	Maximum Process Rate
Aggregate Production			
PCSP1	Portable Crushing and Screening Plant 1 Crushers, screens, and conveyors	Reasonable control & FDCP – water sprays and moisture carryover	2,000 T/day (aggregate)
PCSP2	Portable Crushing and Screening Plant 2 Crushers, screens, and conveyors	Reasonable control & FDCP – water sprays and moisture carryover	2,000 T/day (aggregate)
Concrete Production			
CM	Central Mixer Loading Maximum capacity: 20 T/hr	Reasonable control & FDCP – Water sprays and moisture carryover, and may also include enclosures, hoods, curtains, shrouds, movable and telescoping chutes, central duct collection systems, etc.	80 T/day and 60,000 T/yr (cement + aggregate)
CS1-L/U	Cement/Shotcrete Silo #1 Maximum capacity: 80 T	Loading – Bin Vent Filter Unloading – None	
CS2-L/U	Cement/Shotcrete Silo #2 Maximum capacity: 80 T	Loading – Bin Vent Filter Unloading – None	
CA-L/U	Aggregate Bin Maximum capacity: 2,400 T	Loading – None Unloading – None	
Process Heating			
Sb1	Sb Dryer Maximum capacity: 2.72 MMBtu/hr Fuel: propane	None	not applicable (n/a)
ACB	POX Boiler Maximum capacity: 17 MMBtu/hr Fuel: propane	None	1 hr/day and 30 hr/yr
CKB	Carbon Regeneration Kiln (Burners) Maximum capacity: 2.255 MMBtu/hr Fuel: propane	None	n/a
PV	Propane Vaporizer Maximum capacity: 0.1 MMBtu/hr Fuel: propane	None	n/a
HS	Strip Circuit Solution Heater Maximum capacity: 5 MMBtu/hr Fuel: propane	None	n/a
LKC	PFR Shaft Lime Kiln Combustion Maximum capacity: 20.5 MMBtu/hr (each) Fuel: propane	None	n/a

Source ID No.	Source	Control Equipment	Maximum Process Rate
Heating, Ventilation, and Air Conditioning (HVAC)			
H1M	Mine Air Heater #1 Maximum capacity: 4 MMBtu/hr Fuel: propane	None	n/a
H2M	Mine Air Heater #2 Maximum capacity: 4 MMBtu/hr Fuel: propane	None	n/a
HM	(4) Mill HVAC Heaters #1-4 Maximum capacity: 1.0 MMBtu/hr (each) Fuel: propane	None	n/a
HAC	Autoclave HVAC Heater Maximum capacity: 0.25 MMBtu/hr Fuel: propane	None	n/a
HR	Refinery HVAC Heater Maximum capacity: 0.25 MMBtu/hr Fuel: propane	None	n/a
HA	Admin HVAC Heater Maximum capacity: 0.25 MMBtu/hr Fuel: propane	None	n/a
HMO	(2) Mine Ops. HVAC Heaters Maximum capacity: 0.25 MMBtu/hr (each) Fuel: propane	None	n/a
HTS	(2) Truck Shop HVAC Heaters Maximum capacity: 1.0 MMBtu/hr (each) Fuel: propane	None	n/a
HW	(3) Warehouse HVAC Heaters Maximum capacity: 1.0 MMBtu/hr (each) Fuel: propane	None	n/a

Source ID No.	Source	Control Equipment	Maximum Process Rate
Emergency Power Generation and Fire Suppression			
EDG1	Camp Emergency Generator Date of construction: 2007 or later Maximum capacity: 1,000 bkW Maximum operation: 100 hr/yr (non-emergency) Fuel: ultra-low sulfur diesel (ULSD) Displacement: <10 L/cyl	EPA Tier 2 technologies	1 hr/day and 100 hr/yr
EDG2	Plant Emergency Generator #1 Date of construction: 2007 or later Maximum capacity: 1,000 bkW Maximum operation: 100 hr/yr (non-emergency) Fuel: ULSD Displacement: <10 L/cyl	EPA Tier 2 technologies	1 hr/day and 100 hr/yr
EDG3	Plant Emergency Generator #2 Date of construction: 2007 or later Maximum capacity: 1,000 bkW Maximum operation: 100 hr/yr (non-emergency) Fuel: ULSD Displacement: <10 L/cyl	EPA Tier 2 technologies	1 hr/day and 100 hr/yr
EDFP	Mill Fire Pump Date of construction: 2009 or later Maximum capacity: 200 bkW Maximum operation: 100 hr/yr Fuel: ULSD Displacement: <10 L/cyl	None	1 hr/day and 100 hr/yr
Fuel Storage			
TG1–TG2	Mine Site Gasoline Tanks (#1 through #2) Maximum capacity: 5,000 gal each	Lids or other appropriate closure with gasketed seal and submerged filling	<100,000 gal/mo
TD3–TD10	Mine Site Diesel Tanks (#3 through #10)	Lids or other appropriate closure	n/a

Emissions Inventories

Potential to Emit

IDAPA 58.01.01 defines Potential to Emit (PTE) as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is state or federally enforceable. Secondary emissions did not count in determining the PTE of a facility or stationary source.

Using this definition of PTE, an emissions inventory was developed for the SGP (see Appendix A). Emissions estimates of criteria pollutant and hazardous air pollutant (HAP) PTE were based on project-specific activity rates (e.g., continuous operation with the exception of the POX Boiler and emergency generator engines, design production rates, material haul rates, blasting agent usage rates, etc.), process design (e.g., open-pit mining, electrowinning cells and pregnant solution tank plating, parallel flow regenerative lime production, central mix concrete production, haul fleet, etc.), emission abatement techniques (e.g., dust suppressant, carbon filter, wet scrubber, baghouse, and bin vent filtration control equipment), material characteristics (e.g., moisture content, road silt content, haul route distances, etc.), site conditions (onsite meteorological data, precipitation, etc.), and emission factors based on AP-42,[1] representative source test emissions data, and representative emission limits. Estimated emissions from the autoclave and the carbon regeneration kiln relied on emissions data from representative source test emissions data, scaled to the proposed equipment capacity. Estimated emissions from fuel storage tanks relied on TANKS[2] emission estimation software and projected annual gasoline and ULSD usage rates. Estimated emissions from the emergency generator engines relied on the use of certified engine emission factors.

Uncontrolled PTE

Using the definition of PTE, uncontrolled PTE is then defined as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall **not** be treated as part of its design **since** the limitation or the effect it would have on emissions **is not** state or federally enforceable.

The uncontrolled PTE is used to determine if a facility is a "synthetic minor" source of emissions. Synthetic minor sources are facilities that have an uncontrolled PTE for regulated air pollutants or HAP above an applicable major source threshold without permit limits. Based on the uncontrolled PTE shown in Table 2 below and the emissions inventory in Appendix A, Midas Gold will be a "synthetic minor" source of PM, PM_{10}, and $PM_{2.5}$ emissions for new source review and Title V permitting purposes. The uncontrolled PTE for other criteria pollutants and for HAP emissions confirm Midas Gold will be a natural minor source of these emissions.

[1] Compilation of Air Pollutant Emission Factors, AP-42, Volume I, Fifth Edition (AP-42), Section 1.3 –Fuel Oil Combustion, 1.4 –Natural Gas Combustion, 1.5 – LPG Combustion, 3.2 – Natural Gas-Fired Reciprocating Engines, 3.3 – Gasoline and Diesel Industrial Engines, 3.4 – Large Stationary Diesel and All Stationary Dual-Fuel Engines, 8.3 – Ammonium Nitrate, 11.9 – Western Surface Coal Mining, 11.12 – Concrete Batching, 11.17 – Lime Manufacturing, 11.19 – Construction and Aggregate Processing, 13.2 – Fugitive Dust Sources, and 13.3 – Explosives Detonation, Office of Air Quality Planning and Standards Office of Air and Radiation (OAQPS), EPA, updated as of August 2011.

[2] TANKS Storage Tank Emissions Calculation Software Version 4.09D, OAQPS, EPA, released October 5, 2006.

For Midas Gold, uncontrolled PTE was based upon a worst-case for operation of the facility of continuous operation at proposed maximum material throughput and fuel input rates (Table 1), without consideration of control equipment. For batch operations, the number of operations necessary to achieve the proposed daily throughput rates was assumed in estimating emissions (~~LS-L/U, EW,~~ MR, MF~~, CKD, MF, Sb2, ACB, CM~~). Silo loading and unloading operations were assumed to occur at most once per day (LS1-L/U, MillS2-L/U, LS1-L/U, Mill2S-L/U, LS-L/U, PS-L/U, ACS1–ACS4-L/U, PS-L/U, CS1–CS2-L/U, CA-L/U). Fuel storage was based on estimated facility-wide fuel usage rates (TG1, TG2 and TD3-TD10). For the purposes of maintenance and testing, emergency power generation operations were assumed to occur 1 hour per day and 100 hours per year (EDG1–EDG3, EDFP). With the exception of the POX Boiler operated at 1 hour per day of simultaneous operation with the autoclave (at full boiler and autoclave capacity) ~~and 30 hours per year, continuous operation at~~ maximum fuel input rates was assumed for all process heating and HVAC equipment.

Comment [A2]: Please see related comments provided on the draft PTC.

The following table presents the uncontrolled PTE for regulated air pollutants as submitted by the applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations and the assumptions used to determine emissions for each source.

Table 2 UNCONTROLLED POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	VOC	SO_2
	T/yr[(a)]	T/yr[(a)]	T/yr[(a)]	T/yr[(a)]	T/yr[(a)]	T/yr[(a)]	T/yr[(a)]
OC1	13.69	5.02	0.78				
OC2	13.69	5.02	0.78				
OC3	13.69	5.02	0.78				
OC4	13.69	5.02	0.78				
OC5	13.69	5.02	0.78				
OC6	13.69	5.02	0.78				
OC7	24.64	10.95	1.64				
OC8	13.69	5.02	0.78				
OC9	15.11	5.54	0.86				
OC10	15.11	5.54	0.86				
OC11	15.11	5.54	0.86				
OC12	27.20	12.09	1.81				
OC13	15.11	5.54	0.86				
PS-L~~/U~~	0.07	0.03	0.004				
PS-U	0.07	0.03	0.004				
AC	74.10	74.10	74.10				2.86
MF	1.77	1.77	1.77				
CKD (EW, MR)	6.13	6.13	6.13	0.53	0.05	0.48	
Sb2	5.16	5.16	5.16				
LS1	0.48	0.17	0.03				
LS2	0.86	0.38	0.06				
LS3	3.97	1.38	0.21				
LS4	0.86	0.38	0.06				
LS5	3.97	1.38	0.21				
LS6	0.48	0.17	0.03				
LSBM	64.22	53.89	19.23				
LS7	0.48	0.17	0.03				
LS8	0.48	0.17	0.03				
LS9	0.12	0.05	0.007				
LS10	0.12	0.05	0.007				
LS11	1.03	0.36	0.05				
LS12	0.12	0.05	0.007				
LS-L	0.23	0.23	0.23				
LS-U	0.02	0.02	0.02				
LK	34.05	34.05	34.05	11.78	6.29		0.03
LCR	10.58	8.88	3.17				
LS1-L	1.60	1.03	0.16				
LS1-U	0.01	0.006	0.001				
MillS2-L	1.60	1.03	0.16				
MillS2-U	0.01	0.006	0.001				
ACS1-L	6.39	4.11	0.62				

Source	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	VOC	SO_2
	T/yr[(a)]	T/yr[(a)]	T/yr[(a)]	T/yr[(a)]	T/yr[(a)]	T/yr[(a)]	T/yr[(a)]
ACS1-U	0.04	0.02	0.004				
ACS2-L	6.39	4.11	0.62				
ACS2-U	0.04	0.02	0.004				
ACS3-L	6.39	4.11	0.62				
ACS3-U	0.04	0.02	0.004				
ACS4-L	3.19	2.06	0.31				
ACS4-U	0.02	0.01	0.002				
PCSP1	27.67	10.11	1.54				
PCSP2	27.67	10.11	1.54				
CM	17.16	4.68	0.71				
CS1-L	21.90	14.10	2.14				
CS1-U	0.14	0.08	0.01				
CS2-L	21.90	14.10	2.14				
CS2-U	0.14	0.08	0.01				
CA-L	1.73	0.83	0.13				
CA-U	1.73	0.83	0.13				
Sb1	0.09	0.09	0.09	0.98	1.69	0.10	0.21
ACB	0.002	0.002	0.002	0.02	0.04	0.002	0.004
CKB	0.08	0.08	0.08	0.81	1.40	0.09	0.17
PV	0.003	0.003	0.003	0.04	0.06	0.004	0.008
HS	0.17	0.17	0.17	1.80	3.11	0.19	0.38
LKC	0.63	0.63	0.63	6.72	11.65	0.72	1.42
H1M	0.13	0.13	0.13	1.44	2.49	0.15	0.30
H2M	0.13	0.13	0.13	1.44	2.49	0.15	0.30
HM	0.13	0.13	0.13	1.44	2.49	0.15	0.30
HAC	0.008	0.008	0.008	0.09	0.16	0.01	0.02
HR	0.008	0.008	0.008	0.09	0.16	0.01	0.02
HA	0.008	0.008	0.008	0.09	0.16	0.01	0.02
HMO	0.02	0.02	0.02	0.18	0.31	0.02	0.04
HTS	0.07	0.07	0.07	0.72	1.24	0.08	0.15
HW	0.10	0.10	0.10	1.08	1.87	0.11	0.23
EDG1	0.02	0.02	0.02	0.39	0.71	0.14	0.001
EDG2	0.02	0.02	0.02	0.39	0.71	0.14	0.001
EDG3	0.02	0.02	0.02	0.39	0.71	0.14	0.001
EDFP	0.004	0.004	0.004	0.08	0.09	0.09	0.0001
TG1–TG2						1.91	
TD3—TD10						0.06	
Total	**565**	**342**	**169**	**30.45**	**37.85**	**4.78**	**6.48**

The following table presents the uncontrolled PTE for HAP pollutants as submitted by the applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations and the assumptions used to determine emissions for each source.

Table 3 UNCONTROLLED POTENTIAL TO EMIT FOR HAZARDOUS AIR POLLUTANTS

Hazardous Air Pollutants	PTE (T/yr)
1,3-Butadiene	3.67E-6
2-Methylnaphthalene	4.85E-6
3-Methylchloranthrene	3.64E-7
7,12-Dimethylbenz(a)anthracene	3.24E-6
Acenaphthene	7.09E-6
Acenaphthylene	1.38E-5
Acetaldehyde	1.07E-4
Acrolein	1.98E-5
Anthracene	2.39E-6
Antimony	3.00E-1
Arsenic	1.76E-2
Benz(a)anthracene	1.40E-6
Benzene	1.60E-3
Benzo(a)pyrene	6.22E-7
Benzo(b)fluoranthene	1.94E-6
Benzo(g,h,i)perylene	1.07E-6
Benzo(k)fluoranthene	6.86E-7
Beryllium	8.59E-5
Cadmium	2.50E-4
Carbon disulfide	6.33E-2
Chromium	5.73E-4
Chrysene	2.55E-6
Cobalt	1.20E-4
Cyanide	9.73E-1
Dibenz(a,h)anthracene	7.85E-7
Dichlorobenzene	2.43E-4
Fluoranthene	7.00E-6
Fluorene	2.13E-5
Formaldehyde	1.54E-2
Hexane	3.64E-1
Indeno(1,2,3-cd)pyrene	9.82E-7
Lead	2.62E-4
Manganese	2.17E-2
Mercury	1.60E-2
Naphthalene	3.14E-4
Nickel	1.63E-3
Phenanthrene	6.36E-5
Phosphorus	1.81E-2
Pyrene	6.68E-6
Selenium	4.85E-6
Toluene	1.12E-3
Xylene	2.99E-4
Total	**1.80**
Maximum Single HAP	**0.97**

Pre-Project PTE

Pre-project PTE is used to establish the change in emissions at a facility as a result of this project. Because this is a new facility, pre-project emissions are set to zero for all criteria pollutants.

Post-Project PTE

For existing sources, the Post-project PTE is used to establish the change in emissions at a facility and to determine the facility's classification as a result of this project. Post-project PTE includes all permit limits resulting from this project. Midas Gold is a new source, so the post-project PTE is equivalent to the PTE presented in the emissions inventory at Appendix A.

In addition to assuming continuous operation of the facility at the proposed material throughput and fuel input rates, post-project emissions estimates account for the use of baghouse and bin vent filtration, wet scrubber systems, carbon filter systems, water sprays and moisture carryover, and any other control equipment or methods as defined in the Fugitive Dust Control Plan (FDCP).

A variety of factors impact emissions from unpaved roadways, and it was recognized that accurate determination of site-specific parameters characterizing road conditions and vehicle traffic was critical to estimating particulate matter emissions and ambient air impacts. Midas Gold provided site-specific information to support parameters such as silt content, mean vehicle weight, and dust suppressant control efficiencies, and provided an analysis evaluating the conservatism of the resulting emission factor (AP-42).[3] To ensure operation consistent with these parameters and to reasonably control fugitive emissions, compliance with requirements identified in the FDCP is required by the permit. Further discussion of the sensitivity of predicted air quality impacts is provided in the Ambient Air Quality Impact Analyses section.

The following table presents the post-project PTE for criteria pollutants from all emissions units at the facility as determined by DEQ staff, confirming source status as a "synthetic minor" source.. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 4 POST-PROJECT PTE FOR REGULATED AIR POLLUTANTS

Source	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	VOC	SO_2
	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]
POINT SOURCE EMISSIONS							
OC1	0.64	0.21	0.06				
OC2	0.64	0.21	0.06				
OC3	0.64	0.21	0.06				
OC4	0.64	0.21	0.06				
OC5	0.64	0.21	0.06				
OC6	0.64	0.21	0.06				
OC7	5.48	2.46	0.46				
OC8	0.64	0.21	0.06				
OC9	3.02	1.11	0.17				
OC10	3.02	1.11	0.17				
OC11	3.02	1.11	0.17				
OC12	6.04	2.72	0.50				
OC13	0.71	0.23	0.07				
PS-L	0.07	0.03	0.004				
PS-U	0.07	0.03	0.004				
AC	22.23	22.23	22.23				2.86
EW	0.31	0.31	0.31				
MR	0.006	0.006	0.006				
MF	0.89	0.89	0.89				
CKD	1.84	1.84	1.84	0.53	0.05	0.48	
Sb2	0.52	0.52	0.52				
LS1	0.48	0.18	0.03				
LS2	0.86	0.38	0.06				
LS3	3.97	1.38	0.21				
LS4	0.86	0.38	0.06				
LS5	3.97	1.38	0.21				

[3] Appendix A – Model Parameter / Assumption / Data Level of Conservatism IDEQ Forms, Stibnite Gold Project Permit to Construct Application, Midas Gold, revised February 5, 2020 (2020AAG1078).

Source	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	VOC	SO_2
	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]
LS6	0.48	0.18	0.03				
LSBM	6.42	5.39	1.92				
LS7	0.48	0.18	0.03				
LS8	0.48	0.18	0.03				
LS9	0.12	0.05	0.01				
LS10	0.12	0.05	0.01				
LS11	1.03	0.36	0.06				
LS12	0.12	0.05	0.01				
LS-L	0.02	0.02	0.02				
LS-U	0.002	0.002	0.002				
LK	3.40	3.40	3.40	11.79	6.29		0.03
LCR	1.06	0.89	0.32				
LS1-L	0.002	0.001	0.0001				
LS1-U	0.01	0.006	0.001				
MillS2-L	0.002	0.001	0.0001				
MillS2-U	0.01	0.006	0.001				
ACS1-L	0.009	0.003	0.0004				
ACS1-U	0.04	0.02	0.004				
ACS2-L	0.009	0.003	0.0004				
ACS2-U	0.04	0.02	0.004				
ACS3-L	0.009	0.003	0.0004				
ACS3-U	0.04	0.02	0.004				
ACS4-L	0.004	0.001	0.0002				
ACS4-U	0.02	0.01	0.002				
PCSP1	2.74	1.02	0.13				
PCSP2	2.74	1.02	0.13				
CM	0.55	0.17	0.02				
CS1-L	0.03	0.01	0.002				
CS1-U	0.14	0.08	0.01				
CS2-L	0.03	0.01	0.002				
CS2-U	0.14	0.08	0.01				
CA-L	1.73	0.83	0.13				
CA-U	1.73	0.83	0.13				
Sb1	0.09	0.09	0.09	0.98	1.69	0.10	0.21
ACB	0.002	0.002	0.002	0.02	0.04	0.002	0.004
CKB	0.08	0.08	0.08	0.81	1.40	0.09	0.17
PV	0.003	0.003	0.003	0.04	0.06	0.004	0.008
HS	0.17	0.17	0.17	1.80	3.11	0.19	0.38
LKC	0.63	0.63	0.63	6.72	11.65	0.72	1.42
H1M	0.13	0.13	0.13	1.44	2.49	0.15	0.30
H2M	0.13	0.13	0.13	1.44	2.49	0.15	0.30
HM	0.13	0.13	0.13	1.44	2.49	0.15	0.30
HAC	0.008	0.008	0.008	0.09	0.16	0.01	0.02
HR	0.008	0.008	0.008	0.09	0.16	0.01	0.02
HA	0.008	0.008	0.008	0.09	0.16	0.01	0.02
HMO	0.02	0.02	0.02	0.18	0.31	0.02	0.04
HTS	0.07	0.07	0.07	0.72	1.24	0.08	0.15
HW	0.10	0.10	0.10	1.08	1.87	0.12	0.23
EDG1	0.02	0.02	0.02	0.39	0.71	0.14	0.001
EDG2	0.02	0.02	0.02	0.39	0.71	0.14	0.001
EDG3	0.02	0.02	0.02	0.39	0.71	0.14	0.001
EDFP	0.004	0.004	0.004	0.08	0.09	0.09	0.0001
TG1–TG2						1.91	
TD3—TD10						0.06	
Post-Project PTE	**87.3**	**56.3**	**36.4**	**30.5**	**37.9**	**4.8**	**6.5**

Source	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	VOC	SO_2
	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]	T/yr [(a)]
FUGITIVE EMISSIONS							
Blasting activities	117.35	61.02	3.52	635.83	17.08		0.03
Drilling activities	284.70	148.04	8.54				
Hauling	2901.27	712.95	71.29				
Material load / unload (L/UL) [(b)]	15.00	7.10	1.07				
Dozing	103.56	19.78	10.87				
Grading	36.80	11.04	1.14				
Water Truck Travel	109.27	26.85	2.69				
Access Roads	6.95	1.72	0.17				
Wind Erosion [(b)]	5.72	2.86	0.43				
Surface Exploration	1.12	0.39	0.06				
Underground Exploration	0.002	0.001	0.0001				
Fugitive Total [(b)]	**3,569**	**986**	**100**	**636**	**17.1**		**0.03**

a) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating scenarios and annual limits.

b) Estimated emissions from the "W3" scenario resulted in the most emissions across most activities, with the exception of material load/unload and wind erosion activities, which occurred in the Y1, H1, W1, and B1 scenarios. Totals reported are for the "W3" scenario.

Fourteen operational scenarios were evaluated by the applicant and verified by DEQ in order to estimate maximum hourly, daily, and annual potential emissions from sources. These scenarios encompassed all feasible origin and destination location combinations for locating ore and development rock. A summary of these scenarios is provided in Table 5. Although drilling, blasting, excavating, and hauling activities are not expected to be confined to a single scenario in practice, emissions in each scenario were conservatively estimated at the maximum daily proposed processing rate (180,000 of ore and rock) to allow for maximum operational flexibility, and to evaluate potential air quality impacts. Scenarios having the greatest potential emissions (i.e., the top seven) were those with the longest origin-to-destination distances, which resulted in increased emissions evident in onsite hauling and material loading and unloading activities. Consequently, the W3 scenario having the maximum origin-to-destination distance (16,415 daily vehicle miles traveled) is representative of maximum potential emissions.

There are numerous sources of fugitive dust emissions at the facility, including drilling and blasting activities, crushing and ore handling equipment, ore and rock storage piles, and unpaved roadways. Calculated at maximum daily processing rates, emissions from these sources would tend to be conservatively estimated. But it is also recognized that uncertainties exist in some of the emission factors used, and that predicted modeled impacts may be sensitive to emissions from such sources. In particular, it may prove challenging to consistently and continuously achieve the targeted level of fugitive dust control for emissions from traffic on unpaved roadways, with over 55 miles of haul truck routes within the mining operations boundary, a fleet of 32 haul trucks weighing between 37 and 357 tons, and a targeted dust control efficiency of 93.3% accomplished by application of both dust suppressant and water controls. Based on this, and the scale of operations, a detailed Fugitive Dust Control Plan (FDCP) was required (Permit Conditions 2.5). It is noted that Midas Gold projected actual annual production at approximately 42.7 million T/yr, or 65% of the permitted annual production limit of 65.7 million T/yr (Permit Condition 3.5), and that as a result actual emissions are expected to be lower than presented.

Table 5 OPERATING SCENARIOS

Scenario	Origin [a]	Destination [a]
Y1	YPP	STKP
Y2	YPP	FDRSF
Y3	YPP	HFDRSF
H1	HFP	STKP
H2	HFP	FDRSF
H3	HFP	HFDRSF
H4	HFP	YPDRSF
W1	WEP	STKP
W2	WEP	FDRSF
W3	WEP	HFDRSF
W4	WEP	YPDRSF
W5	WEP	WEDRSF
B1	BT	STKP
B2	BT	HFDRSF

a) Where ore and rock origin and destination locations as depicted in Figure 1 are abbreviated as follows: YPP = Yellow Pine Pit, HFP = Hangar Flats pit, WEP = West End pit, BT = Bradley Tailings, STKP = Primary Crusher Stockpile, FDRSF = Fiddle DRSF, HFDRSF = Hangar Flats DRSF, YPDRSF = Yellow Pine DRSF, WEDRSF = West End DRSF, and DRSF = development rock storage facilities.

Change in PTE

For existing source, t~~T~~he change in facility-wide PTE is used to determine if a public comment period may be required and to determine the processing fee per IDAPA 58.01.01.225. The following table presents the facility-wide change in the potential to emit for criteria pollutants which for a new source equals the post project PTE.

Table 6 CHANGES IN PTE FOR REGULATED AIR POLLUTANTS

Source	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	VOC	SO_2
	T/yr[a]	T/yr[a]	T/yr[a]	T/yr[a]	T/yr[a]	T/yr[a]	T/yr[a]
Pre-Project PTE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post-Project PTE	87.3	56.3	36.4	30.5	37.9	4.8	6.5
Changes in Potential to Emit	**87.3**	**56.3**	**36.4**	**30.5**	**37.9**	**4.80**	**6.50**

Comment [A3]: Footnote (a) is missing.

Toxic Air Pollutant Emissions

A summary of the estimated PTE for emissions increase of non-carcinogenic and carcinogenic toxic air pollutants (TAP) is provided in the following table. Toxic air pollutants (TAP) also classified as hazardous air pollutants (HAP) emitted from sources regulated by National Emission Standards for Hazardous Air Pollutants (NESHAP) were estimated by the applicant. These regulated HAP emissions ~~, but~~ were not required to be evaluated~~included in the evaluation~~ for compliance with TAP increments, in accordance with IDAPA 58.01.01.210.20. Affected sources subject to ~~applicable to~~ Subpart EEEEEEE, Subpart CCCCCC, and Subpart ZZZZ are identified in the incorporation of federal requirements condition (Permit Condition 2.21) and in the MACT/GACT Applicability (40 CFR 63) section. In the event there is a conflict between Permit Condition 2.21 and the listed Subparts in determining applicability, the federal applicability requirements shall apply.

Table 7 POST- PROJECT PTE FOR TOXIC AIR POLLUTANTS

Toxic Air Pollutants	Emissions (lb/hr)				Screening Emission Level [e]		Exceeds Screening Level? (Y/N)
	Propane Combustion (a)	Material Handling (b)	Fugitive Mining (c)	Total TAP (d)	Non-Carcinogenic (lb/hr)	Carcinogenic (lb/hr)	
1,3-Butadiene						2.40E-5	No
2-Methylnaphthalene [f]	1.59E-6			1.59E-6		9.10E-5	No
3-Methylchloranthrene	1.19E-7			1.19E-7		2.50E-6	No
7,12-Dimethylbenz(a)anthracene [f]	1.06E-6			1.06E-6		9.10E-5	No
Acenaphthene [f]	1.19E-7			1.19E-7		9.10E-5	No
Acenaphthylene [f]	1.19E-7			1.19E-7		9.10E-5	No
Acetaldehyde						3.00E-3	No
Acrolein					1.70E-2		No
Anthracene [f]	1.59E-7			1.59E-7		9.10E-5	No
Antimony		6.86E-2		6.86E-2	3.30E-2		**Yes**
Arsenic	1.32E-5	4.36E-3		4.37E-3		1.50E-6	**Yes**
Benzene	1.39E-4			1.39E-4		8.00E-4	No
Benzo(a)pyrene [g]	7.93E-8			7.54E-7		2.00E-6	No
Benz(a)anthracene [g]	1.19E-7						
Benzo(b)fluoranthene [g]	1.19E-7						
Benzo(k)fluoranthene [g]	1.19E-7						
Dibenz(a,h)anthracene [g]	7.93E-8						
Chrysene	1.19E-7						
Indeno(1,2,3-cd)pyrene	1.19E-7						
Benzo(g,h,i)perylene	7.93E-8			7.93E-8		9.10E-5	No
Beryllium	7.93E-7	2.17E-5		2.25E-5		2.80E-5	No
Cadmium	7.26E-5	4.06E-5		1.13E-4		3.70E-6	**Yes**
Carbon disulfide		1.45E-2		1.45E-2	2.00E+0		No
Chromium	9.25E-5	1.22E-4		2.14E-4	3.30E-2		No
Cobalt	5.55E-6	2.35E-5		2.91E-5	3.30E-3		No
Cyanide		2.22E-1		2.22E-1	3.33E-1		No
Dichlorobenzene	7.93E-5			7.93E-5	3.00E+1		No
Fluoranthene	1.98E-7			1.98E-7		9.10E-5	No
Fluorene	1.85E-7			1.85E-7		9.10E-5	No
Formaldehyde	4.95E-3			4.95E-3		5.10E-4	**Yes**
Hexane	1.19E-1			1.19E-1	1.20E+1		No
Manganese	2.51E-5	3.53E-2		3.53E-2	6.70E-2		No
Naphthalene	4.03E-5			4.03E-5	3.33E+0		No
Nickel	1.39E-4	2.89E-3		3.03E-3		2.70E-5	**Yes**
Phenanthrene	1.12E-6			1.12E-6		9.10E-5	No
Phosphorus		6.12E-3		6.12E-3	7.00E-3		No
Pyrene	3.30E-7			3.30E-7		9.10E-5	No
Selenium	1.59E-6			1.59E-6	1.30E-2		No
Toluene	2.25E-4			2.25E-4	2.50E+1		No
Xylene					2.90E+1		No
Barium	2.91E-4	4.71E-3		5.00E-3	3.30E-2		No
Copper	5.61E-5	2.94E-5		8.55E-5	6.70E-2		No
Hydrogen Sulfide		9.00E-1		9.00E-1	9.33E-1		No
Molybdenum	7.26E-5	5.88E-6		7.85E-5	3.33E-1		No
Pentane	1.72E-1			1.72E-1	1.18E+2		No
Silver		2.94E-6		2.94E-6	7.00E-3		No

Toxic Air Pollutants	Emissions (lb/hr)				Screening Emission Level [(e)]		Exceeds Screening Level? (Y/N)
	Propane Combustion (a)	Material Handling (b)	Fugitive Mining (c)	Total TAP (d)	Non-Carcinogenic (lb/hr)	Carcinogenic (lb/hr)	
Sulfuric Acid		2.03E+0		2.03E+0	6.70E-2		**Yes**
Thallium		5.88E-5		5.88E-5	7.00E-3		No
Uranium		5.88E-5		5.88E-5	1.30E-2		No
Vanadium	1.52E-4			1.52E-4	3.00E-3		No
Zinc	1.92E-3			1.92E-3	6.67E-1		No

a) TAP from propane combustion.
b) TAP from material processing.
c) Fugitive TAP from mining activities.
d) Total TAP from all regulated sources and activities. Does not include TAP addressed by NESHAP in accordance with IDAPA 58.01.01.210.20.
e) Non-carcinogenic and carcinogenic screening emission levels (EL) from IDAPA 58.01.01.585-586.
f) Polycyclic aromatic hydrocarbons (PAH) as defined in IDAPA 58.01.01.586.
g) Polycyclic organic matter (POM) as defined in IDAPA 58.01.01.586.

Some of the screening levels ~~changes in emissions rates~~ for non-carcinogenic and carcinogenic TAP were exceeded as a result of this project, triggering modeling. Modeling was required for antimony and sulfuric acid (H_2SO_4) because the 24-hour average non-carcinogenic screening emission levels (EL) in IDAPA 58.01.01.585 were exceeded. Modeling was required for arsenic, cadmium, formaldehyde, and nickel because the annual average carcinogenic EL in IDAPA 58.01.01.586 were exceeded.

Ambient Air Quality Impact Analyses

The applicant has demonstrated preconstruction compliance to DEQ's satisfaction that emissions from this facility will not cause nor significantly contribute to a violation of any ambient air quality standard. The applicant has also demonstrated preconstruction compliance to DEQ's satisfaction that the emissions increase due to this permitting action will not exceed any acceptable ambient concentration (AAC) or acceptable ambient concentration for carcinogens (AACC) for toxic air pollutants (TAP). A summary of the Ambient Air Impact Analysis for TAP is provided in Appendix A.

As presented in the modeling memorandum in Appendix B, the estimated emission rates of PM_{10}, $PM_{2.5}$, SO_2, CO, NO_x, and certain TAP from this project exceeded applicable screening emission levels (EL) and published DEQ modeling thresholds established in IDAPA 58.01.01.585-586 and in the State of Idaho Air Quality Modeling Guideline.[4] Refer to the Emissions Inventories section for additional information concerning the emissions inventories.

Facility-wide emission rate~~s~~ of lead (Pb) ~~and SO_2 were~~was determined to be below the "below regulatory concern" (BRC) threshold level of less than 10% of the "significant" emission rate defined in IDAPA 58.01.01.006 (i.e., less than 0.06 ~~and 4.0 T/yr, respectively~~), and therefore modeling was not required. ~~CO facility-wide emission rates were below published DEQ modeling thresholds, and therefore modeling was not required.~~[5]

[4] Criteria pollutant thresholds in Table 2, State of Idaho Guideline for Performing Air Quality Impact Analyses, Doc ID AQ-011 (September 2013), September 2013, criteria pollutant BRC thresholds as provided in IDAPA 58.01.01.221.01, and DEQ guidance pertaining to BRC (2009ACF12).

[5] Criteria pollutant thresholds in Table 2, State of Idaho Guideline for Performing Air Quality Impact Analyses, Doc ID AQ-011 (September 2013), September 2013, criteria pollutant BRC thresholds as provided in IDAPA 58.01.01.221.01, and DEQ guidance pertaining to BRC (2009ACF12).

With the exception of antimony, arsenic, cadmium, formaldehyde, nickel, and sulfuric acid, estimated emission increases of non-carcinogenic and carcinogenic TAP demonstrated preconstruction compliance with TAP standards, in accordance with IDAPA 58.01.01.210.07 using controlled average emission rates. Modeling analyses conducted in the development of TAP rules supports that if controlled average emission rates do not exceed applicable screening emission levels (EL) in IDAPA 58.01.01.585–586, controlled ambient concentrations are expected to be below the applicable acceptable ambient concentration (AAC/AACC).

Estimated emission increases of antimony, arsenic, cadmium, formaldehyde, nickel, and sulfuric acid demonstrated preconstruction compliance with TAP standards in accordance with IDAPA 58.01.01.210.08 for controlled ambient concentrations. Modeling analyses demonstrated preconstruction compliance with the acceptable ambient concentrations for these non-carcinogens (AAC) and carcinogens (AACC) in IDAPA 58.01.01.585–586. Emission limits consistent with modeled TAP emission rates were established in accordance with IDAPA 58.01.01.210.08. Emission limits (Permit Condition 4.3), operational and material throughput limits (Permit Conditions 3.3–3.8, 4.4–4.10, and 5.4–5.8), fugitive dust control requirements (Permit Conditions 2.1–2.7), and control equipment requirements (Permit Conditions 2.5, 3.9–3.11, 4.11–4.16, and 5.9–5.16) were established to limit nickel, antimony, arsenic, cadmium, formaldehyde, nickel, and sulfuric acid TAP emissions in accordance with IDAPA 58.01.01.210.08.c, to limit Pb to BRC, and to limit PM, PM_{10} ,and $PM_{2.5}$ below the emission rates relied upon in the NAAQS evaluation of ambient air impacts in the modeling analyses.

The applicant has demonstrated preconstruction compliance to DEQ's satisfaction that emissions from this facility will not cause nor significantly contribute to a violation of any ambient air quality standard. The applicant has also demonstrated preconstruction compliance to DEQ's satisfaction that the emissions increase due to this permitting action will not exceed any acceptable ambient concentration (AAC) or acceptable ambient concentration for carcinogens (AACC) for toxic air pollutants (TAP). A summary of the Ambient Air Impact Analysis for TAP is provided in Appendix A.

It was recognized that accurately defining the mining operations boundary and controlling public access within that boundary was critical to estimating ambient air impacts. Midas Gold identified site-specific access control measures used to define the mining operations boundary.[6] To ensure operation consistent with these measures, compliance with requirements identified in an Access Management Plan (AMP) is required (Permit Condition 2.6)~~; the proposed plan is include in Appendix E~~.

An ambient air quality impact analyses document has been crafted by DEQ based on a review of the modeling analysis submitted in the application. That document is part of the final permit package for this permitting action (refer to Appendix B). Refer to the Emissions Inventories section and Appendix A for additional information concerning development of the emissions inventories.

Comment [A4]: GLOBAL: Please update the permit condition references as per comments provided on the draft PTC.

Comment [A5]: Please verify this reference. Appendix A to this report is Emission Inventories.

Comment [A6]: A new AMP will be developed per the requirements of Condition 2.6.

6 Appendix A – Model Parameter / Assumption / Data Level of Conservatism IDEQ Forms, Stibnite Gold Project Permit to Construct Application, Midas Gold, revised February 5, 2020 (2020AAG1078).

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Valley County, which is designated as attainment or unclassifiable for $PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, and Ozone. Refer to 40 CFR 81.313 for additional information.

Facility Classification

The AIRS/AFS facility classification codes are as follows:

For HAP (hazardous air pollutants) only:

A = Use when any one HAP has permitted emissions > 10 T/yr or if the aggregate of all HAP (Total HAP) has permitted emissions > 25 T/yr.

SM80 = Use if a synthetic minor (uncontrolled HAP emissions are > 10 T/yr or if the aggregate of all uncontrolled HAP (Total HAP) emissions are > 25 T/yr and permitted emissions fall below applicable major source thresholds) and the permit sets limits > 8 T/yr of a single HAP or ≥ 20 T/yr of Total HAP.

SM = Use if a synthetic minor (uncontrolled HAP emissions are > 10 T/yr or if the aggregate of all uncontrolled HAP (Total HAP) emissions are > 25 T/yr and permitted emissions fall below applicable major source thresholds) and the permit sets limits < 8 T/yr of a single HAP and/or < 20 T/yr of Total HAP.

B = Use when the potential to emit (i.e. uncontrolled emissions and permitted emissions) are below the 10 and 25 T/yr HAP major source thresholds.

UNK = Class is unknown.

For All Other Pollutants:

A = Use when permitted emissions of a pollutant are > 100 T/yr.

SM80 = Use if a synthetic minor for the applicable pollutant (uncontrolled emissions are > 100 T/yr and permitted emissions fall below 100 T/yr) and permitted emissions of the pollutant are ≥ 80 T/yr.

SM = Use if a synthetic minor for the applicable pollutant (uncontrolled emissions are > 100 T/yr and permitted emissions fall below 100 T/yr) and permitted emissions of the pollutant are < 80 T/yr.

B = Use when the potential to emit (i.e. uncontrolled emissions and permitted emissions) are below the 100 T/yr major source threshold.

UNK = Class is unknown.

Table 8 REGULATED AIR POLLUTANT FACILITY CLASSIFICATION

Pollutant	Uncontrolled PTE (T/yr)	Permitted PTE (T/yr)	Relevant Major Source Thresholds (T/yr)	AIRS/AFS Classification
PM	565	87.3	**100**	SM80
PM_{10}	342	56.3	**100**	SM
$PM_{2.5}$	169	36.4	**100**	SM
SO_2	6.48	6.5	**100**	B
NO_x	37.85	37.9	**100**	B
CO	30.45	30.5	**100**	B
VOC	4.78	4.8	**100**	B
HAP (single)	0.97	0.97	**10**	B
Total HAP	1.80	1.80	**25**	B

Comment [A7]: Major source is not a defined term in IDAPA. Could confuse reader since for PSD major source threshold is 250 TPY

Permit to Construct (IDAPA 58.01.01.201)

The permittee has requested that a PTC be issued to the facility for the proposed new emission sources. Therefore, a permit to construct is required in accordance with IDAPA 58.01.01.22001. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

Comment [A8]: 220 is for PTC exemptions.

Tier II Operating Permit (IDAPA 58.01.01.401)

IDAPA 58.01.01.401 .... Tier II Operating Permit

The application was submitted for a permit to construct (refer to the Permit to Construct (IDAPA 58.01.01.201) section), and an optional Tier II operating permit has not been requested. Therefore, the procedures of IDAPA 58.01.01.400–410 were not applicable to this permitting action.

Particulate Matter – New Equipment Process Weight Limitations (IDAPA 58.01.01.701)

IDAPA 58.01.01.701 .... Particulate Matter – New Equipment Process Weight Limitations

IDAPA 58.01.01.700 through 703 set PM emission limits for process equipment based on when the piece of equipment commenced operation and the piece of equipment's process weight (PW) in pounds per hour (lb/hr). IDAPA 58.01.01.701 establishes PM emission limits for equipment that commenced operation on or after October 1, 1979.

For equipment commencing operation on or after October 1, 1979, the PM allowable emission rate (E) is based on one of the following equations:

IDAPA 58.01.01.701.01.a: If PW is < 9,250 lb/hr; $E = 0.045 (PW)^{0.60}$

IDAPA 58.01.01.701.01.b: If PW is ≥ 9,250 lb/hr; $E = 1.10 (PW)^{0.25}$

For the new ore processing, ore concentration and refining, lime production, aggregate production, and concrete production equipment sources (Table 1) emissions (E) were calculated at the proposed maximum throughput rates (Table 1), and estimated emissions from all sources demonstrated compliance with this requirement. Compliance with operational and material throughput limits (Permit Conditions 3.3–3.8, 4.4–4.10, and 5.4–5.8) and control equipment requirements (Permit Conditions 2.5, 3.9–3.11, 4.11–4.16, and 5.9–5.16) assure compliance with this standard, resulting in much lower emission rates.

Mercury Emission Standard for New or Modified Sources

IDAPA 58.01.01.215 .... Mercury Emission Standard for New or Modified Sources

IDAPA 58.01.01.215 sets requirements for mercury emissions. No owner or operator may commence construction or modification of a stationary source or facility that results in an increase in annual potential emissions of mercury of 25 pounds or more unless a PTC is obtained and Mercury Best Available Control Technology (MBACT) determined. For this standard, fugitive emissions shall not be included in a determination of applicability, and new or modified stationary sources within a source category subject to NESHAP 40 CFR 63 are exempt. As identified in the MACT/GACT Applicability (40 CFR 63) section, sources addressed by NESHAP 40 CFR 63, Subpart EEEEEEE (AC, EW, MR, MF, CKD), Subpart ZZZZ (EDG1, EDG2, EDG3, and EDFP), and Subpart CCCCCC (TG1, TG2) were exempt from this standard. Emissions from drilling, blasting, material handling (excavating), roadways (hauling), dozing, grading, storage piles, and other fugitive and mobile emission sources were also exempt from this standard.

Mercury emissions from the applicable process sources (non-fugitive and non-NESHAP) were estimated to be less than 0.2 pounds per year (lb/yr), below the level at which MBACT review is required.

Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)

IDAPA 58.01.01.301 .... Requirement to Obtain Tier I Operating Permit

Any source subject to 40 CFR 63, Subpart EEEEEEE is a Tier I source as defined in IDAPA 58.01.01.006.122.c. In accordance with IDAPA 58.01.01.313.01.b., 40 CFR 70.3(c)(2), and 40 CFR 63.11640(d), the permittee must submit a complete application to DEQ for an initial Tier I operating permit within 12 months of becoming a Tier I source.

Midas Gold has committed to applying for a Tier I permit. Detailed federal regulatory applicability were provided in the PTC application, and specific federally-applicable requirements will be incorporated into the Tier I. Refer to the NSPS Applicability (40 CFR 60), NESHAP Applicability (40 CFR 61), and MACT/GACT Applicability (40 CFR 63) sections below for additional information regarding applicable requirements.

Post-project facility-wide emissions from this facility do not have a PTE greater than 100 tons per year for criteria pollutants or 10 tons per year for any one HAP or 25 tons per year for all HAP combined as demonstrated previously in the Emissions Inventories section of this analysis. Although not a major facility as defined in IDAPA 58.01.01.008.10, any source subject to 40 CFR 63, Subpart EEEEEEE is a Tier I source as defined in IDAPA 58.01.01.006.122.c. In accordance with IDAPA 58.01.01.313.01.b., 40 CFR 70.3(c)(2), and 40 CFR 63.11640(d), the permittee must submit a complete application to DEQ for an initial Tier I operating permit within 12 months of becoming a Tier I source. Refer to the NESHAP Applicability (40 CFR 61) section for additional discussion of Subpart EEEEEEE applicability.

Permit Condition 2.23 incorporates the requirement to obtain a Tier I permit in accordance with IDAPA 58.01.01.313.01.b., 40 CFR 70.3(c)(2), and 40 CFR 63.11640(d).

Comment [A9]: Added to specify that the Tier I operating permit is required only for the emission units that cause the source to be subject to the part 70 program.

PSD Classification (40 CFR 52.21)

40 CFR 52.21 .... Prevention of Significant Deterioration of Air Quality

The facility is not a major stationary source as defined in 40 CFR 52.21(b)(1), nor is it undergoing any physical change at a stationary source not otherwise qualifying under paragraph 40 CFR 52.21(b)(1) as a major stationary source which would constitute a major stationary source by itself as defined in 40 CFR 52. PSD requirements were therefore not applicable to this permitting action in accordance with 40 CFR 52.21(a)(2).

The facility includes a lime manufacturing plant (LMP) that uses a Parallel Flow Regenerative Shaft Kiln (LK, LKC) to produce lime product from limestone by calcination, which is a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a). For each criteria pollutant, LMP emissions do not exceed 100 T/yr and facility-wide emissions do not exceed 250 T/yr.

NSPS Applicability (40 CFR 60)

The project emissions units were reviewed for NSPS applicability. ~~The permittee has affected facilities subject to the following New Source Performance Standards (NSPS).~~ The POX Boiler (ACB) meets the definition of process heater rather than steam generating unit, and the use of a rotary lime kiln has not been proposed in the production of lime; therefore Subpart Dc and Subpart HH are not applicable. Applicability determinations and regulatory analyses are provided below.

- Standards of Performance for New Stationary Sources (NSPS) 40 CFR 60, Subpart A – General Provisions. DEQ is delegated this Subpart.
- NSPS 40 CFR 60, Subpart LL – Standards of Performance for Metallic Mineral Processing Plants. DEQ is delegated this Subpart. Each crusher (OC7, OC12), conveyor belt transfer point (OC1–OC6, OC8–OC11, OC13), and truck unloading station is an affected facility.
- NSPS 40 CFR 60, Subpart OOO – Standards of Performance for Nonmetallic Mineral Processing Plants. DEQ is delegated this Subpart. Each crusher (LS2, LS4), grinding mill (LSBM, OC12), screening operation (LS3, LS5, LS11), belt conveyor (LS6–LS10, LS12), and storage bin is an affected facility.
- NSPS 40 CFR 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. DEQ is delegated this Subpart. Each emergency generator engine and fire pump (EDG1, EDG2, EDG3, and EDFP) is an affected facility.

Comment [A10]: Please update the source IDs as per comments provided on the draft PTC.

40 CFR 60, Subpart A .... General Provisions

§60.1 .... Applicability

(a) Except as provided in subparts B and C, the provisions of this part apply to the owner or operator of any stationary source which contains an affected facility, the construction or modification of which is commenced after the date of publication in this part of any standard (or, if earlier, the date of publication of any proposed standard) applicable to that facility.

(b) Any new or revised standard of performance promulgated pursuant to section 111(b) of the Act shall apply to the owner or operator of any stationary source which contains an affected facility, the construction or modification of which is commenced after the date of publication in this part of such new or revised standard (or, if earlier, the date of publication of any proposed standard) applicable to that facility.

Because the permittee will own or operate NSPS affected facilities, which have been proposed to commence construction after the date of publication of the relevant applicable NSPS standards (as listed above), general provisions in Subpart A are applicable.

40 CFR 60, Subpart A is incorporated by reference into Permit Condition 2.23, and specific applicable requirements will be incorporated into the Tier I operating permit.

40 CFR 60, Subpart Dc .... Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

§60.40c .... Applicability and delegation of authority.

(a) Except as provided in paragraphs (d), (e), (f), and (g) of this section, the affected facility to which this subpart applies is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/h)) or less, but greater than or equal to 2.9 MW (10 MMBtu/h).

§60.41c .... Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Clean Air Act and in subpart A of this part.

…

Heat input *means heat derived from combustion of fuel in a steam generating unit and does not include the heat derived from preheated combustion air, recirculated flue gases, or exhaust gases from other sources (such as stationary gas turbines, internal combustion engines, and kilns).*

Heat transfer medium *means any material that is used to transfer heat from one point to another point.*

…

Process heater *means a device that is primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst.*

…

Steam generating unit *means a device that combusts any fuel and produces steam or heats water or heats any heat transfer medium. This term includes any duct burner that combusts fuel and is part of a combined cycle system. This term does not include process heaters as defined in this subpart.*

Although the Pressure Oxidation Boiler (POX Boiler) is between 10 and 100 MMBtu/hr in design heat input capacity (17 MMBtu/hr) and is proposed for construction after June 9, 1989, it meets the definition of process heater rather than steam generating unit, and therefore is not applicable to this subpart. The POX Boiler (ACB) is a device used to directly heat ore material via steam injection into the autoclave, to promote chemical oxidation reactions in which the heated ore participates as a reactant. DEQ is delegated this Subpart.

40 CFR 60, Subpart HH .... Standards of Performance for Lime Manufacturing Plants

§60.340 .... Applicability and designation of affected facility.

(a) The provisions of this subpart are applicable to each rotary lime kiln used in the manufacture of lime.

(b) The provisions of this subpart are not applicable to facilities used in the manufacture of lime at kraft pulp mills.

(c) Any facility under paragraph (a) of this section that commences construction or modification after May 3, 1977, is subject to the requirements of this subpart.

§60.341 .... Definitions.

As used in this subpart, all terms not defined herein shall have the same meaning given them in the Act and in the General Provisions.

(a) Lime manufacturing plant *means any plant which uses a rotary lime kiln to produce lime product from limestone by calcination.*

(b) Lime product *means the product of the calcination process including, but not limited to, calcitic lime, dolomitic lime, and dead-burned dolomite.*

(c) Positive-pressure fabric filter *means a fabric filter with the fans on the upstream side of the filter bags.*

(d) Rotary lime kiln *means a unit with an inclined rotating drum that is used to produce a lime product from limestone by calcination.*

(e) Stone feed *means limestone feedstock and mill scale or other iron oxide additives that become part of the product.*

The use of a rotary lime kiln has not been proposed in the production of lime, and therefore the requirements of Subpart HH are not applicable. DEQ is delegated this Subpart.

40 CFR 60, Subpart LL .... Standards of Performance for Metallic Mineral Processing Plants

§60.380 .... Applicability and designation of affected facility.

(a) The provisions of this subpart are applicable to the following affected facilities in metallic mineral processing plants: Each crusher and screen in open-pit mines; each crusher, screen, bucket elevator, conveyor belt transfer point, thermal dryer, product packaging station, storage bin, enclosed storage area, truck loading station, truck unloading station, railcar loading station, and railcar unloading station at the mill or concentrator with the following exceptions. All facilities located in underground mines are exempted from the provisions of this subpart. At uranium ore processing plants, all facilities subsequent to and including the beneficiation of uranium ore are exempted from the provisions of this subpart.

(b) An affected facility under paragraph (a) of this section that commences construction or modification after August 24, 1982, is subject to the requirements of this part.

Because the permittee will own or operate a metallic mineral processing plant with a crusher at an open-pit mine; with crushers, conveyor belt transfer points, and truck unloading stations at the mill or concentrator; and because these are proposed to commence construction after August 24, 1982, requirements in Subpart LL are applicable.

40 CFR 60, Subpart LL is incorporated by reference into Permit Condition 2.23, and specific applicable requirements will be incorporated into the Tier I operating permit.

40 CFR 60, Subpart OOO .... Standards of Performance for Nonmetallic Mineral Processing Plants

§60.670 .... Applicability and designation of affected facility.

(a)(1) Except as provided in paragraphs (a)(2), (b), (c), and (d) of this section, the provisions of this subpart are applicable to the following affected facilities in fixed or portable nonmetallic mineral processing plants: each crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, enclosed truck or railcar loading station. Also, crushers and grinding mills at hot mix asphalt facilities that reduce the size of nonmetallic minerals embedded in recycled asphalt pavement and subsequent affected facilities up to, but not including, the first storage silo or bin are subject to the provisions of this subpart.

(2) The provisions of this subpart do not apply to the following operations: All facilities located in underground mines; plants without crushers or grinding mills above ground; and wet material processing operations (as defined in §60.671).

(b) An affected facility that is subject to the provisions of subparts F or I of this part or that follows in the plant process any facility subject to the provisions of subparts F or I of this part is not subject to the provisions of this subpart.

(c) Facilities at the following plants are not subject to the provisions of this subpart:

(1) Fixed sand and gravel plants and crushed stone plants with capacities, as defined in §60.671, of 23 megagrams per hour (25 tons per hour) or less;

(2) Portable sand and gravel plants and crushed stone plants with capacities, as defined in §60.671, of 136 megagrams per hour (150 tons per hour) or less; and

(3) Common clay plants and pumice plants with capacities, as defined in §60.671, of 9 megagrams per hour (10 tons per hour) or less.

(d)(1) When an existing facility is replaced by a piece of equipment of equal or smaller size, as defined in §60.671, having the same function as the existing facility, and there is no increase in the amount of emissions, the new facility is exempt from the provisions of §§60.672, 60.674, and 60.675 except as provided for in paragraph (d)(3) of this section.

(2) An owner or operator complying with paragraph (d)(1) of this section shall submit the information required in §60.676(a).

(3) An owner or operator replacing all existing facilities in a production line with new facilities does not qualify for the exemption described in paragraph (d)(1) of this section and must comply with the provisions of §§60.672, 60.674 and 60.675.

(e) An affected facility under paragraph (a) of this section that commences construction, modification, or reconstruction after August 31, 1983, is subject to the requirements of this part.

(f) Table 1 of this subpart specifies the provisions of subpart A of this part 60 that do not apply to owners and operators of affected facilities subject to this subpart or that apply with certain exceptions.

Because the project contains crushers, grinding mills, screening operations, belt conveyors, and storage bins in a fixed or portable nonmetallic mineral processing plant, which are proposed to commence construction after August 31, 1983, requirements in Subpart OOO are applicable. The portable crushing and screening plants (PCSP1, PCSP2) will be rated at below 150 tons per hour (T/hr), and are therefore not subject to the provisions of Subpart OOO.

40 CFR 60, Subpart OOO is incorporated by reference into Permit Condition 2.21~~2.23~~, and specific applicable requirements will be incorporated into the Tier I operating permit.

40 CFR 60, Subpart IIII...................................... Standards of Performance for ~~Nonmetallic Mineral Processing Plants~~Stationary Compression Ignition Internal Combustion Engines

§60.4200 .... Am I subject to this subpart?

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

(1) Manufacturers of stationary CI ICE with a displacement of less than 30 liters per cylinder where the model year is:

(i) 2007 or later, for engines that are not fire pump engines;

(ii) The model year listed in Table 3 to this subpart or later model year, for fire pump engines.

(2) Owners and operators of stationary CI ICE that commence construction after July 11, 2005, where the stationary CI ICE are:

(i) Manufactured after April 1, 2006, and are not fire pump engines, or

(ii) Manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006.

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

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

(b) The provisions of this subpart are not applicable to stationary CI ICE being tested at a stationary CI ICE test cell/stand.

(c) If you are an owner or operator of an area source subject to this subpart, you are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart applicable to area sources.

(d) Stationary CI ICE may be eligible for exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C (or the exemptions described in 40 CFR part 89, subpart J and 40 CFR part 94, subpart J, for engines that would need to be certified to standards in those parts), except that owners and operators, as well as manufacturers, may be eligible to request an exemption for national security.

(e) Owners and operators of facilities with CI ICE that are acting as temporary replacement units and that are located at a stationary source for less than 1 year and that have been properly certified as meeting the standards that would be applicable to such engine under the appropriate nonroad engine provisions, are not required to meet any other provisions under this subpart with regard to such engines.

Because the permittee will own or operate compression ignition (CI) internal combustion engines (ICE) which are proposed to commence construction after July 11, 2005 and which will be ordered after April 1, 2006 for the emergency generator engines, and which will be ordered after July 1, 2006 for the fire pump engine, requirements in Subpart IIII are applicable. The permittee has not requested or qualified for exemption pursuant to §60.4200(b), (d), or (e).

40 CFR 60, Subpart IIII is incorporated by reference into Permit Condition 2.23, and specific applicable requirements will be incorporated into the Tier I operating permit.

NESHAP Applicability (40 CFR 61)

The facility is not subject to any NESHAP requirements in 40 CFR 61.

MACT/GACT Applicability (40 CFR 63)

The permittee has proposed to operate as a minor source of hazardous air pollutant (HAP) emissions, and has affected facilities subject to the following National Emission Standards for Hazardous Air Pollutants (NESHAP). The lime manufacturing plant is proposed at an area source of HAP, and therefore is not applicable to Subpart AAAAA. Applicability determinations and regulatory analyses are provided below.

- National Emission Standards for Hazardous Air Pollutants for Source Categories (NESHAP) 40 CFR 63, Subpart A – General Provisions. DEQ is delegated this Subpart for Tier I sources.
- NESHAP 40 CFR 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE). DEQ is delegated this Subpart. The emergency generator and fire pump engines (EDG1, EDG2, EDG3, and EDFP) are affected sources.
- NESHAP 40 CFR 63, Subpart CCCCCC – National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities. DEQ is delegated this Subpart for Tier I sources. The gasoline fuel storage tanks (TG1, TG2) are affected sources.
- NESHAP 40 CFR 63, Subpart EEEEEEE – National Emission Standards for Hazardous Air Pollutants: Gold Mine Ore Processing and Production Area Source Category. DEQ is delegated this Subpart for Tier I sources. The collection of ore pretreatment processes and the carbon process with mercury retort are affected sources. Ore pretreatment processes include the autoclave (AC). Carbon processes with mercury retort include the electrowinning cells and pregnant solution tank (EW), the mercury retort (MR), induction melting furnace (MF), and the carbon regeneration kiln (CKD).

40 CFR 63, Subpart A .... General Provisions

§63.1 .... Applicability.

(a) General*. (1) Terms used throughout this part are defined in §63.2 or in the Clean Air Act (Act) as amended in 1990, except that individual subparts of this part may include specific definitions in addition to or that supersede definitions in §63.2.*

(2) This part contains national emission standards for hazardous air pollutants (NESHAP) established pursuant to section 112 of the Act as amended November 15, 1990. These standards regulate specific categories of stationary sources that emit (or have the potential to emit) one or more hazardous air pollutants listed in this part pursuant to section 112(b) of the Act. This section explains the applicability of such standards to sources affected by them. The standards in this part are independent of NESHAP contained in 40 CFR part 61. The NESHAP in part 61 promulgated by signature of the Administrator before November 15, 1990 (i.e., the date of enactment of the Clean Air Act Amendments of 1990) remain in effect until they are amended, if appropriate, and added to this part.

(3) No emission standard or other requirement established under this part shall be interpreted, construed, or applied to diminish or replace the requirements of a more stringent emission limitation or other applicable requirement established by the Administrator pursuant to other authority of the Act (section 111, part C or D or any other authority of this Act), or a standard issued under State authority. The Administrator may specify in a specific standard under this part that facilities subject to other provisions under the Act need only comply with the provisions of that standard.

(4)(i) Each relevant standard in this part 63 must identify explicitly whether each provision in this subpart A is or is not included in such relevant standard.

(ii) If a relevant part 63 standard incorporates the requirements of 40 CFR part 60, part 61 or other part 63 standards, the relevant part 63 standard must identify explicitly the applicability of each corresponding part 60, part 61, or other part 63 subpart A (General) provision.

(iii) The General Provisions in this subpart A do not apply to regulations developed pursuant to section 112(r) of the amended Act, unless otherwise specified in those regulations.

…

(b) Initial applicability determination for this part*. (1) The provisions of this part apply to the owner or operator of any stationary source that—*

(i) Emits or has the potential to emit any hazardous air pollutant listed in or pursuant to section 112(b) of the Act; and

(ii) Is subject to any standard, limitation, prohibition, or other federally enforceable requirement established pursuant to this part.

(2) [Reserved]

(3) An owner or operator of a stationary source who is in the relevant source category and who determines that the source is not subject to a relevant standard or other requirement established under this part must keep a record as specified in §63.10(b)(3).

Because the permittee will own or operate stationary sources that emit HAP which are subject to standards, limitations, prohibitions, or other federally-enforceable requirements established pursuant to NESHAP, provisions in Subpart A are applicable.

40 CFR 63, Subpart A is incorporated by reference into Permit Condition 2.23, and specific applicable requirements will be incorporated into the Tier I operating permit.

40 CFR 63, Subpart ZZZZ .... ~~*General Provisions*~~*National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*

§63.6580 .... *What is the purpose of subpart ZZZZ?*

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

§63.6585 .... *Am I subject to this subpart?*

You are subject to this subpart if you own or operate a stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand.

(a) A stationary RICE is any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICE differ from mobile RICE in that a stationary RICE is not a non-road engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition.

(b) A major source of HAP emissions is a plant site that emits or has the potential to emit any single HAP at a rate of 10 tons (9.07 megagrams) or more per year or any combination of HAP at a rate of 25 tons (22.68 megagrams) or more per year, except that for oil and gas production facilities, a major source of HAP emissions is determined for each surface site.

(c) An area source of HAP emissions is a source that is not a major source.

(d) If you are an owner or operator of an area source subject to this subpart, your status as an entity subject to a standard or other requirements under this subpart does not subject you to the obligation to obtain a permit under 40 CFR part 70 or 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart as applicable.

(e) If you are an owner or operator of a stationary RICE used for national security purposes, you may be eligible to request an exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C.

(f) The emergency stationary RICE listed in paragraphs (f)(1) through (3) of this section are not subject to this subpart. The stationary RICE must meet the definition of an emergency stationary RICE in §63.6675, which includes operating according to the provisions specified in §63.6640(f).

(1) Existing residential emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in §63.6640(f)(4)(ii).

(2) Existing commercial emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in §63.6640(f)(4)(ii).

(3) Existing institutional emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in §63.6640(f)(4)(ii).

Because the permittee will own or operate stationary RICE at an area source of HAP which are subject to standards, limitations, prohibitions, or other federally-enforceable requirements established pursuant to NESHAP, requirements in Subpart ZZZZ are applicable.

40 CFR 63, Subpart ZZZZ is incorporated by reference into Permit Condition 2.23, and specific applicable requirements will be incorporated into the Tier I operating permit.

40 CFR 63, Subpart AAAAA................................ ~~General Provisions~~National Emission Standards for Hazardous Air Pollutants for Lime Manufacturing Plants

§63.7080... What is the purpose of this subpart?

This subpart establishes national emission standards for hazardous air pollutants (NESHAP) for lime manufacturing plants. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations.

§63.7081... Am I subject to this subpart?

(a) You are subject to this subpart if you own or operate a lime manufacturing plant (LMP) that is a major source, or that is located at, or is part of, a major source of hazardous air pollutant (HAP) emissions, unless the LMP is located at a kraft pulp mill, soda pulp mill, sulfite pulp mill, beet sugar manufacturing plant, or only processes sludge containing calcium carbonate from water softening processes.

(1) An LMP is an establishment engaged in the manufacture of lime product (calcium oxide, calcium oxide with magnesium oxide, or dead burned dolomite) by calcination of limestone, dolomite, shells or other calcareous substances.

(2) A major source of HAP is a plant site that emits or has the potential to emit any single HAP at a rate of 9.07 megagrams (10 tons) or more per year or any combination of HAP at a rate of 22.68 megagrams (25 tons) or more per year from all emission sources at the plant site.

(b) [Reserved]

§63.7143... What definitions apply to this subpart?

Terms used in this subpart are defined in the Clean Air Act, in §63.2, and in this section as follows:

...

Lime manufacturing plant (LMP) *means any plant which uses a lime kiln to produce lime product from limestone or other calcareous material by calcination.*

Lime product *means the product of the lime kiln calcination process including, calcitic lime, dolomitic lime, and dead-burned dolomite.*

Limestone *means the material comprised primarily of calcium carbonate (referred to sometimes as calcitic or high calcium limestone), magnesium carbonate, and/or the double carbonate of both calcium and magnesium (referred to sometimes as dolomitic limestone or dolomite).*

...

The lime manufacturing plant is proposed at an area source of HAP, and therefore is not subject to this Subpart.

40 CFR 60, Subpart CCCCCC........................... ~~General Provisions~~National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities

§63.11110... What is the purpose of this subpart?

This subpart establishes national emission limitations and management practices for hazardous air pollutants (HAP) emitted from the loading of gasoline storage tanks at gasoline dispensing facilities (GDF). This subpart also establishes requirements to demonstrate compliance with the emission limitations and management practices.

§63.11111... Am I subject to the requirements in this subpart?

(a) The affected source to which this subpart applies is each GDF that is located at an area source. The affected source includes each gasoline cargo tank during the delivery of product to a GDF and also includes each storage tank.

(b) If your GDF has a monthly throughput of less than 10,000 gallons of gasoline, you must comply with the requirements in §63.11116.

(c) If your GDF has a monthly throughput of 10,000 gallons of gasoline or more, you must comply with the requirements in §63.11117.

(d) If your GDF has a monthly throughput of 100,000 gallons of gasoline or more, you must comply with the requirements in §63.11118.

(e) An affected source shall, upon request by the Administrator, demonstrate that their monthly throughput is less than the 10,000-gallon or the 100,000-gallon threshold level, as applicable. For new or reconstructed affected sources, as specified in §63.11112(b) and (c), recordkeeping to document monthly throughput must begin upon startup of the affected source. For existing sources, as specified in §63.11112(d), recordkeeping to document monthly throughput must begin on January 10, 2008. For existing sources that are subject to this subpart only because they load gasoline into fuel tanks other than those in motor vehicles, as defined in §63.11132, recordkeeping to document monthly throughput must begin on January 24, 2011. Records required under this paragraph shall be kept for a period of 5 years.

(f) If you are an owner or operator of affected sources, as defined in paragraph (a) of this section, you are not required to obtain a permit under 40 CFR part 70 or 40 CFR part 71 as a result of being subject to this subpart. However, you must still apply for and obtain a permit under 40 CFR part 70 or 40 CFR part 71 if you meet one or more of the applicability criteria found in 40 CFR 70.3(a) and (b) or 40 CFR 71.3(a) and (b).

(g) The loading of aviation gasoline into storage tanks at airports, and the subsequent transfer of aviation gasoline within the airport, is not subject to this subpart.

(h) Monthly throughput is the total volume of gasoline loaded into, or dispensed from, all the gasoline storage tanks located at a single affected GDF. If an area source has two or more GDF at separate locations within the area source, each GDF is treated as a separate affected source.

(i) If your affected source's throughput ever exceeds an applicable throughput threshold, the affected source will remain subject to the requirements for sources above the threshold, even if the affected source throughput later falls below the applicable throughput threshold.

(j) The dispensing of gasoline from a fixed gasoline storage tank at a GDF into a portable gasoline tank for the on-site delivery and subsequent dispensing of the gasoline into the fuel tank of a motor vehicle or other gasoline-fueled engine or equipment used within the area source is only subject to §63.11116 of this subpart.

(k) For any affected source subject to the provisions of this subpart and another Federal rule, you may elect to comply only with the more stringent provisions of the applicable subparts. You must consider all provisions of the rules, including monitoring, recordkeeping, and reporting. You must identify the affected source and provisions with which you will comply in your Notification of Compliance Status required under §63.11124. You also must demonstrate in your Notification of Compliance Status that each provision with which you will comply is at least as stringent as the otherwise applicable requirements in this subpart. You are responsible for making accurate determinations concerning the more stringent provisions, and noncompliance with this rule is not excused if it is later determined that your determination was in error, and, as a result, you are violating this subpart. Compliance with this rule is your responsibility and the Notification of Compliance Status does not alter or affect that responsibility.

§63.11132 .... What definitions apply to this subpart?

As used in this subpart, all terms not defined herein shall have the meaning given them in the Clean Air Act (CAA), or in subparts A and BBBBBB of this part. For purposes of this subpart, definitions in this section supersede definitions in other parts or subparts.

Dual-point vapor balance system *means a type of vapor balance system in which the storage tank is equipped with an entry port for a gasoline fill pipe and a separate exit port for a vapor connection.*

Gasoline *means any petroleum distillate or petroleum distillate/alcohol blend having a Reid vapor pressure of 27.6 kilopascals or greater, which is used as a fuel for internal combustion engines.*

Gasoline cargo tank *means a delivery tank truck or railcar which is loading or unloading gasoline, or which has loaded or unloaded gasoline on the immediately previous load.*

Gasoline dispensing facility (GDF) *means any stationary facility which dispenses gasoline into the fuel tank of a motor vehicle, motor vehicle engine, nonroad vehicle, or nonroad engine, including a nonroad vehicle or nonroad engine used solely for competition. These facilities include, but are not limited to, facilities that dispense gasoline into on- and off-road, street, or highway motor vehicles, lawn equipment, boats, test engines, landscaping equipment, generators, pumps, and other gasoline-fueled engines and equipment.*

Monthly throughput *means the total volume of gasoline that is loaded into, or dispensed from, all gasoline storage tanks at each GDF during a month. Monthly throughput is calculated by summing the volume of gasoline loaded into, or dispensed from, all gasoline storage tanks at each GDF during the current day, plus the total volume of gasoline loaded into, or dispensed from, all gasoline storage tanks at each GDF during the previous 364 days, and then dividing that sum by 12.*

Motor vehicle *means any self-propelled vehicle designed for transporting persons or property on a street or highway.*

Nonroad engine *means an internal combustion engine (including the fuel system) that is not used in a motor vehicle or a vehicle used solely for competition, or that is not subject to standards promulgated under section 7411 of this title or section 7521 of this title.*

Nonroad vehicle *means a vehicle that is powered by a nonroad engine, and that is not a motor vehicle or a vehicle used solely for competition.*

Submerged filling *means, for the purposes of this subpart, the filling of a gasoline storage tank through a submerged fill pipe whose discharge is no more than the applicable distance specified in §63.11117(b) from the bottom of the tank. Bottom filling of gasoline storage tanks is included in this definition.*

Vapor balance system *means a combination of pipes and hoses that create a closed system between the vapor spaces of an unloading gasoline cargo tank and a receiving storage tank such that vapors displaced from the storage tank are transferred to the gasoline cargo tank being unloaded.*

Vapor-tight *means equipment that allows no loss of vapors. Compliance with vapor-tight requirements can be determined by checking to ensure that the concentration at a potential leak source is not equal to or greater than 100 percent of the Lower Explosive Limit when measured with a combustible gas detector, calibrated with propane, at a distance of 1 inch from the source.*

Vapor-tight gasoline cargo tank *means a gasoline cargo tank which has demonstrated within the 12 preceding months that it meets the annual certification test requirements in §63.11092(f) of this part.*

Because the permittee will own or operate a gasoline dispensing facility (GDF) at an area source of HAP, requirements in Subpart CCCCCC are applicable. Because the permittee has committed to loading and dispensing of less than 100,000 gallons of gasoline per month (gal/mo), the requirements of 40 CFR 63.11117 will become applicable in accordance with 40 CFR 63.11111(b) and (c). Gasoline loading and dispensing is limited by Permit Condition 2.17 to avoid requirements applicable to GDF exceeding 100,000 gal/mo, and requires recordkeeping in accordance with 40 CFR 63.11111(e).

40 CFR 63, Subpart CCCCCC is incorporated by reference into Permit Condition 2.23, and specific applicable requirements will be incorporated into the Tier I operating permit.

40 CFR 63, Subpart EEEEEEE........................... National Emission Standards for Hazardous Air Pollutants: Gold Mine Ore Processing and Production Area Source Category

§40 CFR 63.11640... Am I subject to this subpart?

(a) You are subject to this subpart if you own or operate a gold mine ore processing and production facility as defined in §63.11651, that is an area source.

(b) This subpart applies to each new or existing affected source. The affected sources are each collection of "ore pretreatment processes" at a gold mine ore processing and production facility, each collection of "carbon processes with mercury retorts" at a gold mine ore processing and production facility, each collection of "carbon processes without mercury retorts" at a gold mine ore processing and production facility, and each collection of "non-carbon concentrate processes" at a gold mine ore processing and production facility, as defined in §63.11651.

(1) An affected source is existing if you commenced construction or reconstruction of the affected source on or before April 28, 2010.

(2) An affected source is new if you commenced construction or reconstruction of the affected source after April 28, 2010.

(c) This subpart does not apply to research and development facilities, as defined in section 112(c)(7) of the Clean Air Act (CAA).

(d) If you own or operate a source subject to this subpart, you must have or you must obtain a permit under 40 CFR part 70 or 40 CFR part 71.

§40 CFR 63.11651.. What definitions apply to this subpart?

Terms used in this subpart are defined in the Clean Air Act, in §63.2, and in this section as follows:

Autoclave *means a pressure oxidation vessel that is used to treat gold ores (primarily sulfide refractory ore) and involves pumping a slurry of milled ore into the vessel which is highly pressurized with oxygen and heated to temperatures of approximately 350° to 430 °F.*

Calomel-based mercury control system *means a mercury emissions control system that uses scrubbers to remove mercury from the gas stream of a roaster or combination of roasters by complexing the mercury from the gas stream with mercuric chloride to form mercurous chloride (calomel). These scrubbers are also referred to as "mercury scrubbers."*

Carbon adsorber *means a control device consisting of a single fixed carbon bed, multiple carbon beds or columns, carbon filter packs or modules, and other variations that uses activated carbon to remove pollutants from a gas stream.*

Carbon kiln *means a kiln or furnace where carbon is regenerated by heating, usually in the presence of steam, after the gold has been stripped from the carbon.*

Carbon processes with mercury retorts *means the affected source that includes carbon kilns, preg tanks, electrowinning cells, mercury retorts, and melt furnaces at gold mine ore processing and production facilities that use activated carbon, or resins that can be used as a substitute for activated carbon, to recover (adsorb) gold from the pregnant cyanide solution.*

Carbon processes without mercury retorts *means the affected source that includes carbon kilns, preg tanks, electrowinning cells, and melt furnaces, but has no retorts, at gold mine ore processing and production facilities that use activated carbon, or resins that can be used as a substitute for activated carbon, to recover (adsorb) gold from the pregnant cyanide solution.*

Concentrate *means the sludge-like material that is loaded with gold along with various other metals (such as silver, copper, and mercury) and various other substances, that is produced by electrowinning, the Merrill-Crowe process, flotation and gravity separation processes. Concentrate is measured as the input to mercury retorts, or for facilities without mercury retorts, as the input to melt furnaces before any drying takes place. For facilities without mercury retorts or melt furnaces, concentrate is measured as the quantity shipped.*

Deviation *means any instance where an affected source subject to this subpart, or an owner or operator of such a source:*

(1) Fails to meet any requirement or obligation established by this subpart, including but not limited to any emissions limitation or work practice standard;

(2) Fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit; or

(3) Exceeds any operating limit established under this subpart.

Electrowinning *means a process that uses induced voltage on anode and cathode plates to remove metals from the continuous flow of solution, where the gold in solution is plated onto the cathode. Steel wool is typically used as the plating surface.*

Electrowinning Cells *means a tank in which the electrowinning takes place.*

Gold mine ore processing and production facility *means any industrial facility engaged in the processing of gold mine ore that uses any of the following processes: Roasting operations, autoclaves, carbon kilns, preg tanks, electrowinning, mercury retorts, or melt furnaces. Laboratories (see CAA section 112(c)(7)), individual prospectors, and very small pilot scale mining operations that processes or produces less than 100 pounds of concentrate per year are not a gold mine ore processing and production facility. A facility that produces primarily metals other than gold, such as copper, lead, zinc, or nickel (where these metals other than gold comprise 95 percent or more of the total metal production) that may also recover some gold as a byproduct is not a gold mine ore processing and production facility. Those facilities whereby 95 percent or more of total mass of metals produced are metals other than gold, whether final metal production is onsite or offsite, are not part of the gold mine ore processing and production source category.*

Melt furnace *means a furnace (typically a crucible furnace) that is used for smelting the gold-bearing material recovered from mercury retorting, or the gold-bearing material from electrowinning, the Merrill-Crowe process, or other processes for facilities without mercury retorts.*

Mercury retort *means a vessel that is operated under a partial vacuum at approximately 1,100° to 1,300 °F to remove mercury and moisture from the gold bearing sludge material that is recovered from electrowinning, the Merrill-Crowe process, or other processes. Mercury retorts are usually equipped with condensers that recover liquid mercury during the processing.*

Merrill-Crowe process *means a precipitation technique using zinc oxide for removing gold from a cyanide solution. Zinc dust is added to the solution, and gold is precipitated to produce a concentrate.*

Non-carbon concentrate processes *means the affected source that includes mercury retorts and melt furnaces at gold mine ore processing and production facilities that use the Merrill-Crowe process or other processes and do not use carbon (or resins that substitute for carbon) to recover (adsorb) gold from the pregnant cyanide solution.*

Ore dry grinding *means a process in which the gold ore is ground and heated (dried) prior to additional preheating or prior to entering the roaster.*

Ore preheating *means a process in which ground gold ore is preheated prior to entering the roaster.*

Ore pretreatment processes *means the affected source that includes roasting operations and autoclaves that are used to pre-treat gold mine ore at gold mine ore processing and production facilities prior to the cyanide leaching process.*

Pregnant solution tank (or preg tank) *means a storage tank for pregnant solution, which is the cyanide solution that contains gold-cyanide complexes that is generated from leaching gold ore with cyanide solution.*

Pregnant cyanide solution *means the cyanide solution that contains gold-cyanide complexes that are generated from leaching gold ore with a dilute cyanide solution.*

Quenching *means a process in which the hot calcined ore is cooled and quenched with water after it leaves the roaster.*

Roasting operation *means a process that uses an industrial furnace in which milled ore is combusted across a fluidized bed to oxidize and remove organic carbon and sulfide mineral grains in refractory gold ore. The emissions points of the roasting operation subject to this subpart include ore dry grinding, ore preheating, the roaster stack, and quenching.*

Because the permittee will own or operate a gold mine ore processing and production facility at an area source of HAP, requirements in Subpart EEEEEEE are applicable. The collection of ore pretreatment processes and the carbon process with mercury retort are affected sources. Ore pretreatment processes include the autoclave (AC). Carbon processes with mercury retort include the electrowinning cells and pregnant solution tank (EW), the mercury retort (MR), induction melting furnace (MF), and the carbon regeneration kiln (CKD).

Any source subject to 40 CFR 63, Subpart EEEEEEE is a Tier I source as defined in IDAPA 58.01.01.006.122.c. In accordance with IDAPA 58.01.01.313.01.b., 40 CFR 70.3(c)(2), and 40 CFR 63.11640(d), the permittee must submit a complete application to DEQ for an initial Tier I operating permit within 12 months of becoming a Tier I source.

This subpart includes mercury emissions limits for the collection of new ore pretreatment processes and for the new carbon processes with mercury retort. This subpart also requires weight measurement devices for measuring ore throughput for the autoclave (AC) and ~~ore concentrate~~mineral-bearing solution throughput for the electrowinning cells and pregnant solution tank (EW). Requires monitoring of mercury emissions, and monitoring of either inlet gas temperature for each process unit with a carbon filter (EW, MR, MF, CKD) or both water flow and pressure drop for each process unit with a wet scrubber not followed by a carbon filter (AC).

40 CFR 63, Subpart EEEEEEE is incorporated by reference into Permit Condition 2.23, and specific applicable requirements will be incorporated into the Tier I operating permit.

Permit Conditions Review

This section describes the permit conditions for this initial permit.

Permit Conditions 1.1–1.2

These permit conditions describe the purpose of this permitting action and the emission sources and the control equipment regulated by this permit. This reflects information presented in the application and relied upon in the development of emissions inventories, and in the evaluation of ambient air impacts in the modeling analyses. Refer to the Emissions Inventories and the Ambient Air Quality Impact Analyses sections for additional information concerning these analyses.

Because specific vendor and manufacturer information was unavailable at the time of permitting, documentation and testing requirements were included (Permit Condition 2.19) to verify consistency with the information specified in the application. Production values ~~limits~~ were based on process flow diagrams and engineering design information provided.

Permit Conditions 2.1–2.7

These permit conditions incorporate fugitive dust emission control requirements ~~limits~~ (Permit Condition 2.1) in accordance with IDAPA 58.01.01.650-651. Compliance is ensured by implementing reasonable control precautions and corrective actions when appropriate, excluding public access to operations, and complying with inspection, monitoring, recordkeeping, and notification requirements. Specific precautions are identified and required in the fugitive dust control plan (FDCP), and specific measures to control public access within the operations boundary are identified in and required by the Access Control Plan (ACP) (Permit Conditions 2.5 and 2.6, respectively).

Reduction of PM emissions from each of the identified conveyors by 80% was supported by assuming location of these material transfers at below grade (OC9, OC10) or enclosure on all sides (OC11), as specified. Reduction of PM emissions from haul roads by a combined 93.3% was supported by assuming appropriate application ~~liberal use~~ of water and magnesium chloride dust suppression; DEQ is cognizant that to consistently achieve this level of control requires conscientious efforts, vigilant inspection and monitoring, and a comprehensive FDCP. Maximum monthly haul mileage was based on the maximum operating scenario mileage (W3 = 16,415 mi/day ≈ 490,000 mi/mo). Because continuous operation was proposed, suppression measures will need to account for and accommodate all weather conditions including diurnal and seasonal variability, and all traffic loads including mining and public traffic along publicly accessible roads. Conditions outside of what may normally be anticipated may require additional measures such as a reduction in vehicle speeds or selection of a more effective chemical dust suppressant. Although the FDCP specifies a minimum of efforts required, additional operational limits and monitoring are to be considered moving forward and evaluated for incorporation into the FDCP comply with IDAPA 50.01.01.650-651 ~~to achieve this level of control~~ under all conditions and all operating scenarios. Certification of employees for visible emission inspections, training and orientation of relevant employees, and evaluation of FDCP requirements on at least a semi-annual basis are also required.

Access control measures are described in the Ambient Air Boundary section of the application (Section 5.6), and address primary access points, secondary access points, and surveillance.

Comment [A11]: Please update this frequency per comments provided on the draft PTC.

Permit Conditions 2.8–2.11

These permit conditions incorporate visible emission control requirements limits (Permit Condition 2.8) in accordance with IDAPA 58.01.01.625. Compliance is ensured by implementing corrective actions when appropriate and complying with inspection, monitoring, and recordkeeping requirements. Certification of employees for visible emission inspections, is also required.

Permit Condition 2.12

This permit condition incorporates PM emission limits for process equipment as defined in IDAPA 58.01.01.006, in accordance with IDAPA 58.01.01.700-703, which includes all mining, ore processing, ore concentration and refining, lime production, aggregate production, and concrete production equipment (Table 1). Compliance with operational and material throughput limits (Permit Conditions 3.3–3.8, 4.4–4.10, and 5.4–5.8) and control equipment requirements (Permit Conditions 2.5, 3.9–3.11, 4.11–4.16, and 5.9–5.16) and associated monitoring were considered adequate to ensure compliance with process weight-based PM emission limitations.

Comment [A12]: "all mining" is not mentioned in the draft PTC

Permit Conditions 2.13–2.14 incorporate odorous emission limits in accordance with IDAPA 58.01.01.776.01. Compliance is ensured by complying with monitoring and recordkeeping requirements, including corrective action when appropriate.

Permit Conditions 2.15–2.16 incorporate sulfur content limits for distillate fuel oil, in accordance with IDAPA 58.01.01.725. Compliance is ensured by complying with monitoring and recordkeeping requirements.

Permit Conditions 2.17–2.18 limit facility-wide gasoline fuel throughput. Limiting gasoline throughput limits PTE, ensures avoidance of Subpart CCCCCC requirements applicable to GDF exceeding 100,000 gal/mo, and requires recordkeeping in accordance with 40 CFR 63.11111(e). Compliance is ensured by complying with monitoring and recordkeeping requirements.

Permit Conditions 2.19–2.20 require developing and complying with the requirements of an O&M manual to ensure compliance with control equipment maintenance and operation general provisions (Permit Condition 7.2). Documentation of as-built process equipment specifications and control equipment performance guarantees and establishing control equipment operating parameters and procedures were required, since these were relied upon in the development of emissions inventories, and in the evaluation of ambient air impacts in the modeling analyses. Compliance is ensured by complying with monitoring and recordkeeping requirements.

Permit Conditions 2.21–2.23 incorporate applicable general compliance, notification, recordkeeping, reporting, applicable general provisions, and other federal requirements by reference in accordance with IDAPA 58.01.01.107.03 and 590-591. Compliance is ensured by complying with applicable federal testing, monitoring, recordkeeping, and reporting requirements.

These permit conditions specify that with regard to permit conditions referenced in accordance with federal requirements (i.e., NSPS and NESHAP requirements), should there be a conflict between the language of the permit condition and the language of the requirement, the language of the requirement shall govern. The permittee is also required to obtain a Tier I operation permit within 12 months of commencement of operation of any ore concentration and refining equipment (i.e., NESHAP 7E affected sources). Refer to NSPS Applicability (40 CFR 60) and MACT/GACT Applicability (40 CFR 63) sections for additional information concerning applicable requirements.

Permit Condition 2.24 specifies recommended test methods to be used when performance testing is required, unless otherwise specified in the permit, in accordance with IDAPA 58.01.01.157. The permittee is required to comply with notification and reporting requirements and is encouraged to submit performance test protocol to DEQ for approval prior to any performance testing in accordance with the performance testing general provisions (Permit Condition 7.7–7.9).

Permit Condition 2.25 provides DEQ agency contact information.

Permit Conditions 3.1–3.2

These permit conditions describe mining and ore processing equipment and controls. This reflects information presented in the application and relied upon in the development of emissions inventories, and in the evaluation of ambient air impacts in the modeling analyses.

Permit Conditions 3.3–3.8 and 3.12–3.17 establish limits on material throughput and production. These limits were relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses. Overall mine throughput is limited by hauling and excavating limits (Permit Condition 3.5). Compliance is ensured by complying with monitoring and recordkeeping requirements (Permit Conditions 3.12–3.17).

Permit Conditions 3.9–3.11 require measures to include in the facility's FDCPcontrol fugitive emissions. Use of building enclosures and reasonable controls were relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses. Compliance is ensured by complying with fugitive dust monitoring and recordkeeping requirements (Permit Conditions 2.1–2.7).

Comment [A13]: Building enclosures were not relied upon in the emissions inventories for the crushers.

Permit Conditions 4.1–4.2

These permit conditions describe ore concentration and refining equipment and controls. This reflects information presented in the application and relied upon in the development of emissions inventories, and in the evaluation of ambient air impacts in the modeling analyses.

Permit Condition 4.3 and 4.30–4.31 establish emissions limits for ore concentration and refining equipment, consistent with estimates relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses for these sources. A sulfuric acid emission limit consistent with the modeled TAP emission rate from the autoclave was established in accordance with IDAPA 58.01.01.210.08. Compliance is ensured by complying with equipment operating and testing requirements (Permit Conditions 4.4–4.16, and 4.30–4.31).

Permit Conditions 4.4–4.10 and 4.17–4.23 limit operations of ore concentration and refining process equipment, consistent with the hours of operation and material throughput assumptions relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses for these sources. Compliance is ensured by complying with monitoring and recordkeeping requirements (Permit Conditions 4.16–4.23).

Permit Conditions 4.11–4.16 and 4.24–4.29 require control equipment for ore concentration and refining processes, consistent with controls relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses. Compliance is ensured by complying with monitoring and recordkeeping requirements (Permit Conditions 4.24–4.29).

Permit Condition requires testing of ore concentration and refining emission sources to demonstrate compliance with emissions limits (Permit Condition 4.3).

Permit Conditions 5.1–5.2

These permit conditions describe lime, aggregate, and concrete production equipment and controls. This reflects information presented in the application and relied upon in the development of emissions inventories, and in the evaluation of ambient air impacts in the modeling analyses.

Permit Condition 5.3 establishes emissions limits for lime, aggregate, and concrete production equipment, consistent with estimates relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses for these sources. Compliance is ensured by complying with equipment operating requirements (Permit Conditions 5.4–5.16).

Permit Conditions 5.4–5.8 and 5.17–5.21 limit operations of each lime, aggregate, and concrete production process equipment, consistent with material throughput assumptions relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses for these sources. Compliance is ensured by complying with monitoring and recordkeeping requirements (Permit Conditions 5.16–5.21).

Permit Conditions 5.9–5.11 require measures to ~~control fugitive emissions~~include in the facility's FDCP. Use of water sprays, building enclosures, and reasonable controls were relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses. Compliance is ensured by complying with fugitive dust monitoring and recordkeeping requirements (Permit Conditions 2.1–2.7).

Permit Conditions 5.12–5.16 and 5.22–5.25 require control equipment for lime, aggregate, and concrete production processes, consistent with controls relied upon in the development of emissions inventories and in the evaluation of ambient air impacts in the modeling analyses. Compliance is ensured by complying with monitoring and recordkeeping requirements (Permit Conditions 5.22–5.25).

Permit Condition 6.1

This permit condition describes the emergency power generation equipment. This reflects information presented in the application and relied upon in the development of emissions inventories, and in the evaluation of ambient air impacts in the modeling analyses.

Permit Conditions 6.2 and 6.3–6.4 limit operations of each emergency power generation engine, consistent with the purpose and hours of operation assumptions relied upon in the development of emissions inventories, in the determination of federal regulatory applicability, and in the evaluation of ambient air impacts in the modeling analyses for these sources. Compliance is ensured by complying with monitoring, recordkeeping, and notification requirements (Permit Conditions 6.3–6.4).

Permit Condition 7.1

The duty to comply general compliance provision requires that the permittee comply with all of the permit terms and conditions pursuant to Idaho Code §39-101.

Permit Condition 7.2

The maintenance and operation general compliance provision requires that the permittee maintain and operate all treatment and control facilities at the facility in accordance with IDAPA 58.01.01.211.

Permit Condition 7.3

The obligation to comply general compliance provision specifies that no permit condition is intended to relieve or exempt the permittee from compliance with applicable state and federal requirements, in accordance with IDAPA 58.01.01.212.01.

Permit Condition 7.4

The inspection and entry provision requires that the permittee allow DEQ inspection and entry pursuant to Idaho Code §39-108.

Permit Condition 7.5

The permit expiration construction and operation provision specifies that the permit expires if construction has not begun within two years of permit issuance or if construction has been suspended for a year in accordance with IDAPA 58.01.01.211.02.

Permit Condition 7.6

The notification of construction and operation provision requires that the permittee notify DEQ of the dates of construction and operation, in accordance with IDAPA 58.01.01.211.01 and 211.03.

Permit Condition 7.7

The performance testing notification of intent provision requires that the permittee notify DEQ at least 15 days prior to any performance test to provide DEQ the option to have an observer present, in accordance with IDAPA 58.01.01.157.03.

Permit Condition 7.8

The performance test protocol provision requires that any performance testing be conducted in accordance with the procedures of IDAPA 58.01.01.157 and encourages the permittee to submit a protocol to DEQ for approval prior to testing.

Permit Condition 7.9

The performance test report provision requires that the permittee report any performance test results to DEQ within 60 days of completion, in accordance with IDAPA 58.01.01.157.04-05.

Permit Condition 7.10

The monitoring and recordkeeping provision requires that the permittee maintain sufficient records to ensure compliance with permit conditions, in accordance with IDAPA 58.01.01.211.

Permit Condition 7.11

The excess emissions provision requires that the permittee follow the procedures required for excess emissions events, in accordance with IDAPA 58.01.01.130-136.

Permit Condition 7.12

The certification provision requires that a responsible official certify all documents submitted to DEQ, in accordance with IDAPA 58.01.01.123.

Permit Condition 7.13

The false statement provision requires that no person make false statements, representations, or certifications, in accordance with IDAPA 58.01.01.125.

Permit Condition 7.14

The tampering provision requires that no person render inaccurate any required monitoring device or method, in accordance with IDAPA 58.01.01.126.

Permit Condition 7.15

The transferability provision specifies that this permit to construct is transferable, in accordance with the procedures of IDAPA 58.01.01.209.06.

Permit Condition 7.16

The severability provision specifies that permit conditions are severable, in accordance with IDAPA 58.01.01.211.

PUBLIC REVIEW

Public Comment

An opportunity for public comment period on the application was provided in accordance with IDAPA 58.01.01.209.01.c. During this time, there was a request for a public comment period on DEQ’s proposed action.

A public comment period was made available to the public in accordance with IDAPA 58.01.01.209.01.c.

Refer to the Application Chronology section for public comment opportunity and public comment period dates.

APPENDIX A – EMISSIONS INVENTORIES

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

APPENDIX C – FACILITY DRAFT COMMENTS

APPENDIX D – PROCESSING FEE

APPENDIX E – ACCESS MANAGEMENT PLAN

M E M O R A N D U M_DRAFT

DATE: July 31, 2020

TO: Morrie Lewis, Permit Writer, Air Program

FROM: Pao Baylon, Modeling Review Analyst, Air Program
Through Kevin Schilling, Modeling Supervisor, Air Program

PROJECT: P-2019.0047 PROJ 62288, Permit for an Open-pit Gold Mine and On-site Ore Preparation and Gold Extraction Operation located in Valley County, Idaho.

SUBJECT: Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs) as it relates to air quality impact analyses.

Contents

Acronyms, Units, and Chemical Nomenclature

AAC	Acceptable Ambient Concentration of a non-carcinogenic TAP
AACC	Acceptable Ambient Concentration of a Carcinogenic TAP
acfm	Actual cubic feet per minute
ADJ_U*	AERMOD Adjusted Friction Velocity Model Option
AERMAP	The terrain data preprocessor for AERMOD
AERMET	The meteorological data preprocessor for AERMOD
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
Air Sciences	Air Sciences, Inc. (permittee's permitting and modeling consultant)
amsl	Above mean sea level
ANFO	Ammonium Nitrate Fuel Oil
Appendix W	40 CFR 51, Appendix W – Guideline on Air Quality Models
ASOS	Automated Surface Observing System
B_o	Bowen Ratio
BNF	Boise National Forest
BPIP	Building Profile Input Program
BRC	Below Regulatory Concern
BT	Bradley Tailings
BULKRN	Meteorological data processed using Bulk Richardson Method
CAPCOA	California Air Pollution Control Officers Association
CFR	Code of Federal Regulations
CMAQ	Community Multi-Scale Air Quality Modeling System
CO	Carbon Monoxide
CSIRO	Commonwealth Scientific and Industrial Research Organization
DEQ	Idaho Department of Environmental Quality
DR	Development Rock
DRSF	Development Rock Storage Facility
DV	Design Values
EF	Emission Factors
EFSFSR	East Fork of the South Fork of the Salmon River
EIS	Environmental Impact Statement
EL	Emissions Screening Level of a TAP
EPA	United States Environmental Protection Agency
FDRSF	Fiddle Development Rock Storage Facility
g/cm^3	Grams per Cubic Centimeter
GEP	Good Engineering Practice
H_2SO_4	Sulfuric Acid Gas
HAP	Hazardous Air Pollutant
HFDRSF	Hangar Flats Development Rock Storage Facility
HFP	Hangar Flats Pit
Hg	Mercury
hr	Hours
Idaho Air Rules	Rules for the Control of Air Pollution in Idaho, located in the Idaho Administrative Procedures Act 58.01.01

in	Inches
ISCST3	Industrial Source Complex Short Term 3 dispersion model
K	Kelvin
km	Kilometers
lb/hr	Pounds per hour
lb/yr	Pounds per year
LOM	Life of Mine
m	Meters
m/sec	Meters per second
MERPs	Modeled Emission Rates for Precursors
mg/m^3	Milligrams per Cubic Meter
Midas Gold	Midas Gold Idaho, Inc. (permittee)
MM	Million
MMBtu	Million British Thermal Units
mph	Miles per hour
NAAQS	National Ambient Air Quality Standards
NAD83	North American Datum of 1983
NED	National Elevation Dataset
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NON-BULKRN	Meteorological data processed without Bulk Richardson Method
NOx	Oxides of Nitrogen
NSR	New Source Review
NW AIRQUEST	Northwest International Air Quality Environmental Science and Technology Consortium
NWS	National Weather Service
O_3	Ozone
OLM	Ozone Limiting Method
Pb	Lead
PM_{10}	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 10 micrometers
$PM_{2.5}$	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 2.5 micrometers
PNF	Payette National Forest
ppb	parts per billion
ppm	parts per million
PRIME	Plume Rise Model Enhancement
PRO	Midas Gold Plan of Restoration and Operations
PSD	Prevention of Significant Deterioration
PTC	Permit to Construct
PTE	Potential to Emit
PVMRM	Plume Volume Molar Ratio Method
r	Albedo
scfm	Standard cubic feet per minute
SED	Segment Emission Denominator

SGP	Stibnite Gold Project
SIL	Significant Impact Level
SO_2	Sulfur Dioxide
STKP	Crusher Stockpile
TAP	Toxic Air Pollutant
ton/day	Tons per Day
ton/year	Tons per Year
TSF	Tailings Storage Facility
TSP	Total Suspended Particulate
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds
WBAN	Weather-Bureau-Army-Navy
WEDRSF	West End Development Rock Storage Facility
WEP	West End Pit
YPDRSF	Yellow Pine Development Rock Storage Facility
YPP	Yellow Pine Pit
z_o	Surface Roughness Length
ºF	Degrees Fahrenheit
$\mu g/m^3$	Micrograms per cubic meter of air
µm	Microns

1.0 Summary

Midas Gold Idaho, Inc. (Midas Gold) submitted a Permit to Construct (PTC) application to construct and operate the Stibnite Gold Project (SGP) in Valley County, Idaho. The SGP will consist of conventional open-pit mining operations and onsite ore preparation and gold extraction processes. The potential air emissions from the SGP are less than the applicable major source thresholds for both criteria and hazardous air pollutants (HAP), and therefore, the facility is designated as a minor source for Title V and New Source Review (NSR) requirements, and an area source for National Emission Standards for Hazardous Air Pollutants (NESHAP) applicability. Project-specific air quality analyses involving atmospheric dispersion modeling of estimated emissions associated with the facility were submitted to DEQ to demonstrate that applicable emissions do not result in violation of a National Ambient Air Quality Standard (NAAQS) or Toxic Air Pollutant (TAP) increment as required by the Idaho Administrative Procedures Act 58.01.01.203.02 and 203.03 (Idaho Air Rules Section 203.02 and 203.03). This memorandum provides a summary of the applicability assessment for analyses and air impact analyses used to demonstrate compliance with applicable NAAQS and TAP increments, as required by Idaho Air Rules Section 203.02 and 203.03.

Air Sciences, Inc. (Air Sciences), on behalf of Midas Gold, prepared the PTC application and performed ambient air impact analyses for this project. DEQ review of submitted data and DEQ analyses summarized by this memorandum addressed only the rules, policies, methods, and data pertaining to the air impact analyses used to demonstrate that estimated emissions associated with operation of the facility will not cause or significantly contribute to a violation of any applicable air quality standard. This review did not address/evaluate compliance with other rules or analyses not pertaining to the air impact analyses. Evaluation of emission estimates was the responsibility of the DEQ permit writer and is addressed in the main body of the DEQ Statement of Basis, and emission calculation methods were not evaluated in this modeling review memorandum.

Table 1 presents key assumptions and results to be considered in the development of the permit. Idaho Air Rules require air impact analyses be conducted in accordance with methods outlined in 40 CFR 51, Appendix W *Guideline on Air Quality Models* (Appendix W). Appendix W requires that air quality impacts be assessed using atmospheric dispersion models with emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

The submitted information and analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data (review of emission estimates was addressed by the DEQ permit writer); 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that estimated potential/allowable emissions are at a level defined as below regulatory concern (BRC) and do not require a NAAQS compliance demonstration; b) that predicted pollutant concentrations from emissions associated with the project as modeled were below Significant Impact Levels (SILs) or other applicable regulatory thresholds; or c) that predicted pollutant concentrations from emissions associated with the project, when appropriately combined with co-contributing sources and background concentrations, were below applicable NAAQS at ambient air locations where and when the project has a significant impact; 5) showed that TAP emission increases associated with the project will not result in increased ambient air impacts exceeding allowable TAP increments. This conclusion assumes that conditions in Table 1 are representative of facility design capacity or operations as limited by a federally enforceable permit condition. The DEQ permit writer should use Table 1 and other information presented in this memorandum to generate appropriate permit provisions/restrictions to assure emissions do not exceed applicable regulatory thresholds requiring further analyses and to assure the requirements of Appendix W are met regarding emissions representative of design capacity or permit allowable rates.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES.

Criteria/Assumption/Result	Explanation/Consideration
General Emission Rates. Emission rates used in the air impact analyses must represent maximum potential emissions as given by design capacity, inherently limited by the nature of the process or configuration of the facility, or as limited by the issued permit for the specific pollutant and averaging period.	Compliance has not been demonstrated for emission rates greater than those used in the air impact analyses.
Air Impact Analyses for Criteria Pollutant Emissions. SGP facility-wide maximum potential to emit are greater than the respective Level I thresholds for all criteria pollutants and averaging periods except for Lead. Therefore, modeling is triggered for applicable averaging periods for $PM_{2.5}$[a], PM_{10}[b], CO[c], NOx[d], and SO_2[e]. Modeling was not required for Lead.	Project-specific air impact analyses demonstrating compliance with NAAQS, as required by Idaho Air Rules Section 203.02, are required for pollutant increases above BRC thresholds, or for pollutants having an emissions increase that is greater than Level I modeling applicability thresholds (where the BRC exclusion cannot be used).
Air Impact Analyses for TAP Emissions. SGP facility-wide potential TAP emissions exceed the respective screening emission levels (ELs) for antimony, arsenic, cadmium, formaldehyde, nickel, and sulfuric acid. Therefore, air dispersion modeling was required for these six TAPs.	A TAP increment compliance demonstration would be required for any TAPs with emissions above ELs.
Significant Impact Level Analysis Not Conducted. A Significant Impact Level (SIL) analysis was not conducted for the SGP facility.	Based on the magnitude of the facility-wide emissions and preliminary modeling analyses, it was determined that the impacts from the SGP emissions exceeded the SIL for most criteria pollutants. Therefore, SIL analyses were considered redundant and not performed for the project.
Multiple Modeling Scenarios. To evaluate the worst-case air impacts from the SGP facility, a total of 14 scenarios were modeled. These scenarios represent the hauling of material, which can be either ore or development rock (DR), from four possible origins (three pits and a tailings facility) to five possible destinations (ore will be hauled to the crushing area while DR will be hauled to one of four development rock storage facilities [DRSF]). Modeled design values listed in this modeling memo represent the worst-case modeling scenario for every modeled pollutant and averaging period.	Conventional open-pit methods will be used to extract ore and DR from four possible origins (Yellow Pine Pit [YPP], Hangar Flats Pit [HFP], West End Pit [WEP], and Bradley Tailings [BT]). Ore and DR will be hauled to five possible destinations (Stockpile [STKP], Yellow Pine DRSF [YPDRSF], Hangar Flats DRSF [HFDRSF], West End DRSF [WEDRSF], and Fiddle DRSF [FDRSF]). Only 14 of the 20 possible scenarios were modeled. Six scenarios were not feasible because the timing of the activity within the sequence of mine operations makes the scenarios logistically impossible. Modeled results listed in this memo represent worst-case modeling scenarios.
Modeling of Material Origin and Destination. Each material origin location (YPP, HFP, WEP, and BT) was modeled as an AREA source. Ore destination (STKP) was modeled as a VOLUME source. Each DR destination (YPDRSF, HFDRSF, WEDRSF, and FDRSF) was modeled as a VOLUME source.	Each material origin location comprised appropriate emissions from drilling, material loading, dozing, and surface exploration. Ore destination comprised ore unloading emissions. Each DR destination comprised appropriate emissions from DR unloading, dozing, and wind erosion. For the four AREA and five VOLUME sources, the dimensions were developed by reasonably fitting an equal-area rectangle within the actual footprint of each fugitive source. For the pit and DRSF fugitive activity locations, the release height was based on the haul truck height. The applicable initial lateral dispersion for each VOLUME source was calculated from the respective shorter dimension and EPA-specified methods. The applicable initial vertical dispersion for each AREA and VOLUME source was calculated from the respective vertical dimension and EPA-specified methods.
Modeling of Haul Roads. A representative haul road network for hauling material from inside the pit to various destinations was developed for each of the 14 modeling scenarios.	The haul road network was divided into 22 sections. Each section was further divided into multiple segments with a length equal to twice the adjusted haul road width. Each of the segments was characterized as an individual VOLUME source in the model. Material hauling emissions associated with each origin-destination route were assigned to each

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES.	
Criteria/Assumption/Result	**Explanation/Consideration**
	segment along the route based on estimated total emissions along the route and traffic distribution along each section.
Modeling of Blasting Emissions. Blasting emissions were represented by a VOLUME source inside a pit (YPPBL, HFPBL, and WEPBL). Blasting is not expected to occur in BT but was modeled (BTBL) in order to streamline the permitting process.	The blasting physical parameters were developed from dimensions based on blast area used in the emission calculation. The blasting release height was the midpoint of the blasting height. The initial lateral and vertical dispersion dimensions for blasting were calculated per methods specified in the AERMOD User's Guide.
Modeling of Burntlog Route Access Road. The access road portion within the operations boundary was characterized by a series of LINE sources laid along the actual route.	Emissions associated with the portion of the Burntlog Route mine access road that is within project boundary (from the south gate to the process area) are included in the SGP analyses. These include dust emissions generated from travel of maintenance equipment, light-duty pickup trucks and buses used for employee, visitor, and contractor transportation, and heavy-duty trucks used for cargo (including fuel, consumables, machine parts, ore processing supplies, ore concentrate, etc.) and services (including food supplies, trash, recyclables, etc.) transportation. Release parameters for the LINE sources were based on an estimated average vehicle height. The access road emissions were evenly distributed along the road by dividing the total access road emissions by its total area.
Control of Fugitive Dust from Roadways. Fugitive particulate emissions from roadways were assumed to be controlled above 93%, which is an aggressive level of control.	The high level of emission control was needed to demonstrate compliance with NAAQS. Compliance is not demonstrated for emissions greater than those associated with above 93% control.
NOx Chemistry and NO_2/NOx In-Stack Ratios. Ozone Limiting Method (OLM), a Tier 3 NO_2 screening method, was used to estimate the 1-hour and annual NO_2 impacts. The following NO_2/NOx In-Stack Ratios (ISR) were used in the modeling analyses: Blasting: 0.036 Diesel engines: 0.11 Propane heaters: 0.10	The OLM method requires an input of NO_2/NOx ISRs for each modeled source. The NO_2/NOx ratio for blasting was based on blasting plume measurements provided in published literature. The NO_2/NOx ratio for stationary diesel combustion sources was based on heavy-duty diesel trucks in the California Air Pollution Control Officers Association (CAPCOA) Guidance Document. This NO_2/NOx ratio (11 percent) is conservatively higher than the diesel combustion NO_2/NOx ratio provided in the EPA ISR database: 6 percent average, 9.8 percent maximum. The CAPCOA document and the EPA ISR database do not provide an NO_2/NOx ratio for propane boilers. The CAPCOA-recommended NO_2/NOx ratio for natural gas boilers was selected for the propane boilers. The natural gas boilers NO_2/NOx ratio is considered appropriate for the propane boilers because both are gaseous fuels with relatively similar combustion characteristics and are expected to have similar NO_2/NOx ratios. DEQ performed a sensitivity analysis using Tier 2 (Ambient Ratio Method 2), a more conservative NO_2 screening method, and found that the facility is safely below the 1-hour and annual NO_2 NAAQS.
Alternate Meteorological Data Processed Using Cloud Cover. An alternative meteorological dataset was processed without using the Bulk Richardson (BULKRN) method. This alternate processing (NON-BULKRN) used upper air data from Boise airport, supplemented with the cloud-cover data collected at the National Weather Service station in McCall, Idaho.	Meteorological data processing with and without BULKRN are considered acceptable regulatory options by EPA. The NON-BULKRN meteorological data yielded lower modeled design values than the meteorological data processed using the BULKRN method.
Ambient Air Boundary. Midas Gold will legally control the SGP, an active industrial site where mining activities will occur,	Ambient air is defined in Section 006 of the Idaho Air Rules as "that portion of the atmosphere, external to buildings, to

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES.

Criteria/Assumption/Result	Explanation/Consideration
such as heavy equipment operation. Most areas of the mine will require strict safety protocols and controlled access. Midas Gold has established an operations boundary to identify the area where public access will be excluded. Public access inside the operations boundary will be restricted for the life of the mine by physical barriers at points of potential access, including the current Stibnite Road point of entry and proposed site access via the Burntlog Route, as well as natural features of the landscape that prevent access.	which the general public has access." Receptors must be placed at any portion of the atmosphere that is considered ambient air.
Onsite Background $PM_{2.5}$ and PM_{10} Concentrations. The following background $PM_{2.5}$ and PM_{10} concentrations were measured at SGP in 2014 and used in the cumulative NAAQS impact analysis: Annual $PM_{2.5}$: 3.5 µg/m^3 (weighted average of quarterly means) 24-hour $PM_{2.5}$: 15 µg/m^3 (98th percentile/8th high) 24-hour PM_{10}: 37 µg/m^3 (highest 2nd high)	Midas Gold developed an onsite monitoring program to collect site-specific meteorological parameters and determine ambient particulate matter ($PM_{2.5}$ and PM_{10}) concentrations at its Stibnite monitoring station. $PM_{2.5}$ and PM_{10} background concentrations were based on calendar year 2014 instead of the complete dataset (November 2013 through June 2015).
NW AIRQUEST Background CO, NO_2, and SO_2 Concentrations. The following background concentrations for CO, NO_2, and SO_2 were used in the cumulative NAAQS impact analysis: 1-hour CO: 1,740 µg/m^3 8-hour CO: 1,110 µg/m^3 1-hour NO_2: 4.3 µg/m^3 Annual NO_2: 0.9 µg/m^3 1-hour SO_2: 12.3 µg/m^3 3-hour SO_2: 16.8 µg/m^3	Gaseous pollutant background concentrations were determined using the Northwest International Air Quality Environmental Science and Technology Consortium (NW AIRQUEST) online tool. The NW AIRQUEST tool uses regional scale modeling of pollutants in Washington, Oregon, and Idaho, with model results adjusted according to available monitoring data.
Medium-Traffic Background Concentrations. To provide additional information regarding the relative contribution of traffic emissions, background concentrations were obtained from NW AIRQUEST for the road section between mile markers 143 and 144 on Highway 55 passing through the town of McCall.	The McCall location is approximately 38 miles west of the SGP. The annual average daily traffic count for this road section is over 10,000 vehicles per day. Although the background concentrations at McCall are not representative of the rural SGP area, they provide additional information regarding the relative contribution of traffic emissions.
Weight-of-Evidence Analyses for 24-hour PM_{10}. PM_{10} modeling with meteorological dataset processed using the site-specific BULKRN method shows up to five hotspot receptors for Scenario W5 (the highest PM_{10} modeling scenario) that exceed NAAQS. All modeled violations occur during winter when the average snow depth and average precipitation at the project site are 21-68 inches and 6.0 inches, respectively. Therefore, fugitive road dust emissions during high-modeled impact hours could be overestimated. PM_{10} modeling simulation was based on a mining production rate of 180,000 ton/day of development rock (6~~2~~5,700,000 ton/year, which is more conservative than the expected peak production rate of 42,692,000 ton/year). To investigate the effect of a lower modeled mining production rate on design value concentrations, DEQ performed a modeling simulation where mining production rate was assumed to be 120,000 ton/day instead of 180,000 ton/day, but everything else was held constant. Maximum modeled concentration, when summed with the background concentration, is lower than the 24-hour PM_{10} NAAQS thereby demonstrating NAAQS compliance. DEQ's weight-of-evidence analyses conclude that, considering all the collective conservative layers of the modeling analyses, including the use of meteorological data processed by two different methods, there is a satisfactory level of confidence that operation of the project as described in the application will not cause or contribute to a violation of NAAQS.	Meteorological data processing with and without BULKRN are considered acceptable by EPA, with the BULKRN method utilizing more of the onsite collected meteorological parameters. However, the BULKRN-processed meteorological data yielded higher modeled design value impacts for the SGP facility than the meteorological data processed without the BULKRN method. DEQ's supplemental analyses suggest that when emissions are more-closely representative of typical daily mining production rates for a high-production period (everything else held constant), the SGP facility is able to demonstrate compliance with 24-hour PM_{10} NAAQS at those few receptors showing a potential violation when using meteorological data processed with the BULKRN method.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES.	
Criteria/Assumption/Result	Explanation/Consideration

[a] Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
[b] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
[c] Carbon monoxide.
[d] Nitrogen oxides.
[e] Sulfur dioxide.

Summary of Submittals and Actions

May 30, 2019	Modeling protocol was submitted to DEQ by Brown and Caldwell on behalf of the applicant.
June 27, 2019	Conditional modeling protocol approval was provided to Brown and Caldwell by DEQ.
August 21, 2019	Regulatory start date. PTC application and modeling report were prepared by Air Sciences on behalf of the applicant.
September 19, 2019	Application deemed incomplete by DEQ.
October 4, 2019	DEQ received a preliminary response and supplemental information from the applicant.
October 15, 2019	DEQ met with the applicant to review and discuss the preliminary response.
October 22, 2019	DEQ determined that the application remained incomplete while the applicant prepared a response to remaining items previously identified, and included a summary of recommendations provided at the meeting.
November 8, 2019	DEQ requested additional information from the applicant via e-mail, relating to items previously identified.
November 21, 2019	Applicant requested extension until November 27, 2019 to respond to incompleteness.
November 27, 2019	DEQ received supplemental information from the applicant, including a revised application with updated emission inventories and modeling analyses.
December 24, 2019	DEQ determined that the application was incomplete.
January 8, 2020	Applicant requested extension until February 7, 2020 to respond to incompleteness.
February 5, 2020	DEQ received supplemental information from the applicant, including a revised application with updated emission inventories and modeling analyses.
March 6, 2020	DEQ determined that the application was incomplete.
April 2, 2020	Applicant requested extension until April 15, 2020 to respond to incompleteness.

April 15, 2020	DEQ received supplemental information from the applicant, including updated modeling analyses.
May 15, 2020	DEQ determined that the application was complete.
June 24, 2020	DEQ received the final updated application.

2.0 Background Information

This section provides background information applicable to the project and the site proposed for the facility. It also provides a brief description of the applicable air impact analyses requirements for the project.

2.1 Project Description

The SGP will require the construction of significant infrastructure, including a power transmission line, a primary mine site access road, onsite haul roads, an ore processing facility, onsite workspaces, employee housing and recreation, water storage and distribution facilities, and sewage disposal facilities.

The SGP will include three years of pre-mining development and construction activities, followed by an operating mine life of approximately 12 years. Mining will occur in three open pits: Yellow Pine Pit (YPP), Hangar Flats Pit (HFP), and West End Pit (WEP). The general sequence of mining will be the YPP deposit, followed by the HFP and WEP deposits. Legacy tailings from the Meadow Creek valley (Bradley Tailings [BT]) also will be reclaimed and reprocessed during the initial project schedule. Surface exploration drilling will continue within the pits and the Scout Prospect decline (underground exploration) throughout the mine operation period. Restoration and reclamation of other legacy mining features will occur prior to mining, throughout the life of the mine, and as part of the mine closure.

Conventional open-pit methods including drilling, blasting, excavating, and hauling will be used to extract ore and waste rock, termed development rock (DR). Hydraulic shovels and front-end loaders will be used to load ore and DR into haul trucks. DR will be used for construction, restoration, and backfilling, or hauled to the dedicated development rock storage facilities (DRSF). Approximately 340 million tons of DR will be handled over the life of the mine. Ore will be hauled to the primary crusher area, where it will be fed directly into the crusher dump pocket or stockpiled. The ore crushing plant will be designed to operate at a maximum rate of 25,000 tons per day (ton/day). Approximately 100 million tons of ore will be mined from the three pits over the life of the project.

The metal-recovery process from ore will include conventional crushing and grinding, followed by froth-flotation circuits that will generate separate gold-silver and antimony-silver concentrates. The antimony-silver concentrate will be shipped offsite for refining, whereas additional onsite processing of the gold-silver concentrate will include pressure oxidation, carbon-in-leach circuits, and refining processes to recover gold and minor amounts of silver. The finely ground leftover ore material from the mineral-recovery process, termed tailings, will be neutralized, thickened, and transported via a pipeline to the tailings storage facility (TSF).

Lime used in the ore processing will either be purchased or manufactured onsite from limestone available at the site. In addition, certain construction and maintenance activities during operations may require sized aggregate. To allow for the operational flexibility to produce construction aggregate onsite, the application included two portable crushing and screening plants.

The following air pollutants are expected from operations at the SGP facility:

- Criteria air pollutants: carbon monoxide (CO), oxides of nitrogen (NOx), particulate matter less than 2.5 microns (µm) and 10 µm ($PM_{2.5}$ and PM_{10}), sulfur dioxide (SO_2), lead (Pb), and ozone (O_3) precursor volatile organic compounds (VOC)
- Hazardous air pollutants (HAP), including mercury (Hg)
- Other non-HAP toxic air pollutants (TAP)
- Greenhouse gases

The potential emissions from the SGP are less than the applicable major source thresholds for both criteria (100 ton/yr per pollutant) and hazardous air pollutants (HAP) (25 ton/yr aggregate and 10 ton/yr per single HAP); therefore, it is expected to be designated a minor source for Title V and New Source Review (NSR) (applicable threshold is 250 ton/yr per criteria pollutant) requirements and an area source for National Emission Standards for Hazardous Air Pollutants (NESHAP) applicability.

The PTC addresses all air pollutant-emitting activities associated with the facility.

2.2 Facility Location and Area Classification

The SGP is located in the Stibnite-Yellow Pine Mining District in Valley County, central Idaho (Northing: 4,973,751 meters [m]; Easting: 632,038 m; UTM Zone 11), approximately 100 miles northeast of Boise, 38 miles east of McCall, and approximately 10 miles east of Yellow Pine. A facility location map for the SGP is presented in Figure 1. This figure also shows the proposed Burntlog Route (access road) that will provide a year-round safe access to the site. The SGP site layout is presented in Figure 2.

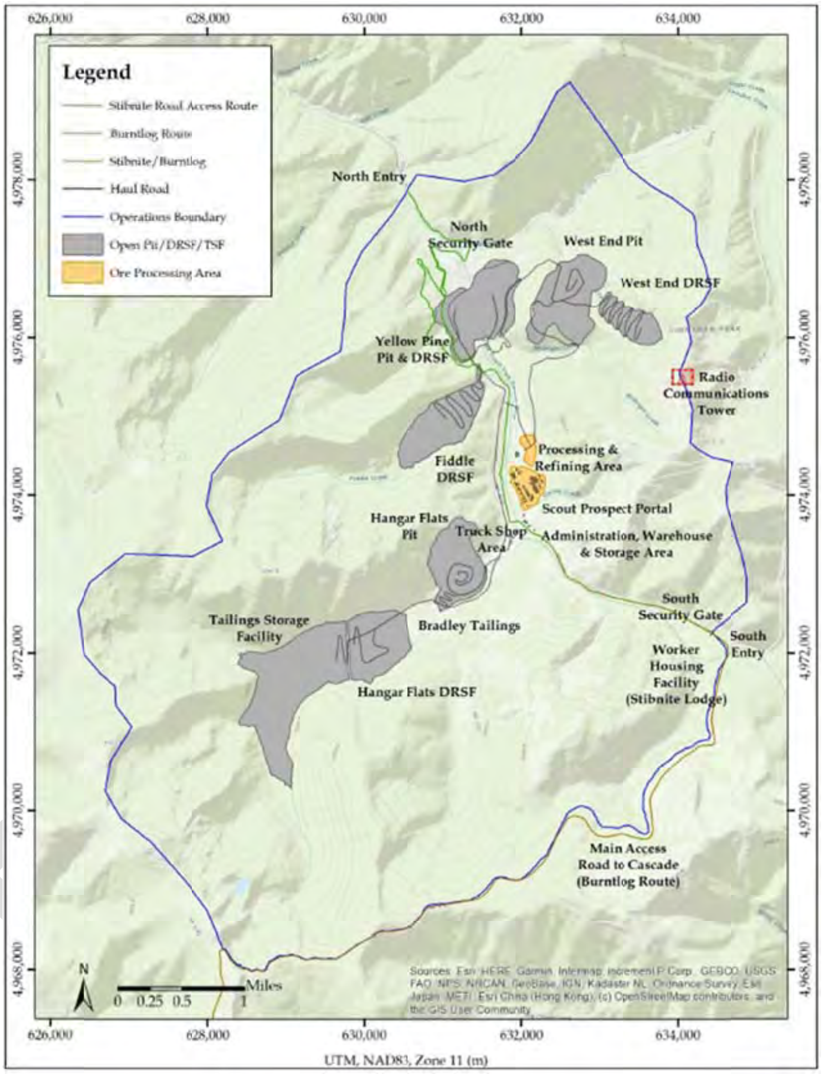
The Stibnite-Yellow Pine Mining District is characterized by historic mining activities and unpatented (federal land) and patented (private land) mining claims that include deposits of gold, silver, tungsten, and antimony. The district lies in both Boise National Forest (BNF) and Payette National Forest (PNF), but is administered by the PNF's Krassel Ranger District (Midas Gold 2017a). The project area terrain is characterized by narrow valleys 6,000 to 6,600 feet above mean sea level (amsl), surrounded by steep mountains ranging over 8,500 feet amsl. The main drainage basin in the project area is the East Fork of the South Fork of the Salmon River (EFSFSR).

The EFSFSR joins Johnson Creek 16 miles downstream, near the village of Yellow Pine. The project area is encompassed by the watersheds of EFSFSR tributaries, including Sugar Creek, Meadow Creek, Johnson Creek, Riordan Creek, Burntlog Creek, Midnight Creek, and Trout Creek. Primary commercial activity in the area comprises mineral exploration, mining, logging, and dispersed recreation.

This area is designated as an attainment or unclassifiable area for SO_2, NO_2, CO, Lead, O_3, PM_{10}, and $PM_{2.5}$. The area is not classified as non-attainment for any criteria pollutants.

Figure 1. SGP FACILITY LOCATION MAP.

Figure 2. SGP SITE LAYOUT AND STIBNITE ROAD ACCESS ROUTE.



2.3 Air Impact Analyses Required for All Permits to Construct

Idaho Air Rules Sections 203.02 and 203.03:

No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:

***02. NAAQS**. The stationary source or modification would not cause or significantly contribute to a violation of any ambient air quality standard.*

***03. Toxic Air Pollutants.** Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Atmospheric dispersion modeling, using computerized simulations, is used to demonstrate compliance with both NAAQS and TAPs. Idaho Air Rules Section 202.02 states:

***02. Estimates of Ambient Concentrations**. All estimates of ambient concentrations shall be based on the applicable air quality models, data bases, and other requirements specified in 40 CFR 51 Appendix W (Guideline on Air Quality Models).*

2.4 Significant Impact Level and Cumulative NAAQS Impact Analyses

If specific criteria pollutant emission increases associated with the proposed permitting project cannot qualify for a BRC exemption as per Idaho Air Rules Section 221, then the permit cannot be issued unless the application demonstrates that applicable emission increases will not cause or significantly contribute to a violation of NAAQS, as required by Idaho Air Rules Section 203.02.

The first phase of a NAAQS compliance demonstration is to evaluate whether the proposed facility/project could have a significant impact to ambient air. Section 3.1.1 of this memorandum describes the applicability evaluation of Idaho Air Rules Section 203.02. The Significant Impact Level (SIL) analysis for a new facility or proposed modification to a facility involves modeling estimated criteria air pollutant emissions from the facility or modification to determine the potential impacts to ambient air. Air impact analyses are required by Idaho Air Rules to be conducted in accordance with methods outlined in Appendix W. Appendix W requires that facilities be modeled using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

A facility or modification is considered to have a significant impact on air quality if maximum modeled impacts to ambient air exceed the established SIL listed in Idaho Air Rules Section 006 (referred to as a "significant contribution" in Idaho Air Rules) or as incorporated by reference as per Idaho Air Rules Section 107.03.b. Table 2 lists the applicable SILs.

Table 2. APPLICABLE REGULATORY LIMITS.

Pollutant	Averaging Period	Significant Impact Levels[a] (μg/m³)[b]	Regulatory Limit[c] (μg/m³)	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	0.2	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 μg/m³)	75 ppb[p] (196 μg/m³)	Mean of maximum 4th highest[q]
	3-hour	25	1,300[m]	Maximum 2nd highest[n]
Nitrogen Dioxide (NO_2)	1-hour	4 ppb (7.5 μg/m³)	100 ppb[s] (188 μg/m³)	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]	70 ppb[w]	Not typically modeled

a. Idaho Air Rules Section 006 (definition for significant contribution) or as incorporated by reference as per Idaho Air Rules Section 107.03.b.
b. Micrograms per cubic meter.
c. Incorporated into Idaho Air Rules by reference, as per Idaho Air Rules 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.

If modeled maximum pollutant impacts to ambient air from the emission sources associated with a new facility or modification exceed the SILs, then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with NAAQS and Idaho Air Rules Section 203.02.

A cumulative NAAQS impact analysis for attainment area pollutants involves assessing ambient impacts (typically the design values consistent with the form of the standard) from potential/allowable emissions resulting from the project and emissions from any nearby co-contributing sources (including existing emissions from the facility that are unrelated to the project), and then adding a DEQ-approved background concentration value to the modeled result that is appropriate for the criteria pollutant/averaging-period at the facility location and the area of significant impact. The resulting pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. Table 2 also specifies the modeled design value that must be used for comparison to the NAAQS. NAAQS compliance is evaluated on a receptor-by-receptor basis for the modeling domain.

If the cumulative NAAQS impact analysis indicates an exceedance of NAAQS, a culpability analysis can determine if this exceedance is due to emissions from the proposed project. The permit may not be issued if the proposed project has a significant contribution (exceeding the SIL) to the modeled violation. If project-specific impacts are below the SIL, then the project does not have a significant contribution to the specific violations.

Compliance with Idaho Air Rules Section 203.02 is generally demonstrated if: a) applicable specific criteria pollutant emission increases are at a level defined as BRC, using the criteria established by DEQ regulatory interpretation (DEQ 2014); or b) all modeled impacts of the SIL analysis are below the applicable SIL or other level determined to be inconsequential to NAAQS compliance; or c) modeled design values of the cumulative NAAQS impact analysis (modeling all emissions from the facility and co-contributing sources, and adding a background concentration) are less than applicable NAAQS at receptors where impacts from the proposed facility/modification exceeded the SIL or other identified level of consequence; or d) if the cumulative NAAQS analysis showed NAAQS violations, the impact of proposed facility/modification to any modeled violation was inconsequential (typically assumed to be less than the established SIL) for that specific receptor and for the specific modeled time when the violation occurred.

2.5 Toxic Air Pollutant Analyses

Emissions of toxic substances are generally addressed by Idaho Air Rules Section 161:

> *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.*

Permitting requirements for toxic air pollutants (TAPs) from new or modified sources are specifically addressed by Idaho Air Rules Section 203.03 and require the applicant to demonstrate to the satisfaction of DEQ the following:

> *Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Per Section 210, if the total project-wide emission increase of any TAP associated with a new source or modification exceeds screening emission levels (ELs) of Idaho Air Rules Section 585 or 586, then the ambient impact of the emission increase must be estimated. If ambient impacts are less than applicable Acceptable Ambient Concentrations (AACs) for non-carcinogens of Idaho Air Rules Section 585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) of Idaho Air Rules Section 586, then compliance with TAP requirements has been demonstrated.

Idaho Air Rules Section 210.20 states that if TAP emissions from a specific source are regulated by the Department or EPA under 40 CFR 60, 61, or 63, then a TAP impact analysis under Section 210 is not required for that TAP. The DEQ permit writer evaluates the applicability of specific TAPs to the Section 210.20 exclusion.

3.0 Analytical Methods and Data

This section describes the methods and data used in the analyses to demonstrate compliance with applicable air quality impact requirements. The DEQ Statement of Basis provides a discussion of the methods and data used to estimate criteria and TAP emission rates.

3.1 Emission Source Data

Emissions of criteria pollutants and TAPs resulting from operation of the SGP facility were estimated by

Air Sciences for various applicable averaging periods. The calculation of potential emissions is the responsibility of the DEQ permit writer, and the representativeness and accuracy of emission estimates is not addressed in this modeling memorandum. DEQ air impact analysts are responsible for assuring that potential emission rates provided in the emission inventory are properly used in the model. The rates listed must represent the maximum allowable rate as averaged over the specified period.

Emission rates used in the impact modeling applicability analyses and any modeling analyses, as listed in this memorandum, should be reviewed by the DEQ permit writer and compared with those in the final emission inventory. All modeled criteria air pollutant and TAP emission rates must be equal to or greater than the facility's potential emissions calculated in the PTC emission inventory or proposed permit allowable emission rates.

Emissions from unpaved roads were calculated based on a control efficiency of 90% from chemical application and 33% from watering (combined control efficiency above 93%). Emission controls and emission calculations are not reviewed in this modeling memorandum. However, it is critical for NAAQS compliance that this high level of control be achieved.

Activity-specific (e.g., drilling, blasting, material crushing and conveying, refining, and other ancillary sources) emissions were estimated based on maximum activity rates, coupled with applicable emission estimation techniques. Maximum emissions were calculated on a short-term (hourly and daily) and long-term (annual) basis for ore processing and mining operations, as discussed below.

The ore-processing rate will range from 20,000 ton/day to 25,000 ton/day at full production. Therefore, maximum potential daily ore processing emissions were based on the maximum design rate of 25,000 ton/day. Maximum potential annual emissions were based on potential daily emissions multiplied by 365 days per year.

Emissions from mining operations (drilling, blasting, material extraction and movement, mobile mine machinery use, and other ancillary sources) vary for each year of the life of the mine (LOM). However, for the modeling analyses, the mining operation potential emissions were estimated using conservatively high maximum activity rates provided in Table 3.

Table 3. MINING ACTIVITY RATES FOR POTENTIAL EMISSION CALCULATIONS.

Activity	Maximum Rate		Comments
Drilling	600	holes per blast	--
Blasting	2	blasts per day	--
	1	blast per hour	--
Material extraction and hauling	180,000	tons per day	Ore or DR
Onsite dozing	144	hours per day	6 dozers operating continuously
Onsite grading	72	hours per day	3 graders operating continuously
Onsite water trucking	48	hours per day	2 trucks operating continuously

The potential hourly emission rates for ore processing and mining operation activities were calculated by dividing the daily rate by the 24 hour-per-day operation schedule, and annual rates were calculated by multiplying maximum daily emissions with 365 days per year. This is conservative because the mine is expected to operate for only 355 days per year.

The maximum mine production rate is approximately 42.7 million (MM) tons per year (ton/yr); however, a maximum daily production rate of 180,000 ton/day used for potential emission calculations results in a conservatively higher production rate of approximately 65.7 MMton/yr, approximately 50 percent higher than the projected production rate.

Midas Gold will employ newer model year mining and maintenance machines (excavators, shovels, haul trucks, dozers, graders, portable light plants, etc.) that are expected to meet or exceed applicable regulatory emission standards. Non-road mobile equipment engines are exempt from permitting requirements; therefore, the tailpipe emissions resulting from fuel combustion in the non-road mobile equipment are not quantified for the SGP facility. Background concentrations from McCall, 38 miles west of the SGP, were used in the cumulative NAAQS impact analyses (Section 4.1.2) to conservatively account for the impact contribution of traffic emissions.

The approximately 38-mile long Burntlog Route mine access road will be outside the project ambient air boundary and open to the public. Traffic emissions on public roads generally are considered to be part of background concentrations. Therefore, emissions on the Burntlog Route mine access road that are outside of the project boundary are not included in the SGP analyses. However, the emissions associated with the portion of the Burntlog Route mine access road that is within project boundary (from the south gate to the process area) are included in the SGP analyses. These include dust emissions generated from travel of maintenance equipment, light-duty pickup trucks and buses used for employee, visitor, and contractor transportation, and heavy-duty trucks used for cargo (including fuel, consumables, machine parts, ore processing supplies, ore concentrate, etc.) and services (including food supplies, trash, recyclables, etc.) transportation.

3.1.1 Criteria Pollutant Modeling Applicability and Modeled Emission Rates

If project-specific emission increases for criteria pollutants would qualify for a BRC permit exemption as per Idaho Air Rules Section 221 if it were not for potential emissions of one or more pollutants exceeding the BRC threshold of 10 percent of emissions defined by Idaho Air Rules as significant, then a NAAQS compliance demonstration may not be required for those pollutants with emissions below BRC levels. DEQ's regulatory interpretation policy of exemption provisions of Idaho Air Rules is that: "*A DEQ NAAQS compliance assertion will not be made by the DEQ modeling group for specific criteria pollutants having a project emissions increase below BRC levels, provided the proposed project would have qualified for a Category I Exemption for BRC emissions quantities except for the emissions of another criteria pollutant*" (DEQ 2014). The interpretation policy also states that the exemption criteria of uncontrolled potential to emit (PTE) not to exceed 100 ton/year (Idaho Air Rules Section 220.01.a.i) is not applicable when evaluating whether a NAAQS impact analyses is required. A permit will be issued limiting PTE below 100 ton/year, thereby negating the need to maintain calculated uncontrolled PTE under 100 ton/year. The BRC exemption cannot be used to exempt a project from a pollutant-specific NAAQS compliance demonstration in most cases where a PTC is required for the action regardless of emission quantities, such as the modification of an existing emission or throughput limit.

A NAAQS compliance demonstration must be performed for pollutant increases that would not qualify for the BRC exemption from the requirement to demonstrate compliance with NAAQS.

Site-specific air impact modeling analyses may not be necessary for some pollutants, even where such emissions do not qualify for the BRC exemption. DEQ has developed modeling applicability thresholds, below which a site-specific modeling analysis is not required. DEQ generic air impact modeling analyses that were used to develop the modeling thresholds provide a conservative SIL analysis for projects with emissions below identified threshold levels. Project-specific modeling applicability thresholds are provided in the *Idaho Air Modeling Guideline* (DEQ 2013). These thresholds were based on assuring an ambient impact of less than the established SIL for specific pollutants and averaging periods.

If total project-specific emission rate increases of a pollutant are below Level I Modeling Applicability Thresholds, then project-specific air impact analyses are not necessary for permitting. Use of Level II Modeling Applicability Thresholds is conditional, requiring DEQ approval. DEQ approval is based on dispersion-affecting characteristics of the emission sources such as stack height, stack gas exit velocity, stack gas temperature, distance from sources to ambient air, presence of elevated terrain, and potential exposure to sensitive public receptors.

For the SGP analyses, several modeling scenarios were considered to evaluate the worst-case air impacts from the SGP facility. The different modeling scenarios are discussed in Section 3.1.3. Table 4 provides a comparison between facility-wide maximum PTE and modeling applicability thresholds. The short-term and long-term PTE emissions are equal to the sum of process and ancillary emissions and mining fugitive emissions. It is important to note that the process and ancillary source emissions remain the same for each modeling scenario discussed in Section 3.1.3.

Table 4. SITE-SPECIFIC CRITERIA POLLUTANT MODELING APPLICABILITY.

Source Category	Carbon Monoxide (CO)	Nitrogen Oxides (NOx)		$PM_{2.5}$[a]		PM_{10}[b]	Sulfur Dioxide (SO_2)		Lead (Pb)
	lb/hr[c]	ton/yr[d]	lb/hr	ton/yr	lb/hr	lb/hr	ton/yr	lb/hr	lb/month[e]
Process and ancillary	33.5	37.9	55.4	36.4	13.4	21.7	6.5	1.88	0.0437
Mining fugitive	1,742.0	17.1	46.8	98.9	22.5	224.7	0.03	0.09	--
Total	1,775.5	55.0	102.2	135.3	35.9	246.4	6.5	1.97	0.0437
Level I threshold	15.0	1.2	0.2	0.35	0.054	0.22	1.2	0.21	14.0
Modeling required	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

a. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometer.
c. Pounds per hour.
d. Tons per year.
e. Pounds per month.

As indicated in Table 4, the SGP facility-wide maximum PTE are greater than the respective Level I thresholds for all criteria pollutants and averaging periods except for Pb. Therefore, modeling is triggered for applicable averaging periods for CO, NOx, $PM_{2.5}$, PM_{10}, and SO_2. Modeling is not required for Pb. The use of Level II modeling thresholds was not approved by DEQ for this project.

Tables 5-7 list criteria pollutant emission rates used in the cumulative NAAQS impact analyses for the worst-case modeling scenarios. Significant Impact Level (SIL) analyses were not performed. Based on the magnitude of the facility-wide emissions and preliminary modeling analyses, it was determined that the impacts from the SGP emissions exceeded the SIL for most criteria pollutants. Therefore, SIL analyses were considered redundant and not performed for this report. Table 5 lists the source-specific modeled emission rates for 24-hour and annual $PM_{2.5}$ and 24-hour PM_{10} (worst-case modeling scenario: W5). Table 6 lists the source-specific modeled emission rates for 1-hour and 8-hour CO and annual NO_2 (worst-case modeling scenario: W1). Table 7 lists the source-specific modeled emission rates for 1-hour NO_2 and 1-hour and 3-hour SO_2 (worst-case modeling scenario: B1). Modeling scenarios are discussed in Section 3.1.3. For 1-, 3-, and 8-hour averaging times, hourly emission rates provided in pounds per hour were used. For 24-hour averaging time, daily emission rates provided in pounds per day were used. For the annual averaging time, annual emission rates provided in tons per year were used. All modeled emission rates in Tables 5-7 are listed in units of pounds per hour (lb/hr). The total modeled input emission rates (highest emission scenario) are listed in Table 8.

Table 5. MODELED 24-HR PM_{10}, 24-HR $PM_{2.5}$, AND ANNUAL $PM_{2.5}$ EMISSION RATES FOR CUMULATIVE NAAQS IMPACT ANALYSIS (WORST-CASE SCENARIO, W5).

Type of Source	Source ID	Description	24-hr PM_{10} (lb/hr)[a]	24-hr $PM_{2.5}$ (lb/hr)	Annual $PM_{2.5}$ (lb/hr)
Point Sources	LS1L	Mill Lime Silo #1 Loading	3.54E-03	5.21E-04	2.50E-05
	MILLS2L	Mill Lime Silo #2 Loading	3.54E-03	5.21E-04	2.50E-05
	SB1	Sb Dryer (2.72 MMBtu/hr Propane-Fired)	2.08E-02	2.08E-02	2.08E-02
	SB2	Sb Bagging	1.18E-01	1.18E-01	1.18E-01
	AC	Autoclave	5.08E+00	5.08E+00	5.08E+00
	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	5.42E-03	5.42E-03	4.45E-04
	ACS1L	AC Lime Silo #1 Loading	1.42E-02	2.08E-03	9.99E-05
	ACS2L	AC Lime Silo #2 Loading	1.42E-02	2.08E-03	9.99E-05
	ACS3L	AC Lime Silo #3 Loading	1.42E-02	2.08E-03	9.99E-05
	ACS4L	AC Lime Silo #4 Loading	7.08E-03	1.04E-03	4.99E-05
	CKD	Carbon Regeneration (Drum)	4.20E-01	4.20E-01	4.20E-01
	CKB	Carbon Regeneration (Kiln)	1.73E-02	1.73E-02	1.73E-02
	EW	Electrowinning Cells and Pregnant Solution Tank	7.00E-02	7.00E-02	7.00E-02
	MR	Mercury Retort	1.00E-02	1.00E-02	1.42E-03
	MF	Induction Melting Furnace	1.42E+00	1.42E+00	2.02E-01
	EDG1	Camp Emergency Generator (Mfr. Yr. >2007; diesel)	1.84E-02	1.84E-02	5.03E-03
	EDG2	Plant Emergency Generator #1 (Mfr. Yr. >2007; diesel)	1.84E-02	1.84E-02	5.03E-03
	EDG3	Plant Emergency Generator #2 (Mfr. Yr. >2007; diesel)	1.84E-02	1.84E-02	5.03E-03
	EDFP	Mill Fire Pump (Mfr. Yr. >2009; diesel)	3.67E-03	3.67E-03	1.01E-03
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	7.65E-04	7.65E-04	7.65E-04
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	3.83E-02	3.83E-02	3.83E-02
	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	3.06E-02	3.06E-02	3.06E-02
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	3.06E-02	3.06E-02	3.06E-02
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	3.06E-02	3.06E-02	3.06E-02
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	1.91E-03	1.91E-03	1.91E-03
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	1.91E-03	1.91E-03	1.91E-03
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	1.91E-03	1.91E-03	1.91E-03
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	3.83E-03	3.83E-03	3.83E-03
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	1.53E-02	1.53E-02	1.53E-02
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	2.30E-02	2.30E-02	2.30E-02
	PSL	Prill Silos Loading (2 x 100 ton)	5.83E-02	8.83E-03	8.83E-04
	CS1L	Cement/Shotcrete Silo #1 Loading	1.13E-03	1.67E-04	3.42E-04
	CS2L	Cement/Shotcrete Silo #2 Loading	1.13E-03	1.67E-04	3.42E-04
	LS6	Limestone transfer to Ball Mill Feed Bin	5.18E-02	8.00E-03	6.17E-03
	LSBM	Limestone Ball Mill	1.60E+00	5.70E-01	4.39E-01

	LS9	Limestone transfer to Kiln Feed Bin	1.22E-02	1.89E-03	1.60E-03
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	9.15E-01	9.15E-01	7.77E-01
	LKC	PFR Shaft Lime Kiln Combustion	1.69E-01	1.69E-01	1.43E-01
	LCR	Lime Mill Crushing and associated transfers In and Out	2.39E-01	8.52E-02	7.23E-02
	LSL	Pebble Lime Silo Loading via Bucket Elevator	6.20E-03	6.20E-03	5.26E-03
Area Sources	WEP	West End Pit	3.69E+01	3.32E+00	3.32E+00
	UGEXP	Underground Exploration	1.66E-04	2.51E-05	2.51E-05
Line Sources	AR01	Access Road within Operations Boundary	7.02E-02	7.02E-03	7.03E-03
	AR02	Access Road within Operations Boundary	5.39E-02	5.40E-03	5.41E-03
	AR03	Access Road within Operations Boundary	1.36E-01	1.36E-02	1.37E-02
	AR04	Access Road within Operations Boundary	1.31E-01	1.31E-02	1.31E-02
Volume Sources	WEPBL	West End Pit Blasting	1.39E+01	8.04E-01	8.04E-01
	WEDRSF	West End Pit Development Rock Storage Facility	2.38E+00	1.26E+00	1.26E+00
	OC1	Loader Transfer of Ore to Grizzly	4.79E-02	1.35E-02	1.35E-02
	OC2	Grizzly to Apron Feeder	4.79E-02	1.35E-02	1.35E-02
	OC3	Apron Feeder to Dribble Conveyor	4.79E-02	1.35E-02	1.35E-02
	OC4	Apron Feeder to Vibrating Grizzly	4.79E-02	1.35E-02	1.35E-02
	OC5	Dribble Conveyor to Vibrating Grizzly	4.79E-02	1.35E-02	1.35E-02
	OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	4.79E-02	1.35E-02	1.35E-02
	OC7	Primary Crusher and Associated Transfers out to Coarse Ore Stockpile Feed Conveyor	5.63E-01	1.04E-01	1.04E-01
	OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	4.79E-02	1.35E-02	1.35E-02
	OC9	Stockpile Transfers to Reclaim Conveyors	2.53E-01	3.91E-02	3.91E-02
	OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	2.53E-01	3.91E-02	3.91E-02
	OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	2.53E-01	3.91E-02	3.91E-02
	OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	6.21E-01	1.15E-01	1.15E-01
	OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	5.29E-02	1.50E-02	1.50E-02
	LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	2.92E-02	4.37E-03	2.10E-04
	MILLS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	2.92E-02	4.37E-03	2.10E-04
	ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	5.60E-02	8.00E-03	7.99E-04
	ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	5.60E-02	8.00E-03	7.99E-04
	ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	5.60E-02	8.00E-03	7.99E-04
	ACS42U	AC Lime Silo #4 Unloading to Lime Slaker	5.60E-02	8.00E-03	4.00E-04
	PSU	Prill Silos Unloading (2 x 100 ton)	5.83E-02	8.83E-03	8.83E-04
	CS1U	Cement/Shotcrete Silo #1 Unloading	9.33E-03	1.33E-03	2.74E-03
	CS2U	Cement/Shotcrete Silo #2 Unloading	9.33E-03	1.33E-03	2.74E-03
	CAL	Aggregate Bin Loading	3.30E-01	5.00E-02	2.85E-02
	CAU	Aggregate Bin Unloading	3.30E-01	5.00E-02	2.85E-02
	CM	Central Mixer Loading	1.83E-02	2.67E-03	5.48E-03
	PCSP1	Portable Crushing and Screening Plant 1	2.33E-01	3.04E-02	3.04E-02
	PCSP2	Portable Crushing and Screening Plant 2	2.33E-01	3.04E-02	3.04E-02
	LS1	Limestone transfer to Primary Crusher Hopper	5.18E-02	8.00E-03	6.17E-03
	LS2	Primary Crushing and Associated Transfers In and Out	1.13E-01	1.69E-02	1.31E-02
	LS3	Primary Screening and Associated	4.10E-01	6.21E-02	4.79E-02

		Transfers In and Out			
	LS4	Secondary Crushing and Associated Transfers In and Out	1.13E-01	1.69E-02	1.31E-02
	LS5	Secondary Screening and Associated Transfers In and Out	4.10E-01	6.21E-02	4.79E-02
	LS7	Limestone transfer to Ball Mill Feed Conveyor	5.18E-02	8.00E-03	6.17E-03
	LS8	Ball Mill Feed transfer to Ball Mill	5.18E-02	8.00E-03	6.17E-03
	LS10	Limestone transfer to Lime Kiln Feed Conveyor	1.22E-02	1.89E-03	1.60E-03
	LS11	Fines Screening and Associated Transfers In and Out	9.68E-02	1.47E-02	1.25E-02
	LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	1.22E-02	1.89E-03	1.60E-03
	LSU	Pebble Lime Silo discharge to Lime Slaker	6.20E-04	6.20E-04	5.26E-04
	HRT001-HRT072	Haul Road	9.09E-01	9.10E-02	9.11E-02
	HRN001-HRN022	Haul Road	9.09E-01	9.10E-02	9.11E-02

[a.] Pounds per hour.

Table 6. MODELED 1-HR and 8-HR CO and ANNUAL NO_2 EMISSION RATES FOR CUMULATIVE NAAQS IMPACT ANALYSIS (WORST-CASE SCENARIO, W1).

Type of Source	Source ID	Description	1-hr, 8-hr CO (lb/hr)[a]	Annual NO_2 (lb/hr)
Point Sources	SB1	Sb Dryer (2.72 MMBtu/hr Propane-Fired)	2.23E-01	3.86E-01
	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	1.39E+00	8.27E-03
	CKD	Carbon Regeneration (Drum)	1.20E-01	1.20E-02
	CKB	Carbon Regeneration (Kiln)	1.85E-01	3.20E-01
	EDG1	Camp Emergency Generator (Mfr. Yr. >2007; diesel)	7.72E+00	1.61E-01
	EDG2	Plant Emergency Generator #1 (Mfr. Yr. >2007; diesel)	7.72E+00	1.61E-01
	EDG3	Plant Emergency Generator #2 (Mfr. Yr. >2007; diesel)	7.72E+00	1.61E-01
	EDFP	Mill Fire Pump (Mfr. Yr. >2009; diesel)	1.54E+00	2.01E-02
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	8.20E-03	1.42E-02
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	4.10E-01	7.10E-01
	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	3.28E-01	5.68E-01
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	3.28E-01	5.68E-01
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	3.28E-01	5.68E-01
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	2.05E-02	3.55E-02
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	2.05E-02	3.55E-02
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	2.05E-02	3.55E-02
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	4.10E-02	7.10E-02
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	1.64E-01	2.84E-01
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	2.46E-01	4.26E-01

	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	3.17E+00	1.44E+00
	LKC	PFR Shaft Lime Kiln Combustion	1.81E+00	2.66E+00
Volume Source	WEPBL	West End Pit Blasting	1.74E+03	3.90E+00

a. Pounds per hour.

Table 7. MODELED 1-HR NO_2 AND 1-HR AND 3-HR SO_2 EMISSION RATES FOR CUMULATIVE NAAQS IMPACT ANALYSIS (WORST-CASE SCENARIO, B1).				
Type of Source	**Source ID**	**Description**	**1-hr NO_2 (lb/hr)[a]**	**1-hr, 3-hr SO_2 (lb/hr)**
Point Sources	SB1	Sb Dryer (2.72 MMBtu/hr Propane-Fired)	3.86E-01	4.73E-02
	AC	Autoclave	0.00E+00	6.53E-01
	ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	2.42E+00	2.95E-01
	CKD	Carbon Regeneration (Drum)	1.20E-02	0.00E+00
	CKB	Carbon Regeneration (Kiln)	3.20E-01	3.92E-02
	EDG1	Camp Emergency Generator (Mfr. Yr. >2007; diesel)	0.00E+00	1.45E-02
	EDG2	Plant Emergency Generator #1 (Mfr. Yr. >2007; diesel)	0.00E+00	1.45E-02
	EDG3	Plant Emergency Generator #2 (Mfr. Yr. >2007; diesel)	0.00E+00	1.45E-02
	EDFP	Mill Fire Pump (Mfr. Yr. >2009; diesel)	0.00E+00	2.90E-03
	PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	1.42E-02	1.74E-03
	HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	7.10E-01	8.69E-02
	H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	5.68E-01	6.95E-02
	H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	5.68E-01	6.95E-02
	HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	5.68E-01	6.95E-02
	HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	3.55E-02	4.34E-03
	HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	3.55E-02	4.34E-03
	HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	3.55E-02	4.34E-03
	HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	7.10E-02	8.69E-03
	HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	2.84E-01	3.48E-02
	HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	4.26E-01	5.21E-02
	LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	1.69E+00	8.45E-03
	LKC	PFR Shaft Lime Kiln Combustion	3.13E+00	3.83E-01
Volume Source	BTBL	Bradley Tailings Blasting	4.68E+01	9.36E-02

a. Pounds per hour.

Table 8. CRITERIA POLLUTANT TOTAL MODELED EMISSION RATES.		
Pollutant	**Averaging Time**	**Emissions[a]**

CO	8 hours	1,775.50	lb/hr
	1 hour	1,775.50	lb/hr
NO_2	1 year	54.93	ton/yr
	1 hour	58.07	lb/hr
$PM_{2.5}$	1 year	135.23	ton/yr
	24 hours	781.69	lb/day
PM_{10}	24 hours	5,768.93	lb/day
SO_2	3 hours	1.97	lb/hr
	1 hour	1.97	lb/hr

a. Combined process, ancillary, and fugitive emissions modeled. Fugitive emissions vary by pit scenario. Maximum pit scenario emissions are shown.

Ozone (O_3) differs from other criteria pollutants in that it is not typically emitted directly into the atmosphere. O_3 is formed in the atmosphere through reactions of VOCs, NOx, and sunlight. Atmospheric dispersion models used in stationary source air permitting analyses cannot be used to estimate O_3 impacts resulting from VOC and NOx emissions from an industrial facility. O_3 concentrations resulting from area-wide emissions are predicted by using more complex airshed models such as the Community Multi-Scale Air Quality (CMAQ) modeling system. Use of the CMAQ model is very resource-intensive and DEQ asserts that performing a CMAQ analysis for a particular permit application is not typically a reasonable or necessary requirement for air quality permitting.

Addressing secondary formation of O_3 within the context of permitting a new stationary source has been somewhat addressed in EPA regulation and policy. As stated in a letter from Gina McCarthy of EPA to Robert Ukeiley, acting on behalf of the Sierra Club (letter from Gina McCarthy, Assistant Administrator, United States Environmental Protection Agency, to Robert Ukeiley, January 4, 2012):

. . . footnote 1 to sections 51.166(I)(5)(I) of the EPA's regulations says the following: "No de minimis air quality level is provided for ozone. However, any net emission increase of 100 tons per year or more of volatile organic compounds or nitrogen oxides subject to PSD would be required to perform an ambient impact analysis, including the gathering of air quality data."

"The EPA believes it unlikely a source emitting below these levels would contribute to such a violation of the 8-hour ozone NAAQS, but consultation with an EPA Regional Office should still be conducted in accordance with section 5.2.1.c. of Appendix W when reviewing an application for sources with emissions of these ozone precursors below 100 TPY."

DEQ determined it was not appropriate or necessary to require a quantitative source-specific O_3 impact analysis because allowable emission estimates of VOCs and NOx are below the 100 tons/year threshold.

3.1.2 TAPs Modeling Applicability and Modeled Emission Rates

A comparison of the applicable non-carcinogenic and carcinogenic screening emission levels (EL) for the TAP from Idaho Administrative Procedures Act (IDAPA) 58.01.01, Sections 585 and 586, respectively, with applicable facility-wide maximum potential TAP emissions is provided in Table 9.

Table 9. TAP MODELING APPLICABILITY DETERMINATION.

HAP/TAP	Emissions (lb/hr)				EL (lb/hr)		Determination
	(a)	(b)	(c)	Total	(d)	(e)	
1,3-Butadiene	--	--	--	--	--	2.4E-5	EL not exceeded
3-Methylchloranthrene	1.2E-7	--	--	1.2E-7	--	2.5E-6	EL not exceeded
Acetaldehyde	--	--	--	--	--	3.0E-3	EL not exceeded

Acrolein	--	--	--	--	1.7E-2	--	EL not exceeded
Antimony	--	--	6.9E-2	6.9E-2	3.3E-2	--	Non-carcinogenic EL exceeded
Arsenic	1.3E-5	--	4.4E-3	4.4E-3	--	1.5E-6	Carcinogenic EL exceeded
Benzene	1.4E-4	--	--	1.4E-4	--	8.0E-4	EL not exceeded
Benzo(a)pyrene	7.9E-8	--	--	7.9E-8	--	2.0E-6	EL not exceeded
Beryllium	7.9E-7	--	2.2E-5	2.2E-5	--	2.8E-5	EL not exceeded
Cadmium	7.3E-5	--	4.1E-5	1.1E-4	--	3.7E-6	Carcinogenic EL exceeded
Carbon disulfide	--	--	1.4E-2	1.4E-2	2.0E+0	--	EL not exceeded
Chromium	9.2E-5	--	1.2E-4	2.1E-4	3.3E-2	--	EL not exceeded
Cobalt	5.5E-6	--	2.4E-5	2.9E-5	3.3E-3	--	EL not exceeded
Cyanide	--	--	2.2E-1	2.2E-1	3.3E-1	--	EL not exceeded
Dichlorobenzene	7.9E-5	--	--	7.9E-5	3.0E+1	--	EL not exceeded
Formaldehyde	5.0E-3	--	--	5.0E-3	--	5.1E-4	Carcinogenic EL exceeded
Hexane	1.2E-1	--	--	1.2E-1	1.2E+1	--	EL not exceeded
Manganese	2.5E-5	--	3.5E-2	3.5E-2	6.7E-2	--	EL not exceeded
Naphthalene	4.0E-5	--	--	4.0E-5	3.3E+0	--	EL not exceeded
Nickel	1.4E-4	--	2.9E-3	3.0E-3	--	2.7E-5	Carcinogenic EL exceeded
Phosphorus	--	--	6.1E-3	6.1E-3	7.0E-3	--	EL not exceeded
Selenium	1.6E-6	--	--	1.6E-6	1.3E-2	--	EL not exceeded
Toluene	2.2E-4	--	--	2.2E-4	2.5E+1	--	EL not exceeded
Xylene	--	--	--	--	2.9E+1	--	EL not exceeded
Barium	2.9E-4	--	4.7E-3	5.0E-3	3.3E-2	--	EL not exceeded
Copper	5.6E-5	--	2.9E-5	8.6E-5	6.7E-2	--	EL not exceeded
Hydrogen Sulfide	--	--	9.0E-1	9.0E-1	9.3E-1	--	EL not exceeded
Molybdenum	7.3E-5	--	5.9E-6	7.9E-5	3.3E-1	--	EL not exceeded
Pentane	1.7E-1	--	--	1.7E-1	1.2E+2	--	EL not exceeded
Silver	--	--	2.9E-6	2.9E-6	7.0E-3	--	EL not exceeded
Sulfuric Acid	--	--	2.0E+0	2.0E+0	6.7E-2	--	Non-carcinogenic EL exceeded
Thallium	--	--	5.9E-5	5.9E-5	7.0E-3	--	EL not exceeded
Uranium	--	--	5.9E-5	5.9E-5	1.3E-2	--	EL not exceeded
Vanadium	1.5E-4	--	--	1.5E-4	3.0E-3	--	EL not exceeded
Zinc	1.9E-3	--	--	1.9E-3	6.7E-1	--	EL not exceeded

a. HAP/TAP emissions from propane combustion.
b. HAP/TAP emissions from diesel combustion. Diesel engine HAP emissions are regulated by Code of Federal Regulations, Title 40, Part 63 (40 CFR 63), Subpart ZZZZ and therefore exempt from TAP analysis per IDAPA 58.01.01 Section 210.20.
c. HAP/TAP emissions from material processing.
d. Non-carcinogenic EL from IDAPA 58.01.01 Section 585.
e. Carcinogenic EL from IDAPA 58.01.01 Section 586.

Table 9 shows that the SGP facility-wide potential TAP emissions exceed the respective EL for antimony, arsenic, cadmium, formaldehyde, nickel, and sulfuric acid. Therefore, modeling was required for these six TAPs.

3.1.3 Modeling Scenarios

As discussed in Section 2.1, conventional open-pit methods will be used to extract ore and DR from three pits: YPP, HFP, and WEP, and legacy tailings from BT. Ore will be hauled to the crushing area, and the DR will be moved to four DRSF: Yellow Pine (YPDRSF), Hangar Flats (HFDRSF), West End (WEDRSF), and Fiddle (FDRSF). The SGP site layout provided later in Figure 4 shows these locations.

Midas Gold plans for an up to three-year construction schedule to build mine site facilities and infrastructure, as well as the power transmission line, followed by 12 years of mining operations (i.e., LOM Years 1 through 12). Depending on the mine design and operating schedule, mining activity rates will vary temporally and spatially during the 12 years of mine production and operation. For example, ore production varies from approximately 6.8 MMton in LOM Year 1 (67% in YPP, 26% in WEP, and 7% in

BT) to 9 MMton in LOM 3 (78% in YPP, 10% in BT, 7% in WEP, and 5% in HFP). Similarly, DR production varies from approximately 4.8 MMton in LOM Year 12 (100% in WEP) to 34 MMton in each of LOM Years 4 through 9, with varying distribution among the four DRSF for each LOM Year. The total material (ore and DR) production varies from approximately 12.5 MMton in LOM Year 12 to 42.7 MMton in LOM Year 4.

Similar to the material production, the distribution and hauling of DR to the four destinations (YPDRSF, HFDRSF, WEDRSF, FDRSF) also will vary for each LOM year. Depending on the material origin (pits and BT) and destination (crushing area and DRSF), material hauling distances also will vary for each LOM year.

Therefore, depending on material production rates and origin, DR destination, and hauling distances, mining emissions will vary spatially and temporally throughout the mine life. For permitting purposes, Midas Gold used a maximum production rate of 180,000 tons of material (ore and/or DR) per day, for an annual production rate of 65.7 MMton/yr. This annual production rate is more than 50% higher than the estimated maximum total material production rate of 42.7 MMton/yr.

In order to allow Midas Gold with operation flexibility and to capture variability in material origin and destination in the air quality analyses, several pit scenarios were developed for the SGP air quality analyses. Each pit scenario uses the maximum production rate of 180,000 ton/day in a single pit and uses a single material destination. Each pit has a dedicated ore scenario that assumes all material produced is ore and is hauled to the crusher area; and depending on mine design multiple DR destination scenarios each assuming all material produced is DR and is transported to a single DRSF. For example, most of the DR from HFP will be moved to HFDRSF and during LOM Years 2 through 10, but a fraction of this rock will be moved to FDRSF during LOM Years 3 and 8, and a fraction to YPDRSF during LOM Year 9. Therefore, in order to evaluate all hauling scenarios originating from HFP, the following four (one for ore hauling, three for DR hauling) HFP scenarios were modeled:

1. HFP Scenario 1 – 180,000 ton/day of ore produced and hauled to the crusher area
2. HFP Scenario 2 – 180,000 ton/day of DR produced and hauled to the FDRSF
3. HFP Scenario 3 – 180,000 ton/day of DR produced and hauled to the HFDRSF
4. HFP Scenario 4 – 180,000 ton/day of DR produced and hauled to the YPDRSF

Overall, 14 scenarios were modeled for $PM_{2.5}$ and PM_{10} analyses to cover all possible origin and destination combinations. Each modeling scenario included processing and ancillary source potential emissions. The multiple scenarios modeled for $PM_{2.5}$ and PM_{10} analyses are presented in Table 10. This table also shows the six origin/destination options that are not applicable to the SGP Project as denoted by "0 ton/day." These six scenarios are not feasible because the timing of the activity within the sequence of mine operations makes the scenarios logistically impossible.

Table 10. MODELING SCENARIOS FOR $PM_{2.5}$ AND PM_{10} ANALYSES.

Pit Scenario	Pit/Origin (ton/day)				Ore Destination (ton/day)	DR Destination (ton/day)			
	YPP	HFP	WEP	BT	STKP	FDRSF	HFDRSF	YPDRSF	WEDRSF
Y1	180,000	--	--	--	180,000	--	--	--	--
Y2	180,000	--	--	--	--	180,000	--	--	--
Y3	180,000	--	--	--	--	--	180,000	--	--
Y4	0	--	--	--	--	--	--	0	--
Y5	0	--	--	--	--	--	--	--	0
H1	--	180,000	--	--	180,000	--	--	--	--

H2	--	180,000	--	--	--	180,000	--	--	--
H3	--	180,000	--	--	--	--	180,000	--	--
H4	--	180,000	--	--	--	--	--	180,000	--
H5	--	0	--	--	--	--	--	--	0
W1	--	--	180,000	--	180,000	--	--	--	--
W2	--	--	180,000	--	--	180,000	--	--	--
W3	--	--	180,000	--	--	--	180,000	--	--
W4	--	--	180,000	--	--	--	--	180,000	--
W5	--	--	180,000	--	--	--	--	--	180,000
B1	--	--	--	180,000	180,000	--	--	--	--
B2	--	--	--	180,000	--	--	180,000	--	--
B3	--	--	--	0	--	0	--	--	--
B4	--	--	--	0	--	--	--	0	--
B5	--	--	--	0	--	--	--	--	0

Scenario Y4 is not applicable because the YPDRSF and the YPP are in the same area; therefore, the pit cannot be backfilled with development rock until after mining of the pit is completed. Scenarios Y5 and H5 are not applicable because the WEDRSF will only be utilized by the WEP because of its proximity; it is only accessible from the WEP. Scenarios B3, B4 and B5 are not applicable because the development rock from the BT will only be hauled to the HFDRSF because of its proximity. All other development rock storage facilities are significantly farther away from BT.

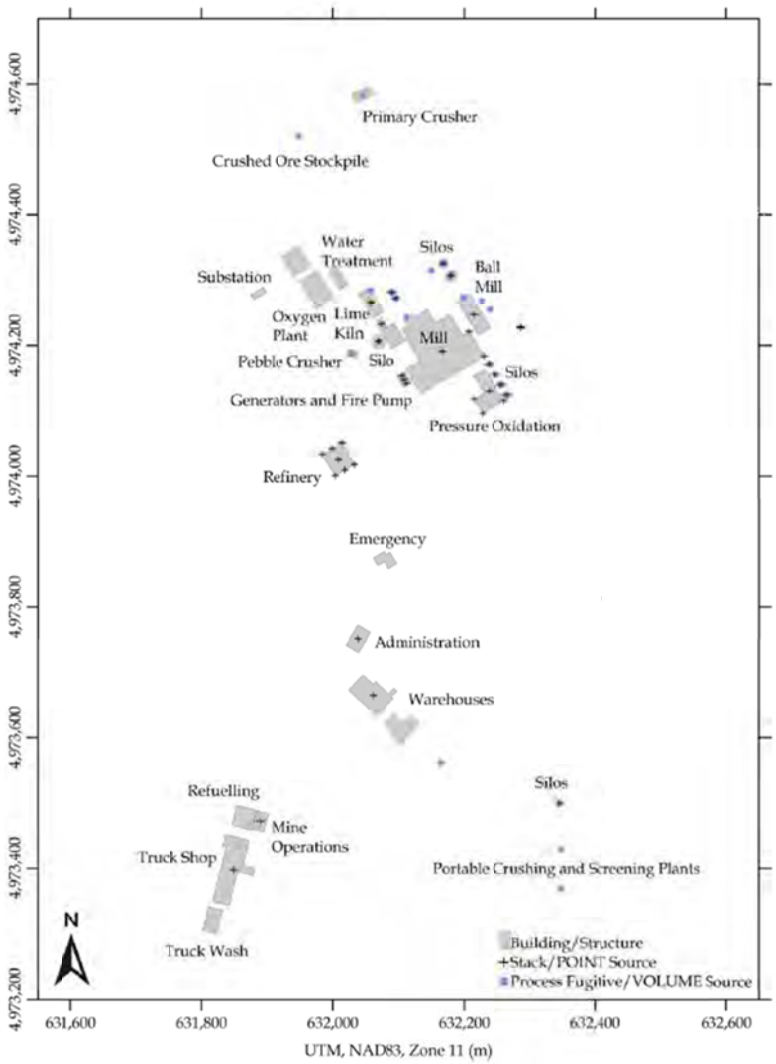
The fugitive CO, NO_2, and SO_2 emissions are limited to pits only, and they do not vary by ore and/or DR hauling and destinations. Therefore, for these pollutants, one scenario for each pit, including processing and ancillary source potential emissions, was modeled, i.e., scenarios Y1, H1, W1, and B1.

The TAP emissions are limited to processing and ancillary sources, so a single scenario was modeled for each applicable TAP analysis.

3.1.4 Processing, Refining, and Ancillary Sources

The processing, refining, and ancillary sources with exhaust stacks, such as baghouse-equipped sources, generators, process and building heaters, autoclave, retort, smelting furnace, carbon kiln, lime kiln, etc., were modeled as POINT sources. The process sources without exhaust stacks, such as material transfers, ore screening and crushing, etc., were modeled as VOLUME sources. A plot plan showing the processing and refining area buildings and sources is provided in Figure 3. Process and ancillary source model input parameters are provided later in Tables 14 and 15.

Figure 3. PROCESSING AND REFINING AREA BUILDING AND SOURCE LAYOUT.



3.1.5 Fugitive Sources: Blasting, Material Origin and Destination, and Underground Exploration Emissions

Blasting emissions were represented by a VOLUME source located inside a pit. Each material origin location (YPP, HFP, WEP, BT) was modeled as an AREA source and comprised appropriate emissions from drilling, material loading, dozing, and surface exploration. Ore destination (crusher area) was modeled as a VOLUME source and comprised ore unloading emissions. Each DR destination (FDRSF, HFDRSF, YPDRSF, WEDRSF) was modeled as a VOLUME source comprising appropriate emissions from DR unloading, dozing, and wind erosion. Emissions from underground core sampling drilling (UGEXP) in the Scout prospect decline were represented by an AREA source characterized by the portal opening dimensions.

Model input physical characteristics for blasting and possible material origin and destination locations, and Scout portal are presented in Table 11. This table also shows the source type and associated dimensions for each of the modeled fugitive source/location. The VOLUME source dimensions for blasting provided in Table 11 were based on an estimated blast area. For the remaining AREA and VOLUME sources listed in Table 11, the dimensions were developed by reasonably fitting an equal-area rectangle within the actual footprint of each fugitive source. Blasting is not expected to occur in BT. However, blasting emissions were modeled in BT (BTBL) in order to streamline the permitting process.

Table 11. MODELED FUGITIVE ACTIVITY LOCATIONS.

Model ID	Activity Location	Type	Lateral Dimensions (m)			Emission Sources
YPP	Yellow Pine Pit	AREA	882	×	882	Drilling, loading, dozing, surface exploration
HFP	Hangar Flats Pit	AREA	491	×	491	Drilling, loading, dozing, surface exploration
WEP	West End Pit	AREA	376	×	376	Drilling, loading, dozing, surface exploration
BT	Bradley Tailings	AREA	820	×	420	Loading, dozing, wind erosion
YPPBL	Yellow Pine Pit (Blasting)	VOLUME	87	×	87	Blasting
HFPBL	Hangar Flats Pit (Blasting)	VOLUME	87	×	87	Blasting
WEPBL	West End Pit (Blasting)	VOLUME	87	×	87	Blasting
BTBL	Bradley Tailings (Blasting)	VOLUME	87	×	87	Blasting
STKP	PC Stockpile	VOLUME	229	×	229	Unloading, dozing, wind erosion
FDRSF	Fiddle DRSF	VOLUME	775	×	775	Unloading, dozing, wind erosion
HFDRSF	Hangar Flats DRSF	VOLUME	752	×	752	Unloading, dozing, wind erosion
YPDRSF	Yellow Pine DRSF	VOLUME	784	×	784	Unloading, dozing, wind erosion
WEDRSF	West End DRSF	VOLUME	533	×	533	Unloading, dozing, wind erosion
UGEXP	Scout Portal	AREA	4.9	×	4.9	Sample core drilling

The model input physical parameters for blasting, material origin and destination locations, and Scout portal are provided in Table 12.

Table 12. MODEL INPUT PARAMETERS FOR FUGITIVE ACTIVITY LOCATIONS.

Model ID	Base Elevation (m)	Release Height (m)	Initial Lateral Dispersion (m)	Initial Vertical Dispersion (m)
YPP	1,832.4	4.7	N/A	4.4
HFP	1,993.3	4.7	N/A	4.4
WEP	2,191.8	4.7	N/A	4.4
BT	2,011.7	4.7	N/A	4.4
YPPBL	1,717.2	15.0	20.2	7.0
HFPBL	1,890.6	15.0	20.2	7.0
WEPBL	1,994.0	15.0	20.2	7.0

BTBL	2,011.7	15.0	20.2	7.0
STKP	1,979.8	4.7	53.3	4.4
FDRSF	2,115.2	4.7	180.2	4.4
HFDRSF	2,079.8	4.7	174.8	4.4
YPDRSF	1,904.1	4.7	182.2	4.4
WEDRSF	2,376.5	4.7	124.1	4.4
UGEXP	2,018.0	0	N/A	0

The blasting physical parameters were developed from dimensions (provided in Table 11) based on blast area used in the emission calculation. The blasting release height is the midpoint of the blasting height (30 m).

The initial lateral and vertical dispersion dimensions for blasting were calculated per methods specified in (EPA 2018c) for a volume source not on or adjacent to a building, as:

$$Initial\ Lateral\ Dispesion = \frac{Width\ (87\ m)}{4.3}$$

$$Initial\ Vertical\ Dispesion = \frac{Height\ (30\ m)}{4.3}$$

For the pit and DRSF fugitive activity locations listed in Table 11, i.e., YPP, HFP, WEP, BT, FDRSF, HFDRSF, and WEDRSF, the release height was based on the haul truck height (weighted based on model-specific usage) and calculated using the recommendations provided in the Haul Road Workgroup Report (EPA 2012), as:

$$Release\ Height = \frac{Plume\ Top\ (Weighted\ Truck\ Height \times 1.7)}{2}$$

The applicable initial lateral dispersion for each VOLUME source was calculated from the respective shorter dimension and EPA-specified methods (EPA 2018c) (EPA 2016) as follows:

$$Initial\ Lateral\ Dispesion = \frac{Short\ Lateral\ Dimension}{2.15}$$

The applicable initial vertical dispersion for each AREA and VOLUME source was calculated from the respective vertical dimension and EPA-specified methods (EPA 2018c) (EPA 2016) as follows:

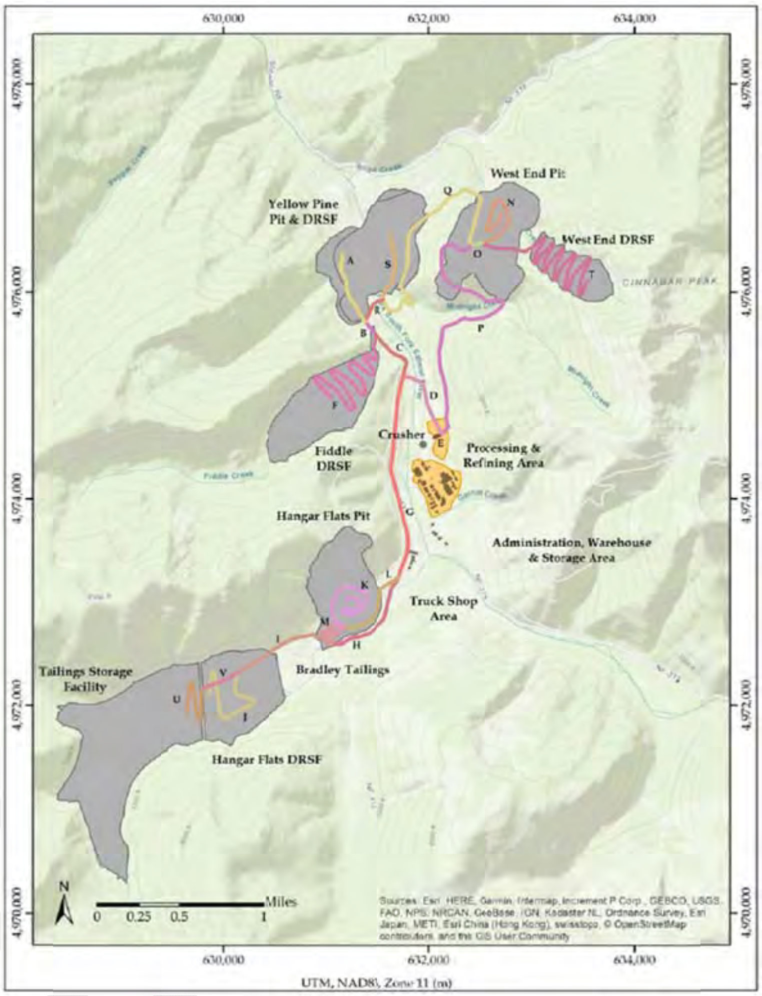
$$Initial\ Vertical\ Dispersion = \frac{Plume\ Top\ (Weighted\ Truck\ Height \times 1.7)}{2.15}$$

Scout portal was modeled as a surface-based AREA source with zero release height.

3.1.6 Fugitive Sources: Haul Roads

A representative haul road network for hauling material from inside the pit (or origin) to various destinations was developed for each pit scenario provided in Table 10. The haul road network is presented in Figure 4.

Figure 4. HAUL ROAD NETWORK AND SECTIONS.



As shown in Figure 4, the haul road network was divided into 22 sections, A through V. Each section was further divided into multiple segments with a length equal to twice the adjusted haul road width of 32.5 m (26 m road width plus 6 m (EPA 2012)). Each of the segments was characterized as an individual VOLUME source in the model, with a release height of 4.75 m (weighted-average truck height times 1.7, divided by 2 (EPA 2012)), an initial lateral dispersion of 15.1 m (adjusted road width divided by 2.15 (EPA 2012)), and an initial vertical dispersion of 4.42 m (weighted-average top-of-plume height divided by 2.15 (EPA 2012)). Material hauling emissions associated with each origin-destination route were assigned to each segment along the route based on estimated total emissions along the route and traffic distribution along each section, as provided in Table 13 for the four HFP scenarios.

Table 13. HAUL ROAD EMISSION DISTRIBUTION GRID FOR HFP SCENARIOS.					
Pit Scenario		**H1**	**H2**	**H3**	**H4**
Route: Origin-Destination		**HFP-STKP**	**HFP-FDRSF**	**HFP-HFDRSF**	**HFP-YPDRSF**
Segment Emission Denominator		96	148	87	115
Section	**No. of Segments**	**Traffic Distribution per Route**			
A	37	--	--	--	--
B	3	--	--	--	1
C	11	--	1	--	1
D	14	1	--	--	--
E	2	--	--	--	--
F	55	--	1	--	--
G	38	1	1	--	1
H	20	--	--	--	--
I	20	--	--	1	--
J	27	--	--	1	--
K	28	1	1	1	1
L	16	1	1	--	1
M	12	--	--	1	--
N	22	--	--	--	--
O	2	--	--	--	--
P	57	--	--	--	--
Q	49	--	--	--	--
R	6	--	--	--	1
S	13	--	--	--	1
T	72	--	--	--	--
U	19	--	--	--	--
V	7	--	--	--	--

The top row in Table 13 shows the pit scenarios, and the next two rows show hauling route and the associated segment emission denominator (SED) used to distribute segment emissions along each route. The remainder of Table 13 presents the number of segments for each road section (shown in Figure 4) and the associated traffic distribution factor for each route. The emission distribution for each applicable segment is illustrated in the following example.

For route: HFP–STKP (Hangar Flats pit to crusher stockpile), Figure 4 shows that material from HFP will be hauled to the crusher area following the route along Sections K, L, G, and D. All (100%) of the ore from HFP will travel on each of these sections; therefore, each of these sections has a traffic distribution factor of 1.0 for this route.

The SED for each route is the sum-product of the number of segments and traffic distribution for the applicable sections. The SED for the HFP–STKP route is calculated as:

$$SED_{(HFP-STKP)} = (28 \times 1) + (16 \times 1) + (38 \times 1) + (14 \times 1) = 96$$

Emissions for each section-segment were estimated by dividing the total emissions along the route by its SED and multiplying by the section distribution factor. For example, the emission rate for each of the 28 segments along Section K was calculated as:

$$Emission\ Rate - Section\ K_{(Segments\ 1-28)} = \frac{Total\ Emissions_{(HFP-STKP)}}{96} \times 1$$

3.1.7 Fugitive Sources: Burntlog Route Access Road

The access road portion within the operations boundary was characterized by a series of LINE sources laid along the actual route. Emissions associated along this access road include dust emissions generated from travel of maintenance equipment, light-duty pickup trucks and buses used for employee, visitor, and contractor transportation, and heavy-duty trucks used for cargo and services transportation. These sources were assigned a release height of 3 m and an initial vertical dispersion of 2.8 m. These release parameters were based on an estimated average vehicle height of 3.5 m, which is representative of an overall approximation of anticipated vehicle heights (grader – 3.7 m, heavy-duty truck – 3.6 m, and pickup truck – 3.2 m) and the AREA source parameterization recommendations provided in the Haul Road Workgroup Report (EPA 2012). The AERMOD emission input units for AREA source are grams per meter square. The access road emissions were evenly distributed along the road by dividing the total access road emissions by its total area, i.e., the Burntlog Route section within the operations boundary (2,950 m) multiplied by the road width (6.1 m).

3.1.8 Emission Release Parameters

Table 14 lists the emission release parameters, including stack height, exhaust temperature, exhaust velocity, and stack diameter for SGP's process and ancillary point sources in metric units (English units are in parentheses). Table 15 lists the emission release parameters for SGP's process and ancillary volume sources in metric units (English units are in parentheses). Emission release parameters were based on information provided in the application. Justification for emission release parameters is summarized in the next section.

Table 14. PROCESS AND ANCILLARY POINT SOURCE EMISSION RELEASE PARAMETERS IN METRIC UNITS (ENGLISH UNITS IN PARENTHESES).

Release Point	Description	UTM[a] Coordinates		Stack Height in m (ft)[c]	Stack Exhaust Temp. in K (°F)[d]	Stack Exhaust Velocity in m/sec (fps)[e]	Stack Diameter in m (ft)	Orient. Of Release[f]
		Easting-X in m[b]	Northing-Y in m					
LS1L	Mill Lime Silo #1 Loading	632,095	4,974,272	13.3 (43.7)	0.0 (-459.7)	18.1 (59.4)	0.15 (0.49)	D
MillS2L	Mill Lime Silo #2 Loading	632,090	4,974,282	13.3 (43.7)	0.0 (-459.7)	18.1 (59.4)	0.15 (0.49)	D
SB1	Sb Dryer (2.72 MMBtu/hr Propane-Fired)	632,231	4,974,183	45.7 (150.0)	455.4 (360.0)	6.9 (22.8)	0.30 (0.98)	D
SB2	Sb Bagging	632,208	4,974,221	45.7 (150.0)	0.0 (-459.7)	6.5 (21.2)	0.30 (0.98)	D
AC	Autoclave	632,229	4,974,096	23.5 (77.0)	364.3 (196.1)	7.4 (24.3)	1.52 (4.99)	D
ACB	POX Boiler (17 MMBtu/hr Propane-Fired)	632,261	4,974,116	23.5 (77.0)	455.4 (360.0)	10.8 (35.6)	0.61 (2.00)	D
ACS1L	AC Lime Silo #1 Loading	632,267	4,974,124	17.4 (57.2)	0.0 (-459.7)	16.1 (52.8)	0.23 (0.75)	D
ACS2L	AC Lime Silo #2 Loading	632,257	4,974,140	17.4 (57.2)	0.0 (-459.7)	16.1 (52.8)	0.23 (0.75)	D
ACS3L	AC Lime Silo #3 Loading	632,248	4,974,156	17.4 (57.2)	0.0 (-459.7)	16.1 (52.8)	0.23 (0.75)	D
ACS4L	AC Lime Silo #4 Loading	632,238	4,974,171	14.5 (47.5)	0.0 (-459.7)	16.1 (52.8)	0.23 (0.75)	D
CKD	Carbon	632,013	4,974,051	16.8	338.7	5.1	0.15	D

	Regeneration Kiln (Drum)			(55.0)	(150.0)	(16.6)	(0.49)	
CKB	Carbon Regeneration Kiln (Burners)	631,998	4,974,042	14.0 (46.0)	455.4 (360.0)	5.8 (18.9)	0.30 (0.98)	D
EW	Electrowinning Cells and Pregnant Solution Tank	631,983	4,974,033	16.8 (55.0)	310.9 (100.0)	24.2 (79.4)	0.30 (0.98)	D
MR	Mercury Retort	632,003	4,974,001	16.8 (55.0)	338.7 (150.0)	1.5 (5.1)	0.09 (0.30)	D
MF	Induction Melting Furnace	632,032	4,974,019	16.8 (55.0)	338.7 (150.0)	21.5 (70.6)	0.38 (1.25)	D
EDG1	Camp Emergency Generator (Mfr. Yr. >2007; diesel)	634,274	4,972,050	2.1 (7.0)	866.5 (1,100.0)	29.7 (97.4)	0.46 (1.51)	D
EDG2	Plant Emergency Generator #1 (Mfr. Yr. >2007; diesel)	632,105	4,974,154	2.1 (7.0)	866.5 (1,100.0)	29.7 (97.4)	0.46 (1.51)	D
EDG3	Plant Emergency Generator #2 (Mfr. Yr. >2007; diesel)	632,109	4,974,148	2.1 (7.0)	866.5 (1,100.0)	29.7 (97.4)	0.46 (1.51)	D
EDFP	Mill Fire Pump (Mfr. Yr. >2009; diesel)	632,113	4,974,141	2.1 (7.0)	866.5 (1,100.0)	23.8 (78.0)	0.23 (0.75)	D
PV	Propane Vaporizer (0.1 MMBtu/hr Propane-Fired)	632,216	4,974,118	20.7 (68.0)	455.4 (360.0)	1.6 (5.2)	0.12 (0.39)	D
HS	Strip Circuit Solution Heater (5 MMBtu, Propane-Fired)	632,017	4,974,010	14.0 (46.0)	455.4 (360.0)	7.5 (24.8)	0.40 (1.31)	D
H1M	Mine Air Heater #1 (4 MMBtu/hr Propane-Fired)	632,287	4,974,227	2.1 (7.0)	455.4 (360.0)	6.0 (19.8)	0.40 (1.31)	D
H2M	Mine Air Heater #2 (4 MMBtu/hr Propane-Fired)	632,288	4,974,228	2.1 (7.0)	455.4 (360.0)	20.8 (68.3)	0.21 (0.69)	D
HM	Mill HVAC Heaters (4 x 1.0 MMBtu Propane-Fired)	632,168	4,974,191	43.0 (141.0)	455.4 (360.0)	28.3 (92.9)	0.09 (0.30)	D
HAC	Autoclave HVAC Heater (0.25 MMBtu Propane-Fired)	632,238	4,974,130	20.7 (68.0)	455.4 (360.0)	7.1 (23.3)	0.09 (0.30)	D
HR	Refinery HVAC Heater (0.25 MMBtu Propane-Fired)	632,008	4,974,026	14.0 (46.0)	455.4 (360.0)	7.1 (23.3)	0.09 (0.30)	D
HA	Admin HVAC Heater (0.25 MMBtu Propane-Fired)	632,038	4,973,751	6.4 (21.0)	455.4 (360.0)	7.1 (23.3)	0.09 (0.30)	D
HMO	Mine Ops. HVAC Heaters (2 x 0.25 MMBtu Propane-Fired)	631,889	4,973,472	12.5 (41.0)	455.4 (360.0)	1.3 (4.3)	0.21 (0.69)	D
HTS	Truck Shop HVAC Heaters (2 x 1.0 MMBtu Propane-Fired)	631,848	4,973,398	12.5 (41.0)	455.4 (360.0)	5.2 (17.1)	0.21 (0.69)	D

HW	Warehouse HVAC Heaters (3 x 1.0 MMBtu Propane-Fired)	632,060	4,973,664	12.5 (41.0)	455.4 (360.0)	5.2 (17.1)	0.21 (0.69)	D
PSL	Prill Silos Loading (2 x 100 ton)	632,346	4,973,500	7.8 (25.5)	0.0 (-459.7)	18.1 (59.4)	0.15 (0.49)	D
CS1L	Cement/Shotcrete Silo #1 Loading	632,095	4,974,272	13.3 (43.7)	0.0 (-459.7)	24.1 (78.9)	0.15 (0.49)	D
CS2L	Cement/Shotcrete Silo #2 Loading	632,095	4,974,272	13.3 (43.7)	0.0 (-459.7)	24.1 (78.9)	0.15 (0.49)	D
LS6	Limestone transfer to Ball Mill Feed Bin	632,181	4,974,307	8.8 (2~~0~~9.0)	0.0 (-459.7)	0.001 (0.003)	0.30 (0.98)	D
LSBM	Limestone Ball Mill	632,215	4,974,248	21.3 (70.0)	0.0 (-459.7)	26.7 (87.5)	0.61 (2.00)	D
LS9	Limestone transfer to Kiln Feed Bin	632,169	4,974,325	8.8 (2~~0~~9.0)	0.0 (-459.7)	0.001 (0.003)	0.30 (0.98)	D
LK	Parallel Flow Regenerative (PFR) Shaft Lime Kiln	632,057	4,974,265	45.7 (150.0)	449.8 (350.0)	26.4 (86.5)	0.61 (2.00)	D
LKC	PFR Shaft Lime Kiln Combustion	632,057	4,974,265	45.7 (150.0)	449.8 (350.0)	26.4 (86.5)	0.61 (2.00)	D
LCR	Lime Mill Crushing and associated transfers In and Out	632,073	4,974,233	15.2 (50.0)	0.0 (-459.7)	28.7 (94.3)	0.23 (0.75)	D
LSL	Pebble Lime Silo Loading via Bucket Elevator	632,069	4,974,206	8.8 (29.0)	0.0 (-459.7)	4.1 (13.4)	0.10 (0.33)	D

a. Universal Transverse Mercator.
b. m: meters.
c. ft: feet.
d. K: Kelvin; °F: degrees Fahrenheit.
e. m/sec: meters per second; fps: feet per second.
f. D: default (vertical, uninterrupted release); R: raincap; H: horizontal.
g. The exhaust temperature for the new silo was set to 0 K. This triggers AERMOD to use the actual temperatures from the meteorological data input files.

Table 15. PROCESS AND ANCILLARY VOLUME SOURCE EMISSION RELEASE PARAMETERS IN METRIC UNITS (ENGLISH UNITS IN PARENTHESES).

Release Point	Description	UTM[a] Coordinates		Release Height in m (ft)[c]	Init. Horiz. Dim. in m (ft)	Init. Vert. Dim. in m (ft)
		Easting-X in m[b]	Northing-Y in m			
OC1	Loader Transfer of Ore to Grizzly	632,045	4,974,583	19.5 (64.0)	3.8 (12.3)	18.1 (59.5)
OC2	Grizzly to Apron Feeder	632,045	4,974,583	19.5 (64.0)	3.8 (12.3)	18.1 (59.5)
OC3	Apron Feeder to Dribble Conveyor	632,045	4,974,583	19.5 (64.0)	3.8 (12.3)	18.1 (59.5)
OC4	Apron Feeder to Vibrating Grizzly	632,045	4,974,583	19.5 (64.0)	3.8 (12.3)	18.1 (59.5)
OC5	Dribble Conveyor to Vibrating Grizzly	632,045	4,974,583	19.5 (64.0)	3.8 (12.3)	18.1 (59.5)
OC6	Vibrating Grizzly to Primary Crusher or Coarse Ore Stockpile Feed Conveyor	632,045	4,974,583	19.5 (64.0)	3.8 (12.3)	18.1 (59.5)
OC7	Primary Crusher and Associated Transfers out to Coarse Ore	632,045	4,974,583	19.5 (64.0)	3.8 (12.3)	18.1 (59.5)

	Stockpile Feed Conveyor					
OC8	Coarse Ore Stockpile Feed Conveyor Transfer to Stockpile	631,947	4,974,520	10.9 (35.8)	0.2 (0.7)	10.2 (33.3)
OC9	Stockpile Transfers to Reclaim Conveyors	631,947	4,974,520	1.2 (4.0)	0.6 (1.9)	1.1 (3.7)
OC10	Reclaim Conveyors to SAG Mill Feed Conveyor	631,947	4,974,520	1.2 (4.0)	0.6 (1.9)	1.1 (3.7)
OC11	SAG Mill Feed Conveyor Transfer to SAG Mill	632,113	4,974,243	20.7 (69.0)	0.3 (0.9)	0.6 (1.9)
OC12	Pebble Crusher and Associated Transfers in (from SAG Mill) and out (to Pebble Discharge Conveyor)	632,028	4,974,187	3.0 (10.0)	2.3 (7.6)	2.8 (9.3)
OC13	Pebble Discharge Conveyor to SAG Mill Feed Conveyor	632,028	4,974,187	3.0 (10.0)	2.3 (7.6)	2.8 (9.3)
LS1U	Mill Lime Silo #1 Unloading to SAG Mill Conveyor	632,095	4,974,272	1.4 (4.5)	0.1 (0.2)	0.1 (0.5)
MillS2U	Mill Lime Silo #2 Unloading to SAG Mill Conveyor	632,090	4,974,282	1.4 (4.5)	0.1 (0.2)	0.1 (0.5)
ACS1U	AC Lime Silo #1 Unloading to Lime Slaker	632,267	4,974,124	1.4 (4.5)	0.1 (0.2)	0.1 (0.5)
ACS2U	AC Lime Silo #2 Unloading to Lime Slaker	632,257	4,974,140	1.4 (4.5)	0.1 (0.2)	0.1 (0.5)
ACS3U	AC Lime Silo #3 Unloading to Lime Slaker	632,248	4,974,156	1.4 (4.5)	0.1 (0.2)	0.1 (0.5)
ACS42 U	AC Lime Silo #4 Unloading to Lime Slaker	632,238	4,974,171	1.4 (4.5)	0.1 (0.2)	0.1 (0.5)
PSU	Prill Silos Unloading (2 x 100 ton)	632,346	4,973,500	1.4 (4.5)	0.1 (0.2)	0.1 (0.5)
CS1U	Cement/Shotcrete Silo #1 Unloading	632,095	4,974,272	1.5 (5.0)	5.1 (16.8)	1.4 (4.7)
CS2U	Cement/Shotcrete Silo #2 Unloading	632,095	4,974,272	1.5 (5.0)	5.1 (16.8)	1.4 (4.7)
CAL	Aggregate Bin Loading	632,095	4,974,272	1.5 (5.0)	5.1 (16.8)	1.4 (4.7)
CAU	Aggregate Bin Unloading	632,095	4,974,272	1.5 (5.0)	5.1 (16.8)	1.4 (4.7)
CM	Central Mixer Loading	632,095	4,974,272	1.5 (5.0)	5.1 (16.8)	1.4 (4.7)
PCSP1	Portable Crushing and Screening Plant 1	632,348	4,973,429	2.1 (7.0)	13.1 (43.1)	2.0 (6.5)
PCSP2	Portable Crushing and Screening Plant 2	632,348	4,973,369	2.1 (7.0)	13.1 (43.1)	2.0 (6.5)
LS1	Limestone transfer to Primary Crusher Hopper	632,239	4,974,256	3.4 (11.3)	1.6 (5.2)	3.2 (10.5)
LS2	Primary Crushing and Associated Transfers In and Out	632,239	4,974,256	3.4 (11.3)	1.6 (5.2)	3.2 (10.5)
LS3	Primary Screening and Associated Transfers In and Out	632,239	4,974,256	3.4 (11.3)	1.6 (5.2)	3.2 (10.5)
LS4	Secondary Crushing and Associated Transfers In and Out	632,227	4,974,268	3.4 (11.3)	1.6 (5.2)	3.2 (10.5)
LS5	Secondary Screening and Associated Transfers In and Out	632,227	4,974,268	3.4 (11.3)	1.6 (5.2)	3.2 (10.5)
LS7	Limestone transfer to Ball Mill Feed Conveyor	632,181	4,974,307	1.1 (3.5)	0.1 (0.2)	0.4 (1.4)
LS8	Ball Mill Feed transfer to Ball Mill	632,200	4,974,273	8.5 (28.0)	0.3 (0.9)	0.6 (1.9)
LS10	Limestone transfer to Lime Kiln Feed Conveyor	632,169	4,974,325	1.1 (3.5)	0.1 (0.2)	0.4 (1.4)
LS11	Fines Screening and Associated	632,151	4,974,314	0.8	0.6	0.7

	Transfers In and Out			(2.5)	(1.9)	(2.3)
LS12	Kiln Feed transfer to PFR Shaft Lime Kiln	632,056	4,974,285	20.7 (68.0)	0.3 (0.9)	0.6 (1.9)
LSU	Pebble Lime Silo discharge to Lime Slaker	632,069	4,974,206	1.1 (3.5)	0.1 (0.2)	0.4 (1.4)

[a.] Universal Transverse Mercator.
[b.] m: meters.
[c.] ft: feet.

3.1.9 Emission Release Parameter Justification

Modeled Process and Ancillary Point Sources

The pneumatic transfer silo loadings and bin transfers (LS1L, MillS2L, ACS1L, ACS2L, ACS3L, ACS4L, PSL, CS1L, CS2L, LS6, LSBM, LS9, LSL) were modeled as POINT sources with a 3-foot bin vent above standard silo height as release height. Exit velocity was estimated using the standard stack diameter and flow rates for similar sources (NDEP 2019) or 0.001 meter per second for horizontal exhaust. These sources were modeled with ambient exhaust temperature.

For propane-fired process (Sb1, ACB, CKB, PV, HS) and building heaters (H1M, H2M, HM, HAC, HR, HA, HMO, HTS, HW), exhaust flow rates were calculated using EPA Method 9 with 3% oxygen content and 15% moisture content. Standard stack diameters were selected based on the heater rating. The process heaters were modeled with a 10-foot stack above the building, whereas the building heaters were modeled with a release height of 1 foot above the respective buildings.

Similar source exhaust temperature, flow, and diameter from (NDEP 2017) were used for refinery sources, including the carbon regeneration kiln (CKD), electrowinning cells (EW), mercury retort (MR), and induction furnace (MF). Each of these sources was modeled with a 10- foot stack above the refinery building.

For emergency generators (EDG1, EDG2, EDG3) and the fire pump (EDFP), the exhaust flow rates were calculated using EPA Method 9 with 9% oxygen content and 8% moisture content. Standard stack diameters were selected based on engine rating. Each engine was modeled with a 7-foot-high stack.

Antimony bagging (Sb2), autoclave (AC), lime kiln (LK) (common stack with kiln burner (LKC)), and lime crushing (LCR) were characterized with similar source parameters from (NDEP 2015b), (APT 2013), and (NDEP 2010). Each of these sources was modeled with a 10-foot stack above its respective building.

Release parameters for the process and ancillary point sources were appropriately documented and justified. DEQ's source-group analysis (Table 28 in Section 4.1.4) suggests that the process and ancillary point sources contribute a small amount to the modeled design concentrations.

Modeled Process and Ancillary Volume Sources

For the following VOLUME source characterization discussion, release height was estimated as half of the vertical length (for example, building height), initial vertical dispersion was calculated by dividing the vertical length by the applicable EPA-recommended constant (EPA 2018c) for a single VOLUME source (4.3), and initial lateral dispersion was determined using the lesser lateral dimension (for example, building width) divided by the applicable EPA-recommended constant (EPA 2018c) for the surface source or elevated source with a building (2.15).

The sources associated with the primary crusher building, including loader transfer (OC1), grizzly feeder (OC2), apron feeders (OC3, OC4), ore transfers (OC5, OC6), and primary crusher (OC7), were characterized by the primary crusher building dimensions: 128’ high and 52.9’ wide.

The stockpile height (71.6’) and the conveyor width (3’) were used to determine the VOLUME source parameters for the stockpile feed conveyor (OC8).

Tunnel exit dimensions (8’ high and 8’ wide) were used to estimate the VOLUME release parameters for the stockpile transfer points (OC9, OC10). The SAG mill feed conveyor transfer (OC11) was characterized by a building opening (4’ high and 4’ wide) at the mid-height (70’) of the mill building.

Pebble crusher building dimensions (20’ high and 32.7’ wide) were used to characterize the pebble crusher-associated sources (OC12, OC13).

Silo/bin unloading sources (LS1U, Mill2SU, ACS1U, ACS2U, ACS3U, ACS42U, PSU) were characterized by a typical screw discharge feeder characteristic, i.e., 5’ above the ground with a 1’ diameter.

Aggregate transfer and handling sources (CS1U, CS2U, CAL, CAU, CM) were characterized by the aggregate stockpile dimensions: 20’ high and 72.2’ wide.

Each portable crushing and screening plant was characterized by typical portable crushing and screening plant dimensions: 14’ high and 185’ wide.

Sources associated with limestone crushing (LS1, LS2, LS3, LS4, LS5) were characterized by the associated crusher building dimensions: 22.6’ high and 22.6’ wide.

The crushed limestone/pebble lime transfers (LS7, LS10, LSU) were characterized by a typical screw discharge to a conveyor characteristic, i.e., 5’ above the ground, 3’ drop, and a 1’ diameter.

The limestone ball mill feed discharge (LS8) was characterized by a building opening (4’ high and 4’ wide) at the mid-height (30’) of the ball mill building.
The limestone fines screening (LS11) was characterized by screen dimensions: 5’ drop and 8’ wide.

The limestone kiln feed (LS12) was characterized by a building opening (4’ high and 4’ wide) at the mid-height (70’) of the kiln building.

Model input source characterization for fugitive emissions is described in Sections 3.1.5 and 3.1.6. Fugitive activity locations and their respective dimensions are provided in Table 11 and associated release parameters are listed in Table 12.

Release parameters for the process and ancillary volume sources were appropriately documented and justified. DEQ’s source-group analysis (Table 28 in Section 4.1.4) suggests that the process and ancillary volume sources contribute a small amount to the modeled design concentrations.

3.2 Background Concentrations

Background concentrations are used if a cumulative NAAQS impact analysis is needed to demonstrate compliance with applicable NAAQS.

3.2.1 Onsite Particulate Monitoring

To establish background ambient air conditions for the SGP area, Midas Gold developed an onsite monitoring program to collect site-specific meteorological parameters and determine ambient particulate matter ($PM_{2.5}$ and PM_{10}) concentrations at its Stibnite monitoring station.

In September 2015, Midas Gold submitted the data collected at the Stibnite monitoring station for the period of November 2013 through June 2015 to DEQ. After reviewing the data and associated quality control procedures, DEQ concluded that the $PM_{2.5}$ and PM_{10} data collected at the Stibnite monitoring station satisfied the applicable regulatory requirements and approved the data to be used for background concentrations in the SGP air quality analyses. In its conclusions, DEQ recommended that the $PM_{2.5}$ and PM_{10} background concentrations should be based on calendar year 2014 instead of the complete dataset (November 2013 through June 2015).

DEQ-approved $PM_{2.5}$ and PM_{10} background concentrations, in units of micrograms per cubic meter (µg/m^3), are provided in Table 16.

Table 16. DEQ-APPROVED $PM_{2.5}$ AND PM_{10} BACKGROUND CONCENTRATIONS FOR SGP.

Pollutant	Averaging Time	Background Concentration (µg/m^3)	Design Value Rank
$PM_{2.5}$	1 year	3.5	Weighted average of quarterly means
	24 hours	15	98th percentile/8th high
PM_{10}	24 hours	37	Highest 2nd high

3.2.2 Gaseous Pollutant Background Concentrations

With a few exceptions of very large facilities or facilities located in nonattainment areas, regulatory agencies do not require the collection of gaseous criteria pollutants, including CO, NOx (and/or nitrogen dioxide [NO_2]), O_3, and SO_2. For these gaseous pollutants, data collected at government-regulated monitoring stations located in settings similar to the project area in terms of terrain, land use, and proximity of emission sources are typically used to establish background concentrations.

To determine representative background concentrations of CO, NOx, O_3, and SO_2 for the SGP site, which is located in a remote rural area, the DEQ-maintained ambient monitoring network was reviewed by Air Sciences. This review revealed that DEQ only conducts limited trace monitoring for CO, NOx, O_3, and SO_2 in the Boise metropolitan area along the Interstate 84 corridor. Thus, the data collected at these monitors are exposed to high emissions from industrial, urban, and transportation sources (DEQ 2015a) (DEQ 2018). For this reason, the gaseous pollutant concentrations recorded at these urban monitoring locations were not considered to be representative of a rural area, like the SGP site.

The EPA-maintained monitoring stations (EPA 2018a) in Idaho and surrounding states also were reviewed by Air Sciences to determine representative gaseous pollutant background concentrations for the SGP site. This review also did not identify any representative monitoring station to establish background gaseous pollutant concentrations for the SGP site.

The DEQ-recommended (DEQ 2019) CO, NOx, O_3, and SO_2 background concentrations for the SGP air quality analyses in units of parts per billion (ppb) and µg/m^3, are provided in Table 17. These background concentrations were obtained from the Northwest International Air Quality Environmental Science and

Technology Consortium (NW AIRQUEST; https://arcg.is/1jXmHH) online tool using the project site coordinates. These background air pollutant levels are based on regional-scale air pollution modeling of pollutants in Washington, Oregon, and Idaho, with modeling results adjusted according to available monitoring data.

Table 17. DEQ-RECOMMENDED GASEOUS POLLUTANT BACKGROUND CONCENTRATIONS FOR SGP.

Pollutant	Averaging Time	Background Concentration (ppb)	Background Concentration ($\mu g/m^3$)	Reference
CO	8 hours	970	1,110	NW AIRQUEST, 2014-2017 design value
	1 hour	1,520	1,740	
NO_2	1 year	0.5	0.9	
	1 hour	2.3	4.3	
O_3 (for NO_2 modeling)	8 hours	55	107.9	
SO_2	3 hours	6.4	16.8	
	1 hour	4.7	12.3	

3.2.3 Medium-Traffic Pollutant Background Concentrations

For additional information, background concentrations were obtained from NW AIRQUEST for the road section between mile markers 143 and 144 on Highway 55 passing through the town of McCall. This site (latitude 44.906° N, longitude 116.098° W) is approximately 38 miles west of the SGP. The annual average daily traffic count for this road section is over 10,000 vehicles per day. Table 18 provides the background concentrations for this medium traffic site. Although these concentrations are not representative of the rural SGP area, they do provide additional information regarding the relative contribution of traffic emissions.

Table 18. MEDIUM-TRAFFIC BACKGROUND CONCENTRATIONS.

Pollutant	Averaging Time	Background Concentration (ppb)	Background Concentration ($\mu g/m^3$)	Reference
CO	8 hours	1,000	1,145	NW AIRQUEST, 2014-2017 design value, near McCall, ID (44.91°N, 116.10°W)
	1 hour	1,570	1,797	
NO_2	1 year	1.4	2.6	
	1 hour	7.6	14.3	
$PM_{2.5}$	1 year	--	5.1	
	24 hours	--	17.5	
PM_{10}	24 hours	--	60.1	
SO_2	3 hours	6.4	16.8	
	1 hour	4.7	12.3	

3.3 Impact Modeling Methodology

This section describes the modeling methods used by the applicant/consultant to demonstrate preconstruction compliance with applicable air quality standards.

3.3.1 General Overview of Impact Analyses

Air Sciences performed the project-specific air pollutant emission inventory and air impact analyses that were submitted with the application. The submitted information/analyses, in combination with results from DEQ's air impact analyses, demonstrate compliance with applicable air quality standards to DEQ's satisfaction, provided the facility is operated as described in the submitted application and in this memorandum.

Table 19 provides a brief description of parameters used in the modeling analyses.

Table 19. MODELING PARAMETERS.

Parameter	Description/Values	Documentation/Addition Description
General Facility Location	Stibnite, Idaho	The area is an attainment or unclassified area for all criteria pollutants.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 19191.
Meteorological Data	Onsite and McCall, Idaho surface data; Boise upper air data	See Section 3.3.5 of this memorandum for additional details of the meteorological data.
Terrain	Considered	1/3 arc second National Elevation Dataset (NED) was acquired from the USGS for the surrounding area. AERMAP version 18081 was used to process terrain elevation data for all buildings and receptors. See Section 3.3.6 for more details.
Building Downwash	Considered	Plume downwash was considered for the structures associated with the facility. BPIP-PRIME was used to evaluate building dimensions for consideration of downwash effects in AERMOD. See Section 3.3.7.
NOx Chemistry	Ozone Limiting Method	See Section 3.3.8.
Receptor Grid	**SIL Analysis** A SIL analysis was not performed.	
	Cumulative NAAQS Impact Analysis The selection of receptors for use in the cumulative NAAQS impact analysis is as follows (see Section 3.3.1~~1~~2):	
	Boundary	25-meter (m) spacing
	Grid 1	50-m spacing, 0.25 kilometers (km) out
	Grid 2	100-m spacing, 0.25 km to 1.25 km out
	Grid 3	500-m spacing, 1.25 km to 5 km out
	Grid 4	1,000-m spacing, 5 km to 10 km out
	Hotspot	25-m spacing, 200-m × 200-m around highest model impacts
	TAPs Analysis The receptor network used in the cumulative NAAQS impact analysis was also used in the TAPs analysis.	

3.3.2 Modeling Protocol

A modeling protocol for the SGP analyses was submitted to DEQ prior to the application, on May 30, 2019. The protocol was submitted by Brown and Caldwell on behalf of Midas Gold. Conditional DEQ protocol approval was provided to Brown and Caldwell on June 27, 2019.

3.3.3 Modeling Methodology

Project-specific modeling and other required impact analyses were generally conducted using data and methods described in the *Idaho Air Quality Modeling Guideline* (DEQ 2013).

3.3.4 Model Selection

Idaho Air Rules Section 202.02 requires that estimates of ambient concentrations be based on air quality models specified in Appendix W. The refined, steady-state, multiple-source, Gaussian dispersion model AERMOD was promulgated as the replacement model for ISCST3 in December 2005. AERMOD retains the single straight-line trajectory of ISCST3, but it includes more advanced algorithms to assess turbulent mixing processes in the planetary boundary layer for both convective and stable stratified layers.

AERMOD version 19191 was used by Air Sciences for the modeling analyses to evaluate impacts of the facility. This version was the current version at the time the application was received by DEQ.

3.3.5 Meteorological Data

AERMOD requires an input of hourly meteorological data to estimate pollutant concentrations in ambient air resulting from modeled source emissions. These data are commonly obtained from National Weather Service (NWS) stations at airports throughout the state. Applicants select data from an airport site that is determined to be reasonably representative of the permitted site location. Collection of meteorological data from the permitted site is not typically required by DEQ for minor source permit applications. The collection of one year of onsite data is required for permitting projects subject to the Prevention of Significant Deterioration (PSD) program, which is triggered by larger non-fugitive emission quantities.

Site-specific hourly surface meteorological data were collected and used in air impact analyses for this project, as described in the submitted modeling report. These data were collected from January 1, 2014 through December 31, 2014 at the Stibnite monitoring station. They were collected for analyses supporting an Environmental Impact Statement (EIS) and the Idaho DEQ minor source permit.

The site-specific surface data were supplemented with the twice-daily upper-air data (all levels) collected at the National Weather Service (NWS) station in Boise, Idaho (WBAN 24131).

These meteorological datasets were processed with the most recent version (19191) of the AERMOD meteorological pre-processor, AERMET, to produce AERMOD-input-ready hourly surface and profile meteorological files. The default option of adjusted surface friction velocity (ADJ_U*) and the Bulk Richardson (BULKRN) method for boundary layer parameter calculations was used for this meteorological data processing.

Additionally, an alternative meteorological dataset was processed without using the BULKRN method (NON-BULKRN). This alternate processing used the onsite and upper air datasets discussed above, supplemented with the cloud-cover data collected at the NWS station in McCall, Idaho (WBAN 94182).

Both processing methods (BULKRN and NON-BULKRN) are considered default for regulatory modeling analyses. EPA Region X Regional Modeling Contact, Jay McAlpine, PhD, was consulted for guidance on which data processing procedure to require for the analyses supporting the Idaho PTC. The BULKRN method was used for air impact analyses supporting the EIS after consultation with EPA, DEQ, and the US Forest Service. EPA recommended (June 18, 2019, email from Jay McAlpine, EPA, to Kevin Schilling, DEQ) using the BULKRN method since "use of the onsite data best fulfills the Guidance, and ensures consistency with the EIS, but this should be looked upon as technical advice only and not a requirement of the EPA."

Compliance with all NAAQS was easily demonstrated using meteorological data processed by the NON-BULKRN method; however, a small number of receptors showed 24-hour PM_{10} violations when the meteorological data processed with BULKRN method was used. DEQ performed a weight of evidence analyses (see Section 4.1.4 of this memorandum) to further evaluate the confidence of NAAQS compliance, using sensitivity analyses of various model input variables and the meteorological data processed using the BULKRN method.

AERMET requires the input of three surface boundary layer parameters: midday Bowen ratio (B_o), midday albedo (r), and surface roughness length (z_o). These parameters are dependent on the land use and vegetative cover of the area being evaluated. The EPA-recommended model, AERSURFACE, was used to estimate these surface parameters for the Stibnite meteorological data processing. AERSURFACE uses 1992 National Land Cover Data to determine these surface characteristics.

The determination of B_o is dependent on ambient moisture conditions (i.e., wet, average, or dry). For this purpose, historic 30-year (1985–2014) precipitation data from the Taylor Ranch station in Idaho (the closest station from which this type of data is available) were used.

The 70th and 30th percentile values estimated from the 30-year precipitation data were used to assign a moisture class to each calendar month per the following scheme: monthly precipitation greater than the 70th percentile was considered "wet"; between the 70th and 30th percentiles was considered "average"; and less than the 30th percentile was considered "dry." The monthly season and moisture classifications and estimated r and B_o for 2014 Stibnite meteorological data processing are presented in Table 20.

Table 20. 2014 MONTHLY SEASON AND MOISTURE CLASSIFICATION, AND CALCULATED *r* AND B_O.

Month	Season	*r*	30-Year Precipitation Percentile (in)		2014 Precipitation (in)	Moisture Classification	*Bo*
			30th	70th			
January	Winter	0.38	0.64	1.29	0.74	Average	0.50
February	Winter	0.38	0.40	0.81	0.99	Wet	0.50
March	Spring	0.13	0.83	1.23	2.33	Wet	0.34
April	Spring	0.13	1.11	1.57	0.99	Dry	1.57
May	Spring	0.13	1.43	2.23	0.74	Dry	1.57
June	Summer	0.13	1.17	1.80	1.32	Average	0.37
July	Summer	0.13	0.46	1.45	0.40	Dry	0.76
August	Summer	0.13	0.42	1.11	2.03	Wet	0.25
September	Fall	0.13	0.27	1.23	0.43	Average	0.87
October	Fall	0.13	0.59	1.69	1.75	Wet	0.35
November	Fall	0.13	0.72	1.44	3.73	Wet	0.35
December	Winter	0.38	0.64	1.16	0.83	Average	0.50

The seasonal z_o values in m for each 30-degree sector of the 1-km radius for the Stibnite monitoring station are provided in Table 21 (i.e., Sector 1 is 0° to 30° clockwise from the north, Sector 2 is 30° to 60° clockwise from the north, etc.).

Table 21. CALCULATED SEASONAL z_O VALUES (m).

Sector	Winter	Spring	Summer	Fall
1	0.410	0.564	0.610	0.607
2	0.212	0.347	0.392	0.387
3	0.517	0.640	0.671	0.669
4	0.769	0.865	0.894	0.894
5	0.989	1.044	1.055	1.055
6	0.741	0.874	0.918	0.915
7	0.400	0.563	0.617	0.614
8	0.414	0.522	0.552	0.550
9	0.049	0.171	0.244	0.243
10	0.060	0.197	0.274	0.274
11	0.183	0.372	0.449	0.449
12	0.576	0.710	0.743	0.742

Winter = December, January, February
Spring = March, April, May
Summer = June, July, August

Fall = September, October, November

Wind frequency distribution for the 2014 Stibnite meteorological dataset is presented in Figure 5, and a map showing the location of the meteorological monitoring stations used for this meteorological data processing is presented in Figure 6.

Figure 5. WIND FREQUENCY DISTRIBUTION FOR 2014 SGP METEOROLOGICAL DATA (NON-BULKRN).

Comment [E1]: Station No. and ID in the figure are for the McCall NWS station.

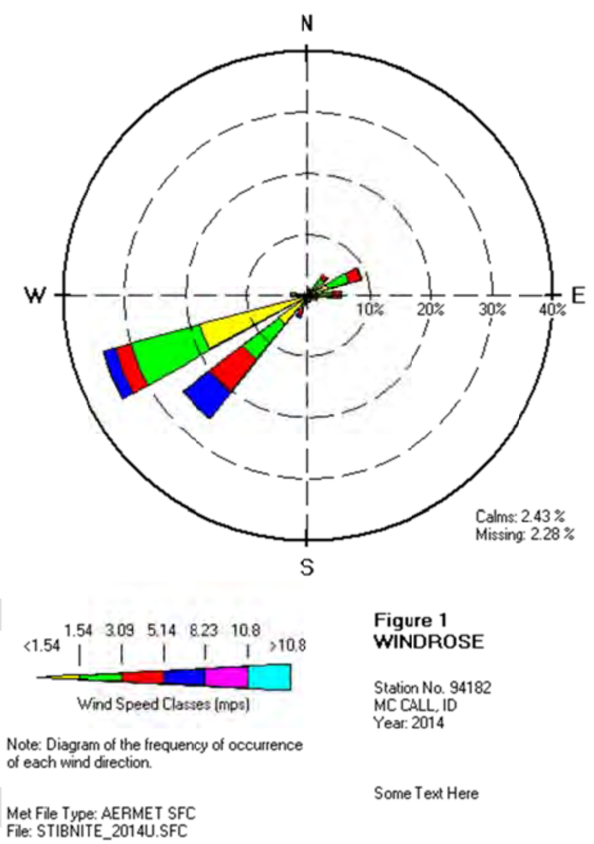
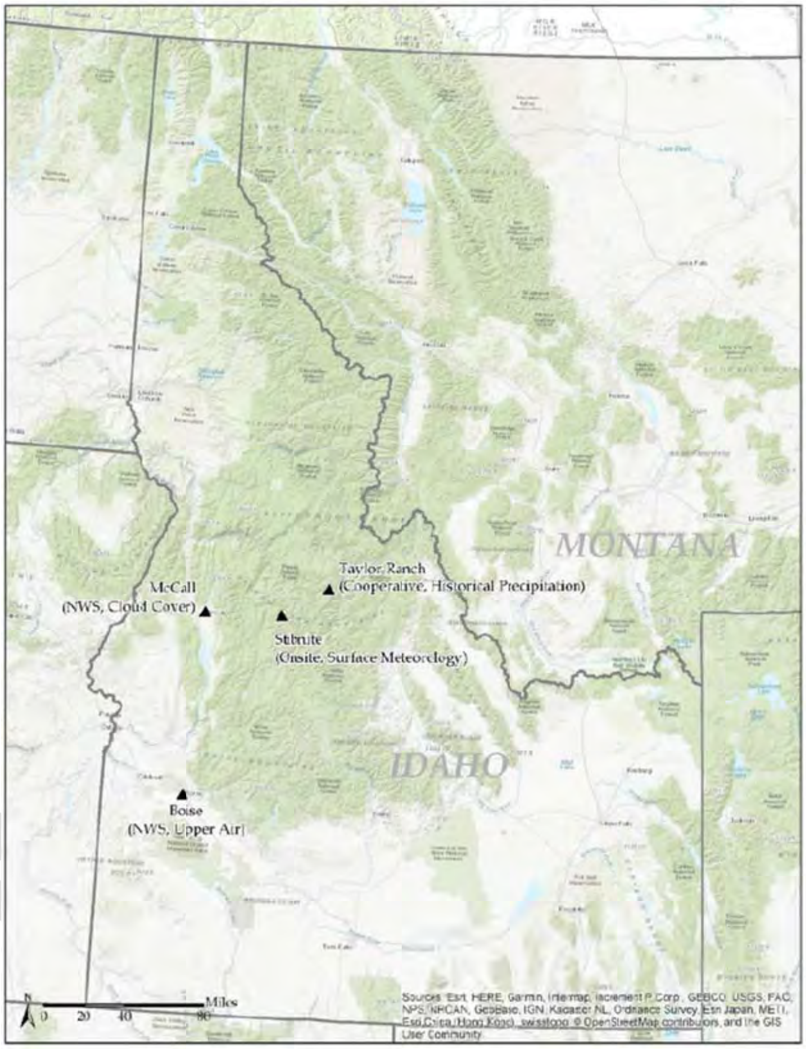


Figure 6. METEOROLOGICAL STATION LOCATIONS FOR SGP MODELING.

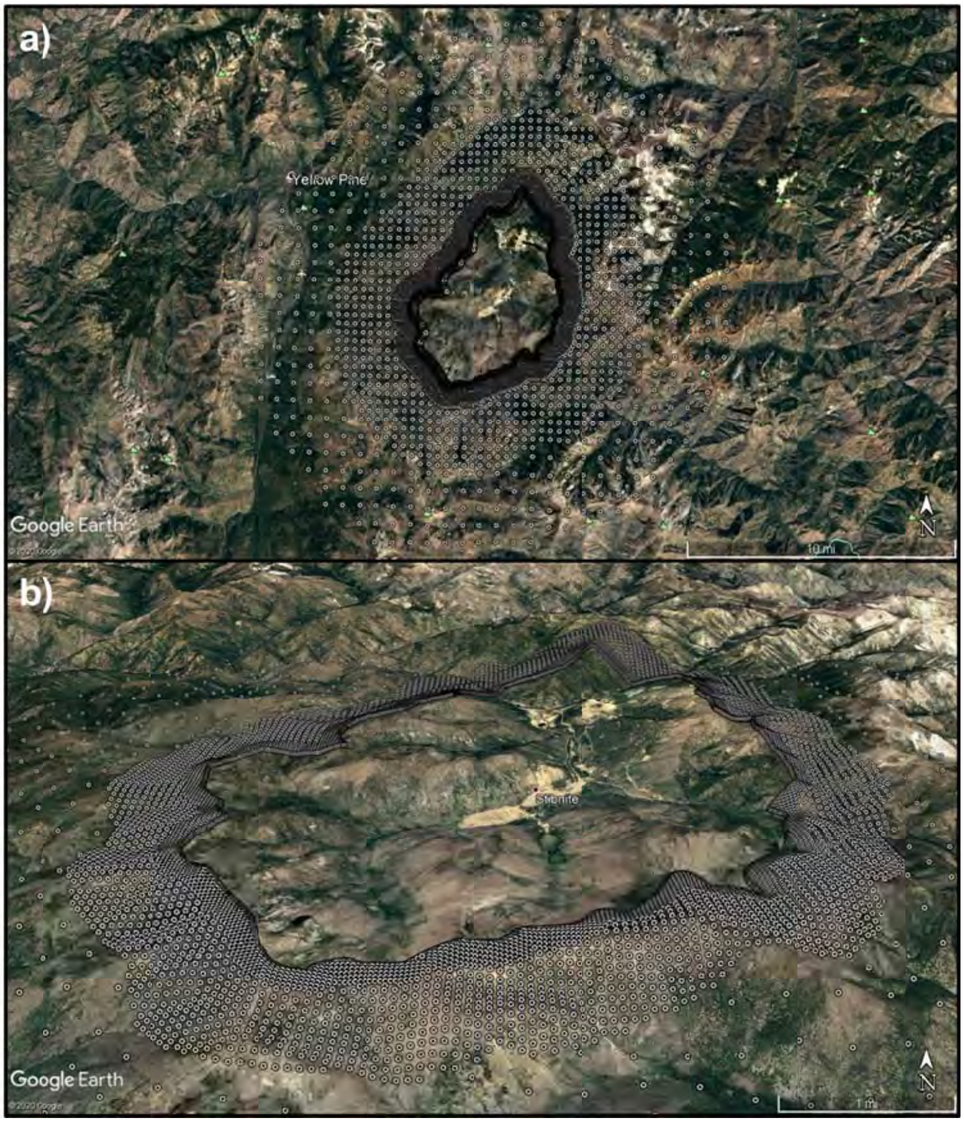


3.3.6 Effects of Terrain on Modeled Impacts

Submitted ambient air impact analyses used terrain data extracted from United States Geological Survey (USGS) National Elevation Dataset (NED) files.

The terrain preprocessor AERMAP version 18081 was used by Air Sciences to extract the elevations from the NED files and assign them to receptors in the modeling domain in a format usable by AERMOD. AERMAP also determined the hill-height scale for each receptor. The hill-height scale is an elevation value based on the surrounding terrain which has the greatest effect on that individual receptor. AERMOD uses those heights to evaluate whether the emission plume has sufficient energy to travel up and over the terrain or if the plume will travel around the terrain. Figure 7a depicts the full receptor grid used in the modeling analyses and Figure 7b illustrates a close-up of Figure 7a, overlaid on a terrain image from Google Earth.

Figure 7. RECEPTOR GRID CENTERED AT THE SGP FACILITY.



3.3.7 Facility Layout and Downwash

Figure 3 shows the processing and refining area buildings and sources at the SGP facility. Figure 8 below depicts a three-dimensional view of Figure 3, as viewed from the southwest.

Figure 8. THREE-DIMENSIONAL VIEW OF PROCESSING AND REFINING AREA BUILDINGS AND SOURCES AT THE SGP FACILITY AS VIEWED FROM THE SOUTHWEST.

DEQ verified proper identification of the site location and the ambient air boundary by comparing a graphical representation of the modeling input file to aerial photographs on Google Earth (available at https://www.google.com/earth).

Potential downwash effects on emission plumes were accounted for in the model by using building dimensions and locations (locations of building corners, base elevation, and building heights). Dimensions and orientation of proposed buildings were used as input to the Building Profile Input Program for the Plume Rise Model Enhancements downwash algorithm (BPIP-PRIME version 04274) to calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information for input to AERMOD.

3.3.8 NOx Chemistry

The atmospheric chemistry of NO, NO_2, and O_3 complicates accurate prediction of NO_2 impacts resulting from NOx emissions. The conversion of NO to NO_2 can be conservatively addressed through the use of several methods as outlined in a *2014 EPA NO_2 Modeling Clarification Memorandum* (EPA 2014). The guidance outlines a three-tiered approach:

- Tier 1 – assume full conversion of NO to NO_2 where total NOx emissions are modeled and modeled impacts are assumed to be 100 percent NO_2.
- Tier 2 – use an ambient ratio to adjust impacts from the Tier 1 analysis.
- Tier 3 – use a detailed screening method to account for $NO/NO_2/O_3$ chemistry such as the Ozone Limiting Method (OLM) or the Plume Volume Molar Ratio Method (PVMRM).

The default option of the Ozone Limiting Method (OLM), a third-tier method from 40 CFR 51, Appendix W, was used by Air Sciences to estimate the NO_2 1-hour and annual impacts for these analyses. The OLM method requires an input of in-stack NO_2/NOx ratio for each modeled source.

An in-depth literature review was conducted by Air Sciences to identify reasonable NO_2/NOx ratios for different combustion source categories. Based on this research, the NO_2/NOx ratio recommended for the heavy-duty diesel trucks in the California Air Pollution Control Officers Association (CAPCOA) Guidance Document (CAPCOA 2011) was selected for stationary diesel combustion sources. This NO_2/NOx ratio (11 percent) is conservatively higher than the diesel combustion NO_2/NOx ratio provided in the EPA ISR (In-Stack Ratio) database: 6 percent average, 9.8 percent maximum. The CAPCOA document and the EPA ISR database do not provide an NO_2/NOx ratio for propane boilers. The CAPCOA-recommended NO_2/NOx ratio for natural gas boilers was selected for the propane boilers. The natural gas boilers NO_2/NOx ratio is considered appropriate for the propane boilers because both are gaseous fuels with relatively similar combustion characteristics and are expected to have similar NO_2/NOx ratios. The NO_2/NOx ratio for blasting is based on blasting plume measurements provided in an Australian study (CSIRO 2008). The NO_2/NOx ratios used for the SGP NO_2 analyses are presented in Table 22.

Table 22. NO_2/NOx RATIOS.

Source Type	NO_2/NO_X Ratio	Reference
Blasting	0.036	Commonwealth Scientific and Industrial Research Organisation (CSIRO 2008)
Diesel Engines	0.11	CAPCOA Guidance Document, heavy-duty diesel trucks (CAPCOA 2011)
Propane Heaters	0.10	CAPCOA Guidance Document, natural gas boilers (CAPCOA 2011)

DEQ performed a sensitivity analysis using a Tier 2 screening method (ARM2), which is more conservative than OLM, and found that the SGP facility is safely below the 1-hour and annual NO_2 NAAQS. Results are summarized in Section 4.1.3.

3.3.9 Particulate Deposition

For $PM_{2.5}$ and PM_{10} analyses, default particulate modeling methods, including deposition (Method 1, to account for depletion due to particulate settling), were used. To account for particulate settling, AERMOD requires the following source-specific variables:

1. Mass-mean aerodynamic particle diameter (PARTDIAM) for each particle size bin
2. Mass fraction (MASSFRAX) for each particle size bin
3. Particle density (PARTDENS) for each particle size bin

A list of references that were used to develop the broad source category particle size bins and associated mass fractions was provided in the application. Midas Gold (Midas Gold 2017b) provided the ore and DR material densities. The diesel and propane combustion particulate densities were adopted from technical literature (UMN 2002) and (Khalizov et al. 2012), respectively. Densities for the remaining materials were obtained from the Engineering Toolbox (https://www.engineeringtoolbox.com/density-materials-d_1652.html). An average density was used when a material-specific density range was available.

For sources that were aggregated and modeled as activity locations, deposition parameters were selected for the dominant source within the activity location. For open-pits (YPP, HFP, WEP), approximately 90% of emissions were associated with drilling; therefore, drilling deposition parameters were assigned to these sources. Similarly, emissions from dozing accounted for over 70% of emissions in the DRSF (FDRSF, HFDRSF, WEDRSF) and BT; therefore, these sources were assigned deposition parameters based on a dozing particulate profile.

The deposition parameters including mass fractions, mass mean diameters, and densities for the different source categories/groups are provided in Table 23.

Table 23. DEPOSITION PARAMETERS BY SOURCE CATEGORY.

Source Category	Parameter	PM_{10}				$PM_{2.5}$	
		Bin 1	Bin 2	Bin 3	Bin 4	Bin 1	Bin 2
Haul Roads	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction	0.10	0.90	--	--	1.00	--
	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (YPP, HFP, WEP DR average)	2.46	2.46	--	--	2.46	--
Material Handling (Ore, DR, Limestone)	Bin Upper Diameter (µm)	2.50	5.00	10.00	--	2.50	--
	Mass Fraction	0.15	0.42	0.43	--	1.00	--
	Mass Mean Diameter (µm)	2.50	5.00	10.00	--	2.50	--
	Density (g/cm^3) (Ore)	Pit-specific, see Table 24.					
	Density (g/cm^3) (Ore and Waste)	Pit-specific, see Table 24.					
	Density (g/cm^3) (Limestone)	1.09	1.09	1.09	--	1.09	--
Baghouses	Bin Upper Diameter (µm)	2.50	6.00	10.00	--	2.50	--
	Mass Fraction	0.28	0.50	0.22	--	1.00	--
	Mass Mean Diameter (µm)	2.50	6.00	10.00	--	2.50	--
	Density (g/cm^3) (Ore)	Pit-specific, see Table 24.					
Diesel Engines	Bin Upper Diameter (µm)	1.00	2.50	6.00	10.00	1.00	2.50
	Mass Fraction	0.85	0.08	0.03	0.03	0.91	0.09
	Mass Mean Diameter (µm)	1.00	2.50	6.00	10.00	1.00	2.50
	Density (g/cm^3) (Diesel Combustion)	1.00	1.00	1.00	1.00	1.00	1.00
Heaters and Boilers	Bin Upper Diameter (µm)	1.00	2.50	6.00	10.00	1.00	2.50
	Mass Fraction	0.29	0.28	0.32	0.11	0.51	0.49
	Mass Mean Diameter (µm)	1.00	2.50	6.00	10.00	1.00	2.50
	Density (g/cm^3) (Propane Combustion)	1.24	1.24	1.24	1.24	1.24	1.24
Lime Loading and Unloading (Quick, Pebble)	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction	0.15	0.85	--	--	1.00	--
	Mass Mean Diameter	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (Quick)	0.44	0.44	--	--	0.44	--
	Density (g/cm^3) (Pebble)	0.96	0.96	--	--	0.96	--
Lime Unloading (Quick, Pebble)	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction	0.15	0.85	--	--	1.00	--
	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (Quick)	0.44	0.44	--	--	0.44	--
	Density (g/cm^3) (Pebble)	0.96	0.96	--	--	0.96	--
Cement and Aggregate	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction	0.15	0.85	--	--	1.00	--

Loading and Unloading	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (Cement)	1.44	1.44	--	--	1.44	--
	Density (g/cm^3) (Aggregate)	1.28	1.28	--	--	1.28	--
Prill Loading and Unloading	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction	0.15	0.85	--	--	1.00	--
	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (Prill)	0.84	0.84	--	--	0.84	--
Refining Processes	Bin Upper Diameter (µm)	1.00	2.50	6.00	10.00	1.00	2.50
	Mass Fraction	0.78	0.11	0.08	0.03	0.88	0.12
	Mass Mean Diameter (µm)	1.00	2.50	6.00	10.00	1.00	2.50
	Density (g/cm^3) (Diesel Combustion)	1.00	1.00	1.00	1.00	1.00	1.00
Portable Crushing and Screening Plant	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction	0.13	0.87	--	--	1.00	--
	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (YPP, HFP, WEP DR average)	2.46	2.46	--	--	2.46	--
Lime Kiln and Ball Mill	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction (Kiln)	0.49	0.51	--	--	1.00	--
	Mass Fraction (Ball Mill)	0.36	0.64	--	--	1.00	--
	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3)	1.09	1.09	--	--	1.09	--
Blasting and Drilling	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction	0.06	0.94	--	--	1.00	--
	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (Ore or DR)	Pit-specific, see Table 24.					
Dozing	Bin Upper Diameter (µm)	2.50	10.00	--	--	2.50	--
	Mass Fraction	0.55	0.45	--	--	1.00	--
	Mass Mean Diameter (µm)	2.50	10.00	--	--	2.50	--
	Density (g/cm^3) (DR)	Pit-specific, see Table 24.					

In order to account for variability in ore and DR densities for different pits, pit-specific densities were used for the ore and DR for each modeling scenario, with the following exception – for haul roads, access roads, and portable crushers, the average DR density from YPP, HFP, and WEP was used. Note that the BT density was excluded from those sources because the BT material will not be used for roads or construction. The pit-specific ore and DR densities are provided in Table 24.

Table 24. PIT-SPECIFIC ORE AND DEVELOPMENT ROCK (DR) DENSITIES FOR DEPOSITION.

Pit	Material	Density (g/cm^3)
YPP	Ore	2.59
BT	Ore	2.00
HFP	Ore	2.59
WEP	Ore	2.68
YPP	DR	2.48
BT	DR	2.00
HFP	DR	2.34
WEP	DR	2.57
Average (YPP,HFP, WEP)	DR	2.46

3.3.10 Ambient Air Boundary

Ambient air is defined in Section 006 of the Idaho Air Rules as "that portion of the atmosphere, external to buildings, to which the general public has access."

Midas Gold will legally control the SGP, an active industrial site where mining activities will occur, such as heavy equipment operation. Most areas of the mine will require strict safety protocols and controlled access. Midas Gold has established an operations boundary to identify the area where public access will be excluded. Public access inside the operations boundary will be restricted for the life of the mine by physical barriers at points of potential access, including the current Stibnite Road point of entry and proposed site access via the Burntlog Route, as well as natural features of the landscape that prevent access. Consistent with the guidance provided in the EPA's draft revised policy on ambient air (EPA 2018b), public access control will include the following measures:

- Primary Access Points: The Stibnite Road (north) and Burntlog Route (south) access points will include locked gates. Guard shacks will be located at each gate to monitor all vehicle ingress/egress. Each gate also will include appropriate adjacent barriers (i.e., fencing, bollards, boulders, or other barriers) to prevent any vehicle from circumventing the gate and gaining site access. These primary access points are also controlled by adjacent natural features, such as streams and creeks, steep topography, and areas of thick vegetation and undergrowth that serve as natural barriers or impediments to access.

- Secondary Access Points: Other potential access points, such as secondary roadways and trails, will include posted signs warning the public against entry into the site. At these locations, boulders will be placed across the trail and at an appropriate width adjacent to the trail to prevent any vehicle from circumventing the barrier. These secondary access points also incorporate adjacent natural features, such as streams and creeks, steep topography, and areas of thick vegetation and undergrowth that serve as natural barriers or impediments to access. Some mine features, such as the TSF and process plant areas, will include perimeter fencing.

- Surveillance: Midas Gold security personnel will routinely patrol mine facilities and roadways for unauthorized individuals. In addition, all onsite personnel will be trained on the necessity of restricting public access to areas within the operations boundary. Any suspected trespassing by unauthorized individuals will be reported immediately to security, and trespassers will be escorted off the site.

In response to comments from local community citizens, Midas Gold will manage an access route to provide the general public with limited access through the SGP site between Stibnite Road at Sugar Creek and Thunder Mountain Road at Meadow Creek (shown in Figure 2). This route will be managed in accordance with the Stibnite Road Access Management Plan which is summarized as follows:

The proposed Stibnite Road access route through the SGP site is meant to provide controlled through-site access that is safe, provides travel-time comparable to current conditions and is consistent with the United States Forest Service travel management plan. The Stibnite Road access route extends from the north entry point southward to the Administration, Warehouse and Storage Area. Continuing southward, the Stibnite Road access route incorporates the Burntlog access road segment that occurs within the operations area and extends to the south entry point as shown on Figure 2. Midas Gold has the legal authority to control access to the Stibnite Road access route and would provide seasonal (non-winter conditions) access only. At the discretion of Midas Gold, additional access controls may occur during various phases of construction, during mine operations that present potential safely hazards such as blasting, due to inclement weather, or under any other circumstances that may present a threat to the protection of public or employee health and safety. Midas Gold has the legal and practical ability to enforce its control over roadway access and to monitor traffic passing through the SGP site. Signage will be placed at the North Security Gate (near the bridge over Sugar Creek) and the South Security Gate (near the Stibnite Lodge) to provide information to travelers, and guard shacks will be located at each gate to monitor all vehicle ingress/egress. Persons wishing to traverse the SGP site on the Stibnite Road access route will be required to check in at the security gate to receive a safety briefing and to alert mine staff of their presence. Travelers will be required to check out upon exiting the site to ensure passage through the site in a safe and timely manner. Travelers will not be allowed to stop or loiter while traveling though the operations area. Along its full length, the Stibnite Road access route would have appropriate signage to direct travelers and would be separated from mine haul roads and areas of mine operations by fencing, berms, or gates to prevent travelers from straying from the route. When possible and to the degree practicable, anticipated public access restrictions will be communicated to the public in a timely manner so that they may plan appropriately. Receptors on the Stibnite Road access route were not included in the SGP air quality analyses as this road is not considered ambient air.

The worker housing facility will be located within the project operations boundary, near the south access security gate. This housing facility will be used strictly for accommodating employees, contractors, and official visitors, and it will not be accessible to the general public. Therefore, the atmosphere over the land occupied by the worker housing facility is not considered ambient air, and receptors were not placed at this location for the air quality analyses.

The operations boundary, shown in Figure 2 above and Figure 9 below, was used to define the ambient air boundary for air dispersion modeling purposes.

3.3.11 Nearby Co-Contributing Sources

If impacts of neighboring emission sources on receptors showing a significant impact from the sources subject to the permitting action are not adequately accounted for by the background concentration used, then emissions from those sources must be modeled. The nearest significant permitted facility to SGP is Tamarack Mill, located more than 75 kilometers (km) west. This facility is located too far away to cause a significant concentration gradient along the periphery of the SGP and was therefore not included in the cumulative impact analyses for SGP.

3.3.12 Receptor Network

DEQ determined that the receptor grid used in the submitted modeling analyses was adequate to resolve maximum modeled impacts.

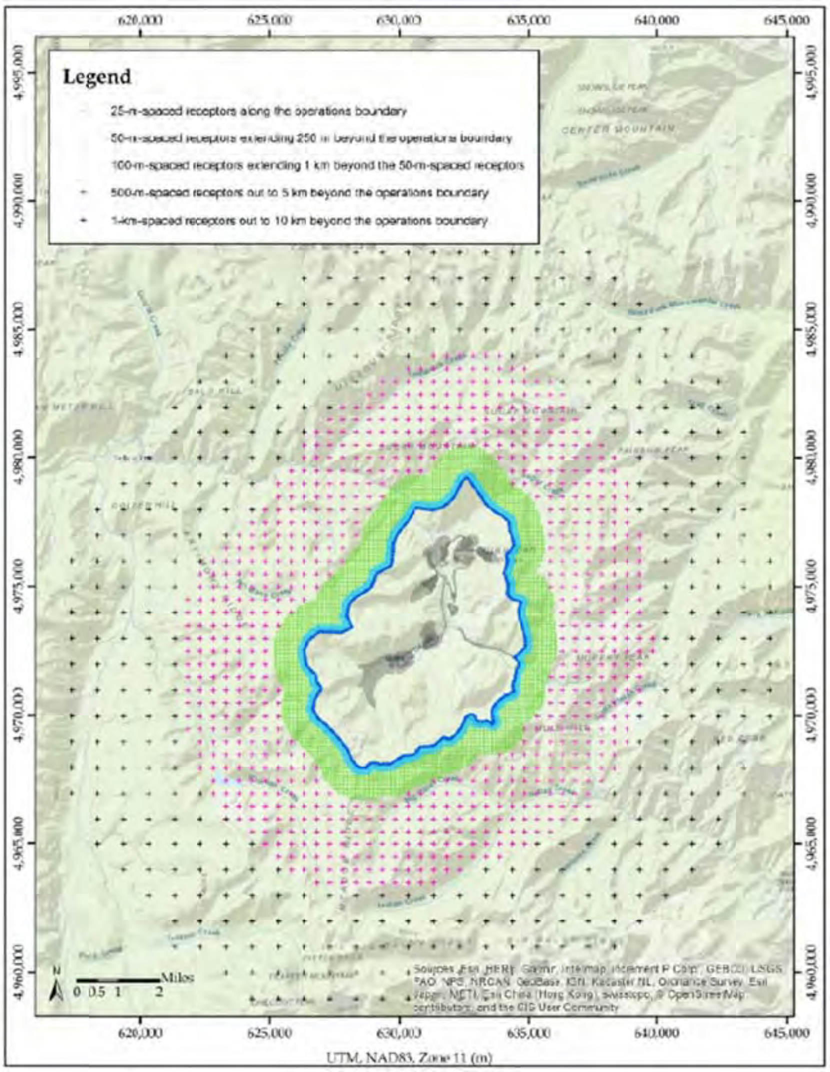
The SGP air quality analyses were performed using the following receptor spacing and extents (Table 19):

- 25-m-spaced receptors placed along the ambient air boundary;
- 50-m-spaced receptors extending 250 m beyond the ambient air boundary;
- 100-m-spaced receptors extending 1 km beyond the 50-m-spaced receptors;
- 500-m-spaced receptors extending 5 km beyond the ambient air boundary; and
- 1-km-spaced receptors extending 10 km beyond the ambient air boundary.

In addition, each highest modeled impact was evaluated further by performing a hot-spot analysis using a finer 25-m-spacing receptor grid. The modeling receptor grid is shown below in Figure 9. The full grid, along with the fenceline receptors, includes a total of 9,631 receptors. A SIL analysis was not conducted. The full receptor grid was used in the cumulative NAAQS impact and TAPs impact analyses.

The receptor grid used in the submitted modeling analyses met the minimum recommendations specified in the *Idaho Air Quality Modeling Guideline* (DEQ 2013), and DEQ determined that the receptor network was effective in reasonably assuring compliance with applicable air quality standards at all ambient air locations.

Figure 9. SGP AMBIENT AIR BOUNDARY AND MODELING RECEPTOR GRID.



3.3.13 Good Engineering Practice Stack Height

An allowable good engineering practice (GEP) stack height may be established using the following equation in accordance with Idaho Air Rules Section 512.03.b:

H = S + 1.5L, where:

H = good engineering practice stack height measured from the ground-level elevation at the base of the stack.

S = height of the nearby structure(s) measured from the ground-level elevation at the base of the stack.

L = lesser dimension, height or projected width, of the nearby structure.

Sources from the SGP facility are below GEP stack height. Therefore, consideration of downwash caused by nearby buildings was required.

4.0 NAAQS and TAPs Impact Modeling Results

4.1 Results for NAAQS Analyses

4.1.1 Significant Impact Level Analyses

A SIL analysis was not performed for the SGP project.

4.1.2 Cumulative NAAQS Impact Analyses

Table 25 provides results (highest of 14 scenarios) for the cumulative NAAQS impact analysis. It provides the model-predicted maximum design concentration (including the hot-spot analyses) and the associated modeling scenario, the background concentration, and the estimated total concentration (SGP impact plus background) for each pollutant-averaging time combination. A comparison of the estimated total concentrations with the applicable NAAQS is also provided in this table. For each pollutant and averaging period, two modeled design concentrations are listed, each corresponding to the meteorological data processed with (BULKRN) and without (NON-BULKRN, grey shading) the Bulk Richardson method.

Table 25. RESULTS FOR CUMULATIVE NAAQS IMPACT ANALYSIS.

Pollutant	Averaging Time	Max. Conc.[a] ($\mu g/m^3$)[b]	Model Scenario	Back. Conc.[c] ($\mu g/m^3$)	Total Conc.[d] ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Percent of NAAQS
Carbon monoxide	8 hours	6,218[e]	W1	1,110	7,328	10,000	73.3%
		3,516[f]	W1		4,626		46.3%
	1 hour	17,054	W1	1,740	18,794	40,000	47.0%
		9,467	W1		11,207		28.0%
Nitrogen dioxide	1 year	2.3	W1	0.9	3.2	100	3.2%
		1.4	W1		2.3		2.3%
	1 hour	116.7	B1	4.3	121.0	188	64.4%
		111.0	W1		115.3		61.3%
$PM_{2.5}$[g]	1 year	7.7	W5	3.5	11.2	12	93.3%
		4.2	W5		7.7		64.2%
	24 hours	18.6	W5	15.0	33.6	35	96.0%
		11.0	W5		26.0		74.3%
PM_{10}[h]	24 hours	121.5	W5	37.0	158.5	150	105.7%[i]
		75.7	W5		112.7		75.1%

Sulfur dioxide	3 hours	1.8	B1	16.8	18.6	1,300	1.4%
		1.2	B1		18.0		1.4%
	1 hour	3.2	B1	12.3	15.5	196	7.9%
		2.7	B1		15.0		7.7%

[a] Max. Conc. = maximum modeled design concentration.
[b] Micrograms per cubic meter.
[c] Back. Conc. = background concentration.
[d] Total Conc. = total (modeled + background) concentration.
[e] The first Max. Conc. value for each pollutant and averaging time represents results using the BULKRN meteorological data.
[f] The second (grey-shaded) Max. Conc. value for each pollutant and averaging time represents results using the NON-BULKRN meteorological data.
[g] Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
[h] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
[i] Results for 24-hour PM_{10} with meteorological data processed using BULKRN show up to five hotspot receptors that exceed NAAQS. Refer to Section 4.1.4 of this modeling memo for a weight-of-evidence analysis demonstrating NAAQS compliance.

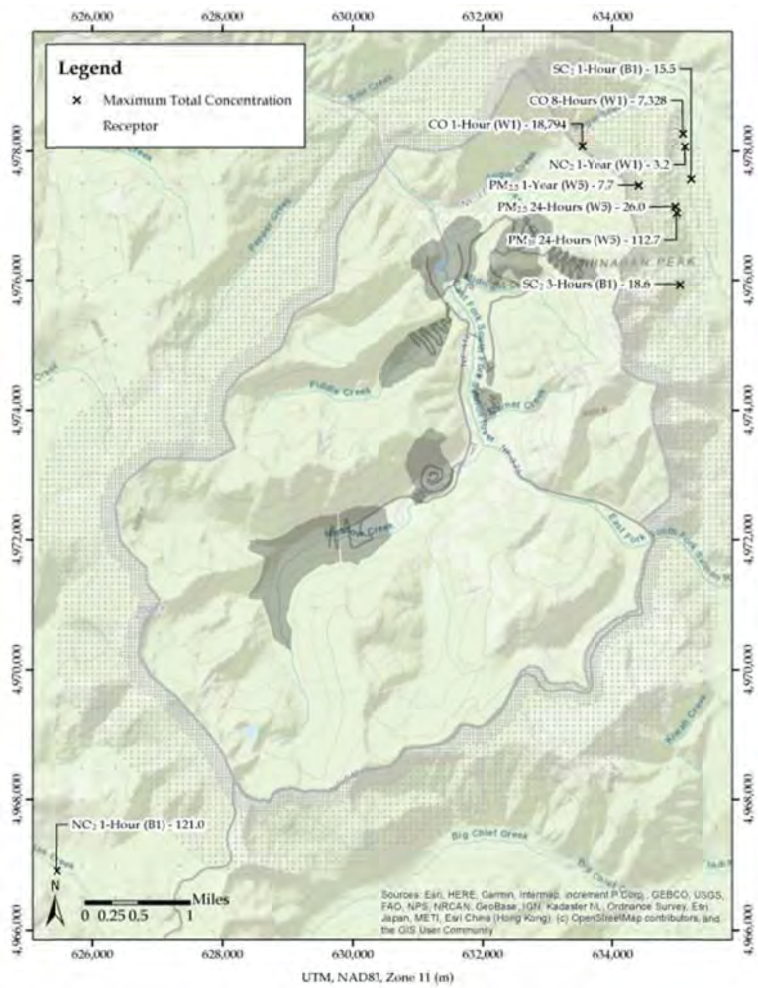
Table 25 shows that modeled concentrations derived using the BULKRN meteorological data are higher than the NON-BULKRN dataset. It also shows that the total (modeled + background) concentrations from the SGP cumulative impact analyses do not exceed the applicable NAAQS, except for when the BULKRN meteorological data are used in modeling 24-hour PM_{10} (total concentration is 105.7% of the 24-hour PM_{10} NAAQS).

PM_{10} modeling with the meteorological dataset processed with the BULKRN method shows up to five hotspot receptors for three modeling scenarios (W1, W3, and W5) with slight exceedance of NAAQS. Scenario W5 is the worst-case scenario, with a maximum total concentration of 158.5 $\mu g/m^3$ which exceeds the NAAQS of 150 $\mu g/m^3$. A weight-of-evidence analysis demonstrating PM_{10} NAAQS compliance is presented in Section 4.1.4 of this modeling memo.

The locations of the maximum impacts for each pollutant and averaging time are illustrated in Figure 10. The results presented in this figure include the hot-spot analyses conducted for each applicable pollutant-averaging time combination. For $PM_{2.5}$ and PM_{10}, the alternate meteorological data (NON-BULKRN) were used.

Modeling for ozone and secondary $PM_{2.5}$ were not performed for this minor stationary source. These analyses are typically associated with applications for major stationary sources. Nonetheless, taking the ratio of the VOC, NOx, and SO_2 emissions from the SGP facility by the emissions and resulting concentrations of O_3 and secondary $PM_{2.5}$ from EPA's modeled emission rates for precursors (MERPs) guidance yields estimated O_3 and secondary $PM_{2.5}$ concentrations of less than 1 ppb of O_3 and less than 0.1 $\mu g/m^3$ of $PM_{2.5}$ (24-hour and annual) for the SGP. These estimated concentrations have a negligible effect on compliance demonstration with the NAAQS.

Figure 10. SGP CUMULATIVE IMPACTS (μg/m³) AND LOCATIONS.



Higher background concentrations from McCall that include medium-traffic emissions provided in Section 3.2.3 were then combined with the SGP model-predicted maximum design concentrations to provide an additional level of conservatism in demonstrating compliance. These results are shown in Table 26. For $PM_{2.5}$ and PM_{10}, the alternate meteorological data (NON-BULKRN) were used. For the rest of the criteria pollutants, the BULKRN meteorological data were used.

Table 26. RESULTS FOR CUMULATIVE NAAQS IMPACT ANALYSIS WITH MEDIUM-TRAFFIC BACKGROUND.

Pollutant	Averaging Time	Max. Conc.[a] (μg/m³)[b]	Model Scenario	Back. Conc.[c]	Total Conc.[d]	NAAQS (μg/m³)	Percent of NAAQS

				($\mu g/m^3$)	($\mu g/m^3$)		
Carbon monoxide	8 hours	6,218	W1	1,145	7,363	10,000	73.6%
	1 hour	17,054	W1	1,797	18,851	40,000	47.1%
Nitrogen dioxide	1 year	2.3	W1	2.6	4.9	100	4.9%
	1 hour	116.7	B1	14.3	131.0	188	69.7%
$PM_{2.5}$[e]	1 year	4.2	W5	5.1	9.3	12	77.5%
	24 hours	11.0	W5	17.5	28.5	35	81.4%
PM_{10}[f]	24 hours	75.7	W5	60.1	135.8	150	90.5%
Sulfur dioxide	3 hours	1.8	B1	16.8	18.6	1,300	1.4%
	1 hour	3.2	B1	12.3	15.5	196	7.9%

a. Max. Conc. = maximum modeled design concentration.
b. Micrograms per cubic meter.
c. Back. Conc. = background concentration.
d. Total Conc. = total (modeled + background) concentration.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
f. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.

4.1.3 DEQ's Sensitivity Analyses for 1-hour and annual NO_2

DEQ performed a sensitivity analysis for 1-hour and annual NO_2 using a Tier 2 (ARM2) screening method. Minimum and maximum NO_2/NOx ratios of 0.5 and 0.9, respectively, were used. Results from DEQ's cumulative NAAQS impact analyses, summarized below in Table 27, indicate that the SGP facility is safely below the 1-hour and annual NO_2 NAAQS even when using a more conservative NO_2 screening method.

Table 27. RESULTS FOR DEQ'S NO_2 SENSITIVITY ANALYSES USING TIER 2 (AMBIENT RATIO METHOD 2) SCREENING METHOD.

Pollutant	Averaging Time	Max. Conc.[a] ($\mu g/m^3$)[b]	Model Scenario	Back. Conc.[c] ($\mu g/m^3$)	Total Conc.[d] ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Percent of NAAQS
Nitrogen dioxide	1 year	1.8	B1	0.9	2.7	100	2.7%
		1.8	H1		2.7		2.7%
		2.3	W1		3.2		3.2%
		1.8	Y1		2.7		2.7%
	1 hour	110.9	B1	4.3	115.2	188	61.3%
		73.0	H1		77.3		41.1%
		162.6	W1		166.9		88.8%
		59.8	Y1		64.1		34.1%

a. Max. Conc. = maximum modeled design concentration.
b. Micrograms per cubic meter.
c. Back. Conc. = background concentration.
d. Total Conc. = total (modeled + background) concentration.

4.1.4 DEQ's Weight-of-Evidence Analyses for 24-hour PM_{10}

This section describes a weight-of-evidence analysis that provides additional analytical information to evaluate the degree of NAAQS compliance confidence for 24-hour PM_{10}. NAAQS compliance was demonstrated in the submitted application using meteorological data processed with an EPA-approved method using regional cloud cover to calculate stability parameters rather than site-specific monitored solar radiation and measured temperature differences with height.

As described in Section 4.1.2, PM_{10} modeling with meteorological dataset processed using the site-specific BULKRN method shows up to five hotspot receptors for Scenario W5 (the highest PM_{10} modeling scenario) that exceed NAAQS (150 $\mu g/m^3$). The hotspot receptors have a 25-meter grid spacing. Hotspot receptors that exceed 24-hour PM_{10} NAAQS have total (modeled + background) concentrations of 152.7, 154.3, 155.0, 155.7, and 158.5 µg/m^3. Locations of these receptors are illustrated in Figure 11. Figure 12 shows these receptors overlaid on Google Earth.

Figure 11. HOTSPOT RECEPTORS THAT EXCEED 24-HOUR PM_{10} NAAQS (SCENARIO W5, BULKRN METEOROLOGICAL DATA).

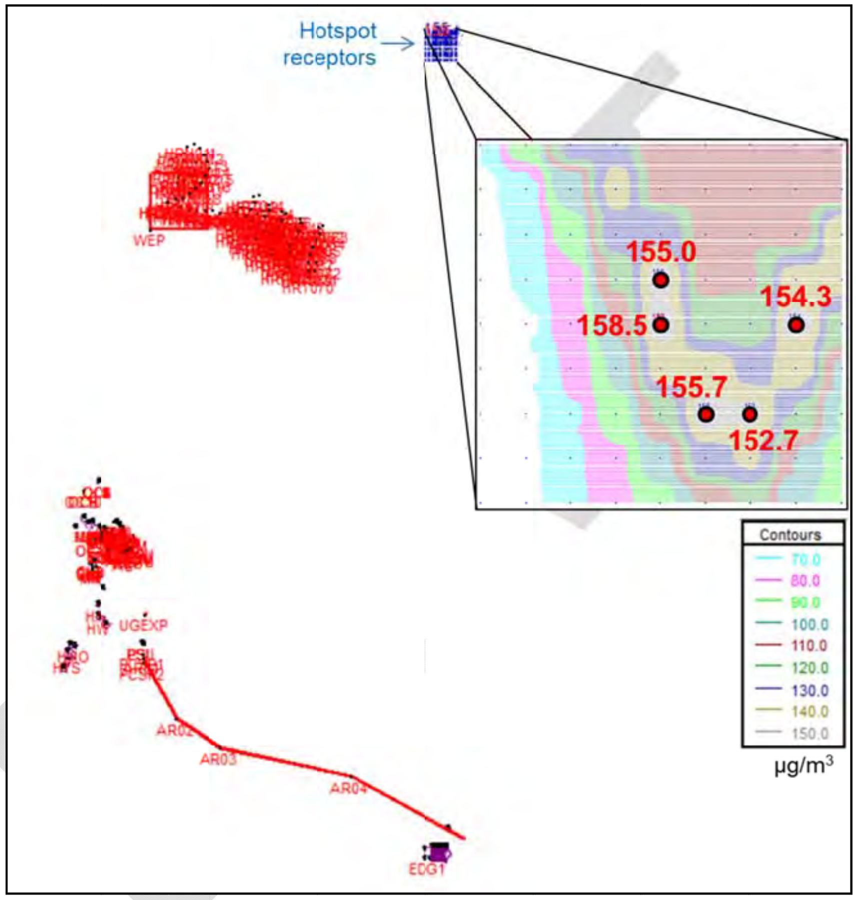
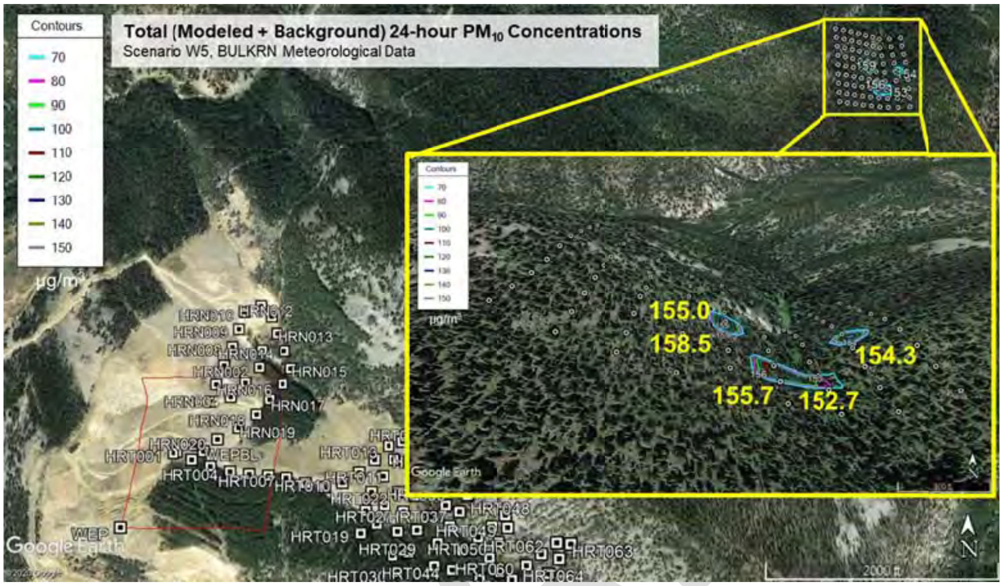


Figure 12. HOTSPOT RECEPTORS THAT EXCEED 24-HOUR PM_{10} NAAQS, OVERLAID ON GOOGLE EARTH IMAGE (SCENARIO W5, BULKRN METEOROLOGICAL DATA).



Figures 11 and 12 show that the modeled PM_{10} NAAQS exceedances are located northeast of the SGP facility. These receptors are located 2 km away from the center of the West End Pit (WEP). The AERMOD output files indicate that all modeled violations occur during winter (all modeled violations occur on December 23, 2014). Data provided in the SGP baseline study (Midas Gold 2017a) specify an average snow depth of 21-68 inches and an average precipitation of 6.0 inches at the project site during this period. Therefore, fugitive road dust emissions during high-modeled impact hours could be overestimated.

DEQ performed a source-group analysis (Table 28) which indicates that emissions from the WEP and the Haul Road (HR) are the largest contributors to the maximum modeled PM_{10} design concentrations. For comparison, source-group analyses using the NON-BULKRN meteorological data are also listed in Table 28.

Table 28. SOURCE-GROUP ANALYSIS FOR 24-HOUR PM_{10} (SCENARIO W5).

Emission Source Group	Modeled Design Concentration ($\mu g/m^3$)[a]	
	BULKRN	NON-BULKRN
ALL	121.5	75.7
West End Pit (WEP)	89.3	24.5
West End Pit Blasting (WEPBL)	1.94	1.81
West End Pit Development Rock Storage Facility (WEDRSF)	0.98	3.47
Haul Road (HR)	51.0	52.5
Access Road (ACCRD)	0.0064	0.0074
Underground Exploration (UGEXP)	0.00001	0.00001

Process & Ancillary Point Sources	0.23	0.76
Process & Ancillary Volume Sources	0.20	0.29

[a.] Micrograms per cubic meter.

The six source groups listed in Table 28 that are related to mining activity and emissions (WEP, WEPBL, WEDRSF, HR, ACCRD, UGEXP) were examined further. Table 29 lists the daily modeled PM_{10} emissions (in pounds per day [lb/day]), grouped according to mining activity. Key assumptions for calculating the daily emissions are also listed in this table. Total modeled PM_{10} emission from mining activity for Scenario W5 is 3,336.76 lb/day. The contribution from each source group is listed in the second column of Table 29, and a pie chart is illustrated in Figure 13.

Table 29. KEY ASSUMPTIONS FOR CALCULATING DAILY MINING ACTIVITY EMISSIONS FOR 24-HOUR PM_{10} (SCENARIO W5).

Mining Activity	Emissions (lb/day)[a]
WEP (West End Pit)	**885.54**
Open Pit Drilling • Blasting 180,000 tons of material (DR) per day • Drilling 1,200 holes per day	811.20
Material Loading • Blasting 180,000 tons of material (DR) per day	18.00
Dozing • Dozers operating 144 hours per day • Surface material silt content of 6.9% • Material moisture content of 7.9%	54.20
Surface Exploration • Total wet drilling holes of 700 divided by 14 years • 50 holes per year	2.15
WEPBL (West End Pit Blasting)	**334.38**
Open Pit Blasting • Blasting 180,000 tons of material (DR) per day • Two blasts per day	334.38
WEDRSF (West End Pit Development Rock Storage Facility)	**57.12**
Material Unloading • Blasting 180,000 tons of material (DR) per day	2.88
Dozing • Six dozers operating 144 hours per day • Surface material silt content of 6.9% • Material moisture content of 7.9%	54.20
Wind Erosion	0.04
HR (Haul Road)	**2,050.34**
Onsite Hauling • Blasting 180,000 tons of material (DR) per day • One-way hauling distance of 3.07 miles • Total travel of 7,758 vehicle miles traveled (VMT) per day • Surface material silt content of 4% • Daily PM_{10} emission factor of 3.55 pounds per VMT • Control efficiency of 90% for chemical suppressant • Control efficiency of 33% for watering	1,842.97
Grading • Grader average speed of 6.5 mph • Three graders operating 72 hours per day • Control efficiency of 90% for chemical suppressant	60.51
Water Truck Travel • Two water trucks operating 48 hours per day	146.86

• Average truck speed of 15 mph • Surface material silt content of 4% • Daily PM_{10} emission factor of 3.04 pounds per VMT • Control efficiency of 90% for chemical suppressant • Control efficiency of 33% for watering	
ACCRD (Access Road)	**9.38**
Vehicle Travel • Access road length of 1.6 miles (within project boundary) • Surface material silt content of 4% • Daily PM_{10} emission factor of 1.26 pounds per VMT • Control efficiency of 90% for chemical suppressant • Control efficiency of 33% for watering	9.17
Grading • PM_{10} emission factor of 1.3 pounds per VMT • Control efficiency of 90% for chemical suppressant	0.21
UGEXP (Underground Exploration)	**0.004**
Underground Exploration • Wet drilling 25 holes per year	0.004

[a.] Pounds per day.

Figure 13. PIE CHART FOR DAILY MODELED PM_{10} EMISSIONS FROM MINING ACTIVITY (SCENARIO W5).

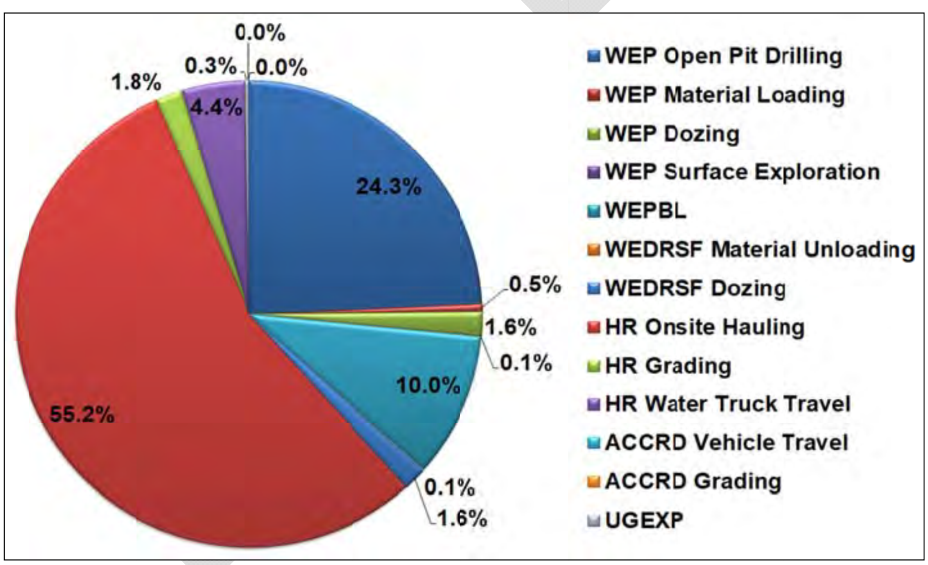


Figure 13 shows that onsite hauling on haul roads ("HR Onsite Hauling") accounts for 55.2% of the total daily PM_{10} emissions. Open pit drilling at the WEP ("WEP Open Pit Drilling") and blasting ("WEPBL") account for 24.3% and 10.0% of the daily PM_{10} emissions, respectively. Therefore, it is not surprising that HR, WEP, and WEPBL are the largest contributors to the modeled design concentrations in Table 28.

As listed in Table 29, PM_{10} modeling simulation for Scenario W5 was based on a mining production rate of 180,000 ton/day of development rock. This corresponds to 6~~2~~5,700,000 ton/year, which is more conservative than the expected peak production rate of 42,692,000 ton/year (116,964 ton/day). To investigate the effect of a lower modeled mining production rate on design value concentrations, DEQ performed a modeling simulation ("DEQ Run 1") where mining production rate was assumed to be 120,000 ton/day instead of 180,000 ton/day, but all other model variables were held constant. This adjustment lowered the modeled daily emission rates for WEP, WEDRSF, and HR, which are summarized in Table 30. Because the modeled emission rates were lower, the modeled design concentrations were also lower. Results for DEQ's sensitivity analyses are summarized in Table 31.

Table 30. DAILY MINING ACTIVITY EMISSIONS USED IN DEQ'S SENSITIVITY ANALYSES FOR 24-HOUR PM_{10} (SCENARIO W5).

Mining Activity	Emissions (lb/day)[a]	
	Applicant's Submittal	DEQ Run 1
WEP (West End Pit)	**885.54**	**879.54**
Open Pit Drilling	811.20	811.20
Material Loading	18.00	12.00
Dozing	54.20	54.20
Surface Exploration	2.15	2.14
WEPBL (West End Pit Blasting)	**334.38**	**334.38**
Open Pit Blasting	334.38	334.38
WEDRSF (West End Pit Development Rock Storage Facility)	**57.12**	**56.15**
Material Unloading	2.88	1.92
Dozing	54.20	54.20
Wind Erosion	0.04	0.03
HR (Haul Road)	**2,050.34**	**1,436.50**
Onsite Hauling	1,842.97	1,229.13
Grading	60.51	60.51
Water Truck Travel	146.86	146.86
ACCRD (Access Road)	**9.38**	**9.38**
Vehicle Travel	9.17	9.17
Grading	0.21	0.21
UGEXP (Underground Exploration)	**0.004**	**0.004**
Underground Exploration	0.004	0.004
Total	**3,336.76**	**2,715.95**

a. Pounds per day.

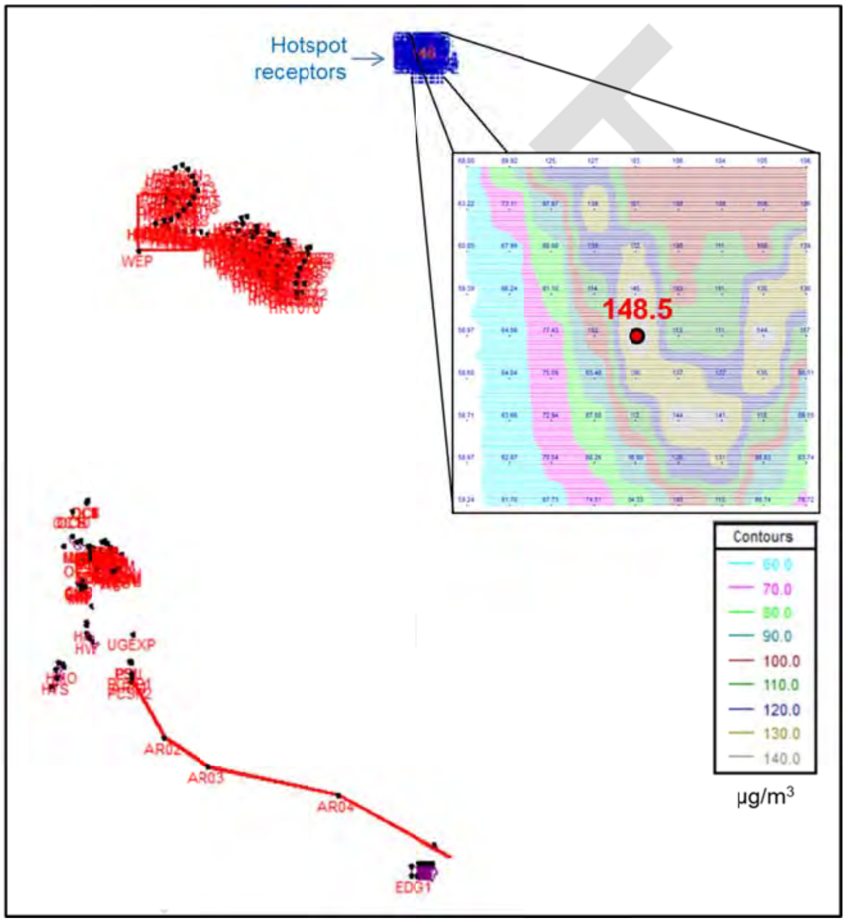
Table 31. RESULTS FOR DEQ'S SENSITIVITY ANALYSES FOR 24-HOUR PM_{10} (SCENARIO W5, BULKRN METEOROLOGICAL DATA).

Pollutant	Averaging Time	Max. Conc.[a] ($\mu g/m^3$)[b]	Model Scenario	Back. Conc.[c] ($\mu g/m^3$)	Total Conc.[d] ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Percent of NAAQS
PM_{10}[e]	24 hours	111.5[f]	W5	37.0	148.5	150	99.0%

a. Max. Conc. = maximum modeled design concentration.
b. Micrograms per cubic meter.
c. Back. Conc. = background concentration.
d. Total Conc. = total (modeled + background) concentration.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
f. DEQ Run 1: mining production rate was modeled at 120,000 ton/day instead of 180,000 ton/day. Everything else was held constant.

Maximum modeled concentration for "DEQ Run 1", when summed with the background concentration, is lower than NAAQS thereby demonstrating NAAQS compliance. Total (modeled + background) concentrations for all hotspot receptors are depicted in Figure 14; maximum total impact is depicted by the red circle. The SGP facility complies with the 24-hour PM_{10} NAAQS when daily mining production rates closer to a more typical daily rate for a high-production period are used in the model, instead of a very conservative mining production rate, even when using site-specific BULKRN meteorological data.

Figure 14. RESULTS FOR DEQ'S SENSITIVITY ANALYSES SHOWING TOTAL (MODELED + BACKGROUND) 24-HOUR PM_{10} CONCENTRATIONS AT HOTSPOT RECEPTORS (SCENARIO W5, BULKRN METEOROLOGICAL DATA).



Meteorological data processing with and without BULKRN are considered acceptable by EPA. However, the BULKRN meteorological data yielded higher modeled design values for the SGP facility than the meteorological data processed without the BULKRN method. DEQ's analyses suggest that when daily mining production rates closer to a more typical daily rate for a high-production period are used (everything else held constant), the SGP facility is able to demonstrate compliance with 24-hour PM_{10} NAAQS at those few receptors showing a potential violation when using meteorological data processed with the BULKRN method.

Maximum modeled design value 24-hour PM_{10} impacts, even with the use of more reasonably expected daily production rates, are still just under the 150 µg/m^3 NAAQS. As noted earlier in this section, these high values were observed during the winter season. During this period, not only are fugitive emissions minimized because of the higher moisture content of material handled or driven over, but background concentrations in such remote areas are generally much lower because of the absence of wildfires and dust-generating sources.

DEQ's weight-of-evidence analyses show that, considering all the collective conservative layers of the modeling analyses, modeling efforts using both site-specific and alternative meteorological datasets show acceptable impacts.

4.1.5 DEQ's Sensitivity Analyses for a Lower Fugitive Road Dust Control Efficiency

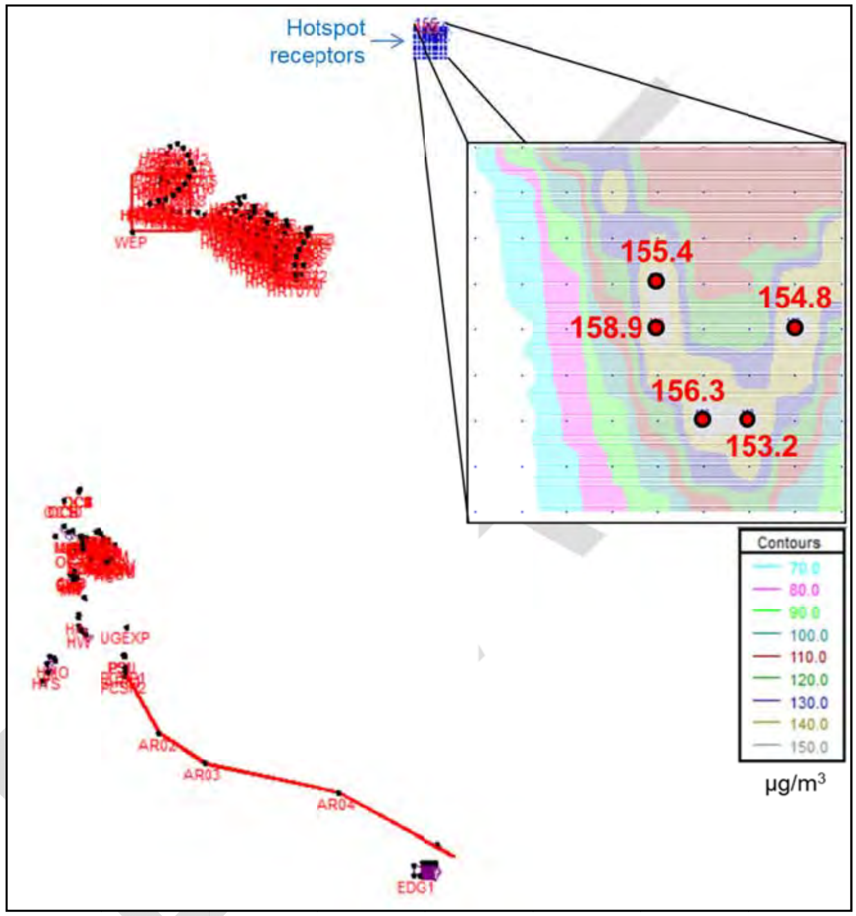
Fugitive particulate emissions from roadways were estimated by the applicant to be controlled above 93%, which is an aggressive level of control. The high level of emission control was needed to demonstrate compliance with NAAQS. To investigate the effect of lower unpaved road emission control efficiency, DEQ performed a modeling simulation ("DEQ Run 2") where the control efficiency was set to 90%. The daily mining production rate was assumed to be 120,000 ton/day instead of 180,000 ton/day, but everything else was held constant. These adjustments lowered the daily modeled emission rates for WEP and WEDRSF, but increased the daily modeled emission rate for HR and the Access Road (ACCRD) (Table 32). Five receptors exceed the 24-hour PM_{10} NAAQS. Figure 15 shows the locations of these receptors.

Table 32. DAILY MINING ACTIVITY EMISSIONS USED IN DEQ'S SENSITIVITY ANALYSES FOR 24-HOUR PM_{10} (SCENARIO W5).

Mining Activity	Emissions (lb/day)[a]	
	Applicant's Submittal	DEQ Run 2
WEP (West End Pit)	**885.54**	**879.54**
Open Pit Drilling	811.20	811.20
Material Loading	18.00	12.00
Dozing	54.20	54.20
Surface Exploration	2.15	2.14
WEPBL (West End Pit Blasting)	**334.38**	**334.38**
Open Pit Blasting	334.38	334.38
WEDRSF (West End Pit Development Rock Storage Facility)	**57.12**	**56.15**
Material Unloading	2.88	1.92
Dozing	54.20	54.20
Wind Erosion	0.04	0.03
HR (Haul Road)	**2,050.34**	**2,114.24**
Onsite Hauling	1,842.97	1,834.53
Grading	60.51	60.51
Water Truck Travel	146.86	219.20
ACCRD (Access Road)	**9.38**	**13.90**
Vehicle Travel	9.17	13.69
Grading	0.21	0.21
UGEXP (Underground Exploration)	**0.004**	**0.004**
Underground Exploration	0.004	0.004
Total	**3,336.76**	**3,398.21**

a. Pounds per day.

Figure 15. RESULTS FOR DEQ'S SENSITIVITY ANALYSES SHOWING HOTSPOT RECEPTORS THAT EXCEED 24-HOUR PM_{10} NAAQS, ASSUMING MINING PRODUCTION RATE OF 120,000 TONS PER DAY AND FUGITIVE ROAD DUST CONTROL EFFICIENCY OF 90% (SCENARIO W5, BULKRN METEOROLOGICAL DATA).



DEQ's sensitivity analyses suggest that a few hotspot receptors exceed the 24-hour PM_{10} NAAQS when the unpaved road control efficiency falls below 93% and the meteorological data processed with the BULKRN method is used. However, all the hotspot receptors demonstrate compliance with NAAQS at a 90% control efficiency when using the meteorological data processed without the BULKRN method, and at both examined production levels:

- maximum impact at 120,000 ton per day – 73.9 µg/m³ + 37.0 µg/m³ = 110.9 µg/m³.
- maximum impact 180,000 ton per day – 84.6 µg/m³ + 37.0 µg/m³ = 121.6 µg/m³.

As previously stated, meteorological data processing with and without BULKRN are both considered acceptable regulatory options by EPA. Therefore, this demonstrates that emissions resulting from a lower unpaved road control efficiency (even potentially less than 90%) do not cause or contribute to a NAAQS violation. Nonetheless, the permit requires ~~This highlights the need for~~ an aggressive implementation of measures to ~~achieve above 93%~~ control ~~efficiency for~~ fugitive particulate emissions from roadways.

4.2 Results for TAPs Impact Analyses

The SGP TAP modeling results and their comparison with the applicable AACs/AACCs are provided in Table 33.

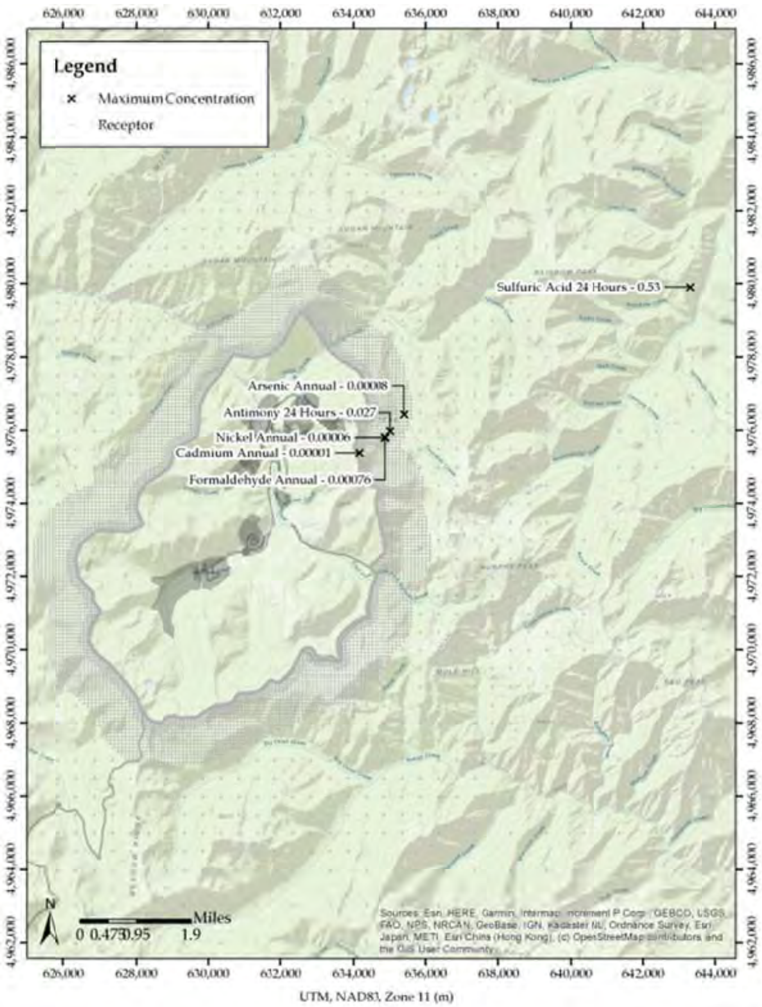
Table 33. RESULTS FOR TAPS IMPACT ANALYSIS.

Pollutant	Averaging Time	Maximum Modeled Concentration (µg/m³)[a]	Model Scenario	AAC[b] (µg/m³)	AACC[c] (µg/m³)	Percent of AAC/AACC
Antimony	24 hours	2.7E-02	B1	25	--	0.1%
Arsenic	Annual	8.0E-05	All	--	0.00023	34.8%
Cadmium	Annual	1.0E-05	All	--	0.00056	1.8%
Formaldehyde	Annual	7.6E-04	All	--	0.077	1.0%
Nickel	Annual	6.0E-05	All	--	0.0042	1.4%
Sulfuric Acid	24 hours	5.3E-01	All	50	--	1.1%

a. Micrograms per cubic meter.
b. Acceptable Ambient Concentration of a non-carcinogenic TAP.
c. Acceptable Ambient Concentration of a Carcinogenic TAP.

Table 33 shows that the modeled TAP impacts from the SGP sources do not exceed the applicable AACs/AACCs. The locations of the maximum impacts for each TAP are presented in Figure 16.

Figure 16. SGP TAP IMPACTS (µg/m^3) AND LOCATIONS.



5.0 Conclusions

The information submitted with the PTC application, combined with DEQ's air impact analyses, demonstrated to DEQ's satisfaction that emissions from the Stibnite Gold Project in Valley County, Idaho will not cause or significantly contribute to a violation of any applicable ambient air quality standard or TAP increment.

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APPENDIX D – PROCESSING FEE

PTC Processing Fee Calculation Worksheet

Instructions:
Fill in the following information and answer the following questions with a Y or N. Enter the emissions increases and decreases for each pollutant in the table.

Company:	**Midas Gold Idaho, Inc.**
Address:	**Forest Service Roads NF-374 &**
City:	**Stibnite**
State:	**ID**
Zip Code:	**83611**
Facility Contact:	**Alan Haslam**
Title:	**Vice President - Permitting**
AIRS No.:	**085-00011**

N	Does this facility qualify for a general permit (i.e. concrete batch plant, hot-mix asphalt plant)? Y/N
Y	Did this permit require engineering analysis? Y/N
N	Is this a PSD permit Y/N (IDAPA 58.01.01.205.04)

Emissions Inventory			
Pollutant	Annual Emissions Increase (T/yr)	Annual Emissions Reduction (T/yr)	Annual Emissions Change (T/yr)
NO_X	37.9	0	37.9
SO_2	6.5	0	6.5
CO	30.5	0	30.5
PM10	56.3	0	56.3
VOC	4.8	0	4.8
Total:	**135.8**	0.0	**135.8**
Fee Due	**$ 7,500.00**		

Comments: Non-major facility required to obtain T1 permit in accordance with IDAPA 58.01.01.313.01.b and 40 CFR 63.11640(d).

APPENDIX E – ACCESS MANAGEMENT

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info@midasgoldidaho.com

MAX.TSX
MDRPF.OTCQX

www.midasgoldidaho.com

Midas Gold Idaho, Inc. - Stibnite Gold Project
Stibnite Road Access Management Plan – Version 1

April 15, 2020

1 Purpose and Objectives

This Stibnite Road Access Management Plan (Plan) describes the methods whereby Midas Gold Idaho, Inc. (Midas Gold), an Idaho corporation, would manage access on designated roads that traverse the proposed Stibnite Gold Project (SGP) mine site. The SGP is described in Midas Gold's Plan of Restoration and Operations (PRO).

The SGP is a proposed open pit mine that will be located at Stibnite, in central Idaho (see inset, Figure 1). The United States Forest Service (USFS) Forest System Road (FR) that passes through Stibnite (Stibnite Road; FR 50412) extends from the village of Yellow Pine eastward along the East Fork of the South Fork of the Salmon River for approximately 14 miles. Stibnite Road then continues south through the historic Stibnite mine site and connects with Thunder Mountain Road (FR 50375) on the southeastern portion of the proposed SGP. This route also allows for access to Meadow Creek Lookout Road (FR 51290; see Figure 1). As initially proposed, construction and operations at the SGP would prohibit access through the mine site for the life of the mine (approximately 20 to 25 years). During this period, alternative access to Thunder Mountain Road and Meadow Creek Lookout Road would be provided via the newly constructed Burntlog Route; a proposed mine access route that would connect the existing Burnt Log Road to Thunder Mountain Road with a new section of roadway and an upgraded section of Meadow Creek Lookout Road. Additionally, as proposed in the PRO, an off-highway vehicle (OHV) Trail would be upgraded to connect Horse Heaven/Powerline Road to Meadow Creek Lookout Road. Public access routes proposed in the PRO are illustrated in Figure 1. As part of reclamation of the SGP and closure of the mine site, Stibnite Road would be re-established in an alignment similar to its current location and would become the primary access route to Thunder Mountain Road. The Burntlog Route would be reclaimed to its previous condition and would no longer be connected to Thunder Mountain Road.

Following the presentation of the proposed public access routes described above in Midas Gold's PRO, an alternative public access route has been proposed by Midas Gold and would pass through the SGP mine site (Stibnite Road access route). This alternative route is under evaluation as part of the USFS's obligation to review the SGP in accordance with the National Environmental Policy Act (NEPA). One of the alternatives currently being evaluated in the Draft environmental impact statement (EIS), Alternative 2, would provide continued access through the SGP site on a realigned Stibnite Road during mine operations. The implementation of this Plan is contingent upon the selection of the applicable alternative by the USFS as the preferred alternative for the SGP and inclusion of the proposed Stibnite Road access route as a component of the approved SGP.

The health and safety of the public and the employees of the SGP is Midas Gold's priority. The procedures included in this Plan would be implemented by Midas Gold over the course of the life of the mine to ensure that the use of the Stibnite Road access route is conducted safely and responsibly.

2 Project Information

2.1 Introduction

Midas Gold has proposed to redevelop portions of the Stibnite Mining District (District) as described in the SGP PRO, submitted to the United States Forest Service (USFS) in September 2016. The SGP will be located at Stibnite in Valley County, approximately 92 miles by air and 144 miles by road northeast of Boise, Idaho; 44 air miles northeast of Cascade, Idaho; and 10 air miles east of Yellow Pine, Idaho. Current access to the site is from State Highway 55 to the SGP area via Warm Lake, Johnson Creek, and Stibnite Roads as shown in Figure 1. The proposed layout of the SGP mine features is illustrated in Figure 2.

Mining operations in the District first began in the 1920s and continued episodically through 1996. Proposed SGP mine operations described in Section 9 of the PRO would include open-pit mining in the three previously mined areas:

- The Yellow Pine open pit will encompass the area of the former Yellow Pine pit, Homestake pit, and portions of the Bradley Mining Company rock dumps.
- The West End open pit will encompass the former Stibnite Mines, Inc., open pits.
- The Hangar Flats open pit will encompass the former underground Meadow Creek Mine area, Hecla heap, and adjacent former mill and smelter area.

Other features and facilities that would be part of SGP mine operations include development rock storage facilities (DRSF), a tailings storage facility (TSF) and tailings pipeline, surface water management features (diversions, collection ditches, stormwater collection ponds), an ore processing facility, a water treatment facility, equipment maintenance and storage buildings, a worker housing facility, and all associated haul roads and access roads. The north and south points of entry to the SGP would have security gates and guard shacks that would be occupied on a continual basis. Features related to SGP mine but located off-site are illustrated in Figure 1 and include the Landmark Road Maintenance Facility, Stibnite Gold Logistics Facility, and features associated with powerline upgrades and extension.

The general timeline for constructing, operating, restoring, and mitigating the SGP is approximately 20 to 25 years, including 3 years of site preparation, construction, and early restoration activities; 12 to 15 years of operations; and 5 to 7 years of final closure and reclamation work. The SGP will produce gold, silver, and antimony over the 12- to 15-year mining period.

2.2 The SGP and NEPA

The proposed SGP occurs on patented mining claims (private land) and land administered by the United States Forest Service (USFS) within both the Boise National Forest (BNF) and Payette National Forest (PNF). The Big Creek/Stibnite Management Area 13, which includes the District, is administered by the Krassel Ranger District of the PNF. Proposed actions that occur on Federally managed lands require environmental review and analysis in compliance with NEPA. The NEPA analysis for the SGP was initiated in mid-2017 with the USFS as the lead agency. The USFS is preparing an EIS to evaluate the environmental effects of the proposed SGP as well as a range of alternatives to the proposed action.

Public comments received for the SGP indicated that the change in access through the SGP for 20 to 25 years was of significant concern, particularly for those in the Johnson Creek and Yellow Pine area who use Stibnite Road to access Thunder Mountain Road and points beyond. At the direction of the USFS, Midas Gold evaluated numerous additional access options for the SGP that provided access similar to existing conditions and travel times. Midas Gold identified a suitable access route through the SGP site that would provide through-site access during operations. The road was designed to be separated from mine operations and to provide access similar to that provided by the existing Stibnite Road. The alternative access route through the SGP was included for consideration in the Draft EIS document as a component of Alternative 2.

2.3 Proposed Stibnite Road Access Route Through the SGP

The proposed SGP Stibnite Road access route that is currently under evaluation in the SGP Draft EIS is illustrated in Figure 2 and would include one of the two optional routes described below. During mine site construction, a new 12-foot-wide gravel road would be constructed to provide public access from Stibnite Road on the northern end of the SGP to Thunder Mountain Road on the southeastern end of the site. Along its full length, the Stibnite Road access route would have appropriate signage to direct travelers and would be separated from mine haul roads and areas of mine operations by fencing, berms, or gates to prevent travelers from straying from the route.

Two optional routes were identified and include variations in alignment in the vicinity of the Yellow Pine pit:

- **Stibnite Road Access Route: Option 1** – The access road would begin at the North Security Gate and would be constructed along a widened bench of the western portion of Yellow Pine pit during an early operational phase of the mine. South of the Yellow Pine pit this road would pass beneath the mine haul leading to the Fiddle Creek DRSF and would then parallel a mine haul road along a partially revegetated portion of the former Bradley mine haul road. In the central portion of the SGP site near the Mine Administration Building, the road would connect with the Burntlog Route and continue southeast toward the Worker Housing Facility and the South (Main) Security Gate. From the north end (North Security Gate) of the SGP to the south end (South Security Gate), this road would be approximately 3 miles in length.

- **Stibnite Road Access Route: Option 2** – The access road would begin at the North Security Gate and would be constructed west of the Yellow Pine pit. South of the Yellow Pine pit this road would pass beneath the mine haul leading to the Fiddle Creek DRSF and would then parallel a mine haul road along a partially revegetated portion of the former Bradley mine haul road. In the central portion of the SGP site near the Mine Administration Building, the road would connect with the Burntlog Route and continue southeast toward the Worker Housing Facility and the South (Main) Security Gate. From the north end (North Security Gate) of the SGP to the south end (South Security Gate), this road would be approximately 4 miles in length.

Based on assessment of impacts and public and agency feedback, one of these two options would be selected if Alternative 2 is identified as the Preferred Alternative for the Midas Gold SGP.

2.4 Access Controls

The proposed Stibnite Road access route through the SGP site is meant to provide controlled, through-site access that is safe, and provides travel-time comparable to current conditions. Additionally, the Stibnite Road access route would provide access that is consistent with the USFS travel management plan. Whereas Stibnite Road between Yellow Pine and Stibnite is not plowed in winter, Midas Gold would operate the Stibnite Road access route on a seasonal basis, i.e. access would not be provided in winter. Public access to the road would begin when Stibnite Road becomes passable in the Spring.

For either of the two route options described above, the northern extent of the Stibnite Road access route would begin at the North Security Gate, would continue southward traversing the SGP mine site, would connect with the Burntlog Route and would continue southeastward out of the mine operations area. The access route would exit South Security Gate near the employee housing facility.

Midas Gold has the legal authority to control access to the Stibnite Road access route and would provide seasonal (non-winter conditions) access only. At the discretion of Midas Gold, additional access controls may occur during various phases of construction, during mine operations that present potential safety hazards such as blasting or pit expansion, due to inclement weather, or under any other circumstances that may present a threat to the protection of public health and safety. Midas Gold has the legal and practical ability to enforce its control over roadway access and to monitor traffic passing through the SGP site. Signage would be placed at the North Security Gate (near the bridge over Sugar Creek) and the Main (South) Security Gate (near the Stibnite Lodge) entry points to provide information to travelers, and guard shacks would be located at each SGP Site entry gate to monitor all vehicle ingress/egress. To ensure passage through the site in a safe and timely manner, persons wishing to traverse the SGP site on the Stibnite Road access route would be required to check in at the security gate upon entry to receive a safety briefing and to alert mine staff as to their presence. After passing through the SGP site, travelers would also be required to stop at the guard shack upon exiting to check out. Travelers would not be allowed to stop or loiter while traveling though the operations area. Along its full length, the Stibnite Road access route would have appropriate signage to direct travelers and would be separated from mine haul roads and areas of mine operations by fencing, berms, or gates to prevent travelers from straying from the route.

Midas Gold would have the ability to temporarily restrict travel along the Stibnite Road access route for the protection of public health and safety. When possible and to the degree practicable, anticipated public access restrictions would be communicated to the public in a timely manner so that they may plan appropriately.

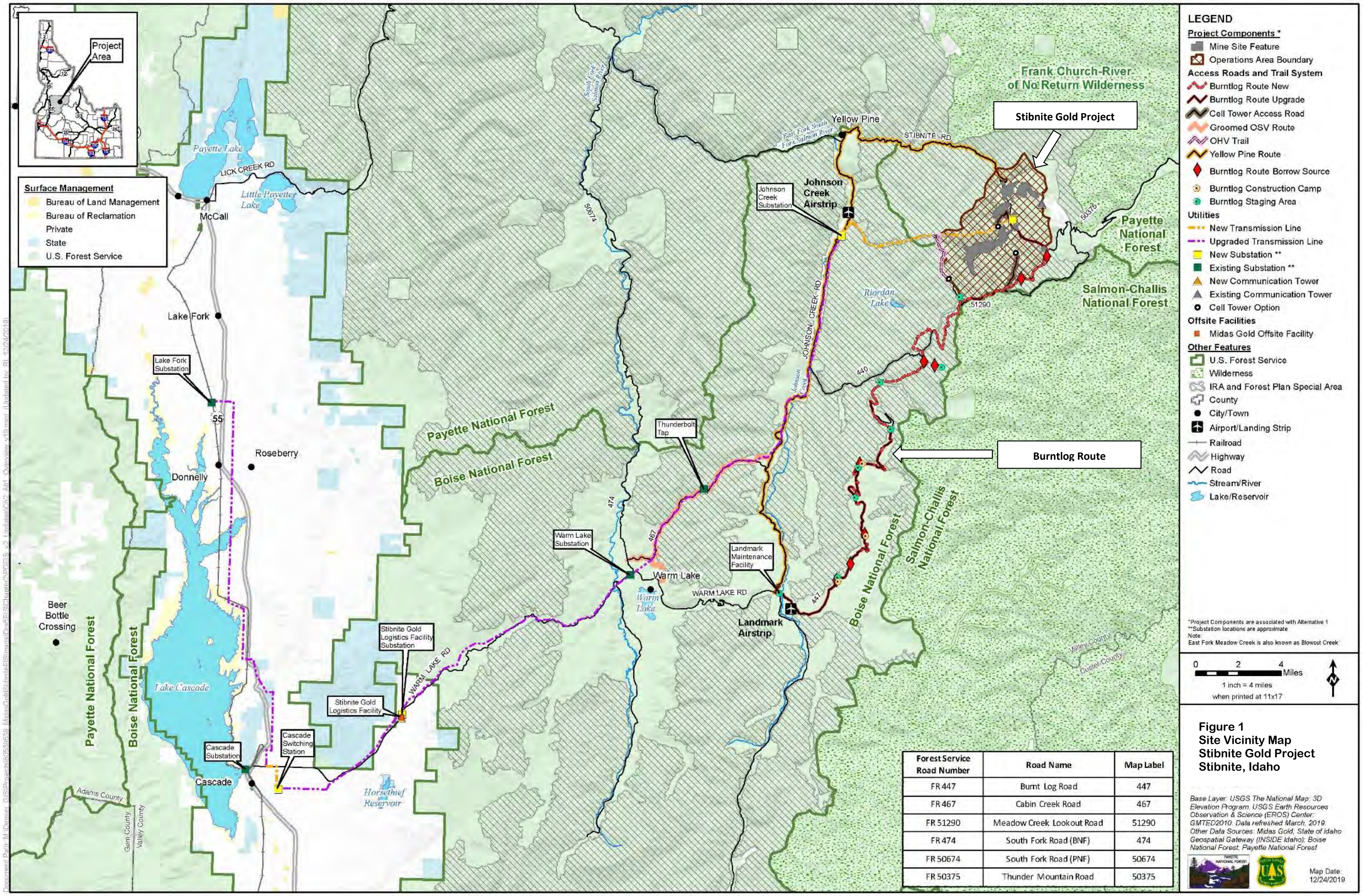
3 Conclusion

Midas Gold's SGP is under evaluation by the USFS and is proceeding through environmental analysis under NEPA. Midas Gold's proposed action and several alternatives to the proposed action will be included in the forthcoming Draft EIS. Alternative 2 in the Draft EIS includes an access alternative that would route a roadway, the Stibnite Road access route, through the mine site.

Maintaining and protecting SGP mine employee and public health and safety is Midas Gold's priority. This Stibnite Road Access Management Plan has been prepared to demonstrate that appropriate best practices, roadway construction features, and Midas Gold SGP site security measures would be in place over the life of the SGP mine and would effectively control access to the Stibnite Road access route.

This Plan will be updated and revised as appropriate.

List of Figures



Forest Service Road Number	Road Name	Map Label
FR 447	Burnt Log Road	447
FR 467	Cabin Creek Road	467
FR 51290	Meadow Creek Lookout Road	51290
FR 474	South Fork Road (BNF)	474
FR 50674	South Fork Road (PNF)	50674
FR 50375	Thunder Mountain Road	50375

Figure 1
Site Vicinity Map
Stibnite Gold Project
Stibnite, Idaho

Base Layer: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2019. Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); Boise National Forest; Payette National Forest

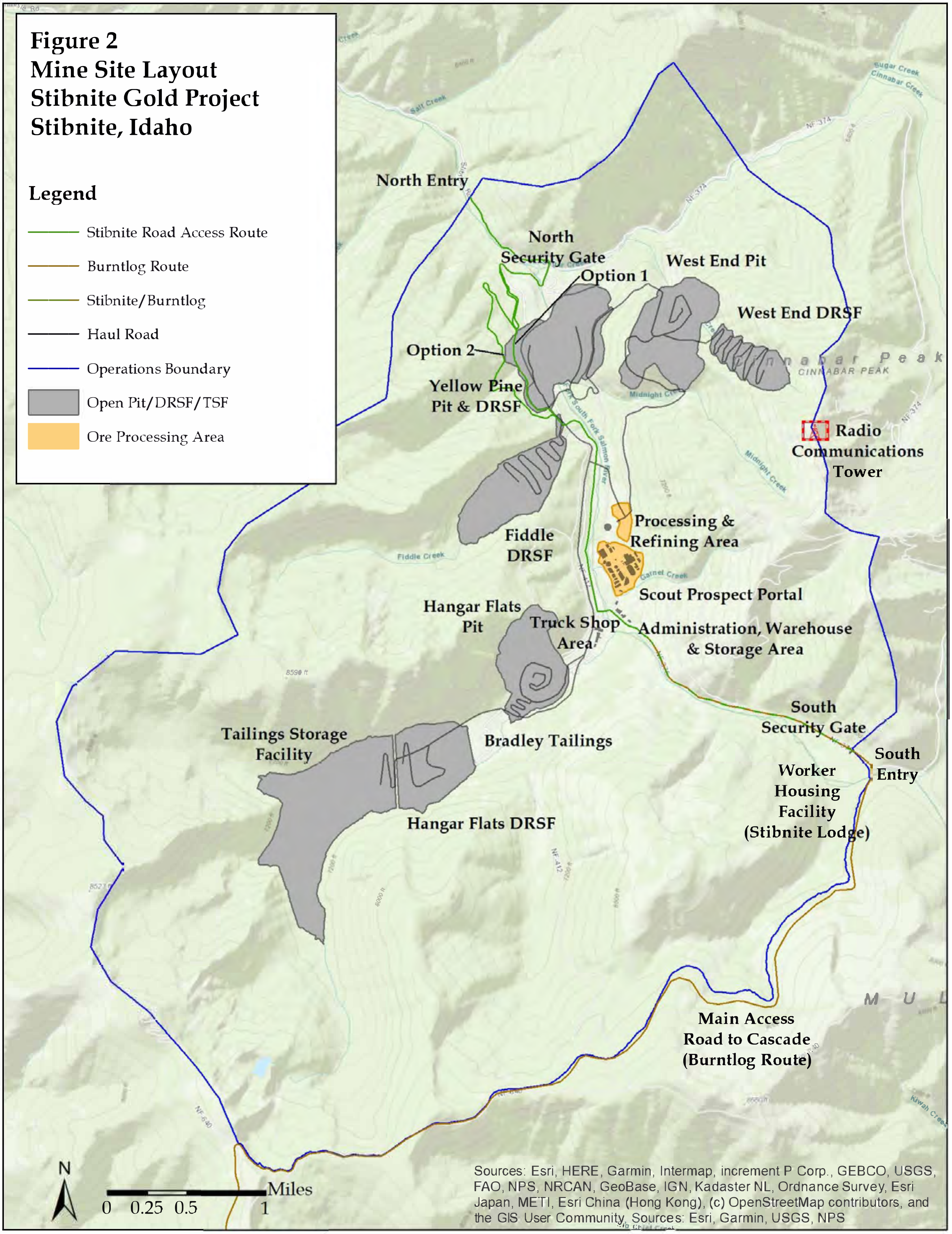


Figure 2
Mine Site Layout
Stibnite Gold Project
Stibnite, Idaho

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August 03, 2020

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Via: Email Michael.Simon@deq.idaho.gov and Morrie.Lewis@deq.idaho.gov

Re: Facility ID No. 085-00011, Midas Gold Idaho, Inc., Stibnite Gold Project, Draft Permit to Construct No. P-2019.0047, Project 62288, Issued for Applicant Review

Dear Mr. Simon and Mr. Lewis:

Midas Gold Idaho, Inc. (Midas Gold) greatly appreciates the opportunity to provide these comments on the Idaho Department of Environmental Quality's (IDEQ) Stibnite Gold Project (SGP) Draft Permit to Construct (PTC) No. P-2019.0047, Project 62288 (Draft Permit), dated July 14, 2020. Midas Gold has also received the updated Appendix B to the Statement of Basis from IDEQ on July 31, 2020, starting the 10-day review. Additional comments on the Statement of Basis, if any, will be presented to IDEQ before the close of the 10-day review period. During our review, Midas Gold examined examples of PTCs for similar surface mining operations authorized by IDEQ to evaluate consistency within this industry. Our proposed changes and edits are shown in a redlined version of the Draft Permit enclosed with this letter.

A short description of each of the noneditorial proposed change is provided below:

1. Condition 1.2, Table 1.1, and Condition 3.2, Table 3.1 (Item 31): Please remove the control efficiency values listed for haul roads (93.3%) and enclosures (80%). It appears that these percentages are provided for descriptive purposes only. As such, this information would more appropriately be provided in the Statement of Basis only. In addition, it does not appear that Idaho mining PTCs typically contain control efficiency values for fugitive sources. Alternatively, the following language may be added to Condition 1.2, "Control equipment information and maximum process rate information is provided for information only unless also included in specific enforceable permit conditions."

2. Condition 1.2, Table 1.1, Hauling, and Condition 2.5, 2nd (Item 13) and 17th (Item 20) Bullets: Please remove the Maximum Process Rate of "490,000 mi/mo" and related monitoring obligation. The

   mining excavation rate is already limited to 180,000 T/day, which directly impacts vehicle miles traveled. At this limit, all hauling scenarios were modeled to capture the maximum-case hauling distances, which included a hauling mileage of 16,415 mi/day (492,465 mi/30 days or 508,880 mi/31 days). The maximum-case mileage far exceeds the peak production total actual annual hauling mileage of 1.4 million mi/yr (116,700 mi/mo). Therefore, a mileage limit is not necessary to limit emissions, and recording miles daily adds unnecessary and burdensome monitoring.

3. Condition 1.2, Table 1.1, Prill Silos, and Conditions 3.8 and 3.17 (Item 32): Please revise the Maximum Process Rate of "608/month" to "200 T/day." The daily rate was used for the 24-hour PM_{10} and 24-hour $PM_{2.5}$ modeling. See Appendix B, pages 11, 12, and 15 of the June 23, 2020, PTC Application (Application). No other criteria pollutants or toxic air pollutants (TAP) are emitted by these insignificant sources. The Application also requested a 7,300 T/yr limit. However, it has come to our attention that an annual limit of 9,000 T/yr is needed. This change has essentially no effect on the annual emission inventory for annual $PM_{2.5}$ modeling. The $PM_{2.5}$ emission change from increasing the annual throughput from 7,300 T/yr to 9,000 T/yr (an increase of 0.00005 g/s) is less than five-thousandth of a percent of the total $PM_{2.5}$ emissions.

4. Condition 1.2, Table 1.1, Autoclave (AC) and Electrowinning Cells: Please remove "and as limited by Subpart EEEEEEE" from the Maximum Process Rate. Subpart EEEEEEE does not contain any process rate limits. This subpart only provides emission limits, and control and monitoring requirements as noted in Condition 4.2, Table 4.1, and Conditions 4.18 and 4.19.

5. Condition 1.2, Table 1.1, POX Boiler, and Condition 4.4 (Item 36): Please replace the Maximum Process Rate of "1 hr/day and 30 hr/yr" with "operation is limited to AC start-up only." The boiler is used only for starting up the AC. Once the AC is running, the boiler is turned off; however, a start-up will be longer than 1 hour. AC start-ups are expected to require up to 10 hours of POX Boiler firing, and there may be as many as three start-ups per year. Limiting operation only to start-up provides flexibility and reflects the proposed operating scenario. Midas will continue to monitor boiler operating hours during AC start-up, per Condition 4.17.

6. Condition 1.2, Table 1.1, PFR Shaft Lime Kiln Combustion: Please replace "20.5" with "22.0 MMBtu/hr." See page 93 of the Application.

7. Condition 1.2, Table 1.1, SAG Mill and AC Lime Silos: The Maximum Process Rate of "169 T/day and 52,337 T/yr" only applies to LS-L/U, LK, and LCR. The SAG Mill and AC Lime Silos (6 storage silos) have a combined Maximum Process Rate of 70,000 T/yr of lime.

8. Condition 1.2, Table 1.1, Concrete Production, and Condition 5.8 (Item 41): Please replace the Maximum Process Rate of "80 T/day and 60,000 T/yr (cement + aggregate)" with "2,480 T/day and 560,000 T/yr of (cement + aggregate)." See page 47 of the Application. Also, the Central Mixer capacity is 120 T/hr (20 T/hr of cement plus 100 T/hr of aggregate).

9. Condition 1.2, Table 1.1, Concrete Production, Central Mixer Loading, and Conditions 5.1 and 5.2 (Item 39): Please revise the control description to match the control options listed in AP-42 and the Application (page 7 and Appendix B page 11).

10. Condition 2.4: Please replace the facility-wide inspection frequency with "monthly." A monthly inspection rate is typical for large mining operations and consistent with other Idaho mining PTCs.

11. Condition 2.5, 1st Paragraph: IDAPA 58.01.01.799 applies to nonmetallic mineral processing plants. Thus, clarifying language should be added: "IDAPA 58.01.01.799 applies to fugitive dust sources at the limestone crushing plant and aggregate production plant."

12. Condition 2.5, 1st Bullet: Please replace "to 20 miles per hour or lower if appropriate" with "in accordance with the FDCP." The Application did not propose a 20 miles per hour speed limit, and certain haul road sections may be driven at higher speeds while emissions are minimized.

13. Condition 2.5, 2nd Bullet: Please remove this bullet as discussed in Condition 1.2, Table 1.1, Hauling, above (Item 2).

14. Condition 2.5; 3rd, 4th, 5th, 7th, 13th, 15th Bullets: Each of these bullets require some action if fugitive PM emissions are observed to exceed 20% or leaving a roadway in the case of haul roads. However, the periods that trigger corrective action in these bullets are inconsistent with each other. IDAPA 58.01.01.650 does not impose a trigger for action, other than the requirement to take reasonable precautions. While the visible emissions rule IDAPA 58.01.01.625 does not suit fugitive emission observations, for comparison, that rule states, "for a period or periods aggregating more than ***three*** minutes in any 60-minute period." The Draft Permit states, "for a period or periods aggregating more than ***one*** minute in any 60-minute period." If IDEQ prefers to establish a threshold for dust mitigation action, then the following period would be acceptable to Midas Gold:

    - Whenever visible fugitive PM emissions exceed 20% for more than two consecutive minutes (4th, 5th, 7th bullets)

    - Whenever visible fugitive PM emissions are observed leaving a roadway for more than two consecutive minutes (3rd bullet). Note that this would also apply to the 13th and 15th bullets, but Midas Gold is proposing to remove these conditions.

15. Condition 2.5, 4th Bullet: Please add language to address upstream water sprays to provides downstream control via moisture carryover.

16. Condition 2.5, 6th Bullet: There are no plans to apply water or chemical to the "mine working face." Please revise to, "Apply appropriate dust control at the initial point of material handling to suppress dust throughout the material handling process, as necessary."

17. Condition 2.5, 13th Bullet: Please remove "Whenever visible fugitive PM emissions are observed leaving a roadway during inspection or valid complaint (Permit Condition 2.3), the adequacy of water and dust suppressant application rates should be evaluated." These requirements are already addressed elsewhere:

    - The Condition 2.5, 3rd bullet addresses the dust mitigation action whenever visible PM emissions are observed leaving a roadway.

    - The Condition 2.5, 20th bullet addresses the periodic evaluation of the FDCP, including dust suppressant application rates.

    - The Condition 2.3 addresses valid complaints.

18. Condition 2.5, 14th Bullet: Please remove this bullet. Chemical suppressant application will be based on the manufacturer's recommendations and periodic inspections of fugitive dust, not atmospheric conditions.

19. Condition 2.5, 15th Bullet: Please remove this bullet, as it is a repeat of the 2nd sentence of the 13th bullet.

20. Condition 2.5, 17th Bullet: Please remove this bullet as discussed in Condition 1.2, Table 1.1, Hauling, above (Item 2).

21. Condition 2.5, 18th Bullet: Please remove this bullet as the 10th bullet already requires that "Chemical dust suppressants shall be applied consistent with manufacturer's instructions and recommendations" and the 16th bullet already requires that "At least once per day during operation, monitor and record the frequency of application and application rates for water and suppressant controls."

22. Condition 2.5, 20th Bullet: Please add "and evaluate effectiveness of practices including dust suppressant application rates."

23. Condition 2.5, 20th Bullet: Please replace "every six-months" with "every year." Annual review is more typical for the mining industry. Also, it does not appear that Idaho mining PTCs typically require a six-month review of FDCPs.

24. Condition 2.9: Please replace "each shift" with "each month" and add "including any stack, vent, or functionally equivalent opening" after "potential sources of visible emissions" to clarify which sources are subject to this condition. It does not appear that Idaho mining PTCs typically contain a visible emission inspection frequency for each shift.

25. Condition 2.11: Please revise "and 22" to "and knowledgeable of procedures of Method 22" language to reflect that there is no certification for Method 22.

26. Condition 2.21, NSPS 40 CFR 60, Subpart LL: Please remove "OC8." Conveyor drops to stockpiles are not subject to Subpart LL.

27. Condition 2.23: Please add the citation "40 CFR 70.3(c)(2)" to specify that the Tier I operating permit is required only for the emission units that cause the source to be subject to the part 70 program.

28. Condition 2.24, Table 2.1, Pollutant: Please replace "PM" with "PM_{10}" as this is the pollutant that is required to be tested in the Draft Permit (Condition 4.3).

29. Condition 2.24, Table 2.1, Test Method: Please add Method 201A for PM_{10}.

30. Condition 2.24, Table 2.1, Additional Requirements: Please revise the PM Additional Requirements to: "Particulate matter (PM) including condensable PM as defined in IDAPA 58.01.01.006, with an aerodynamic diameter less than or equal to a nominal 10 micrometers for PM_{10}, and less than or equal to a nominal 2.5 micrometers for $PM_{2.5}$" to make it consistent with the rest of the Draft Permit.

31. Condition 3.2, Table 3.1: Please revise as discussed in Condition 1.2, Table 1.1, above (Item 1).

32. Condition 3.8 and 3.17: Please revise as discussed in Condition 1.2, Table 1.1, Prill Silos, above (Item 3).

33. Condition 3.11: Please remove this condition. The crushers will be controlled by water sprays. No emission control credit was taken for the buildings, which will likely have door and vent openings.

34. Condition 4.2, Table 4.1: Please revise as follows:

    - Carbon bed pressure drop is a maximum limit (O&M)
    - Carbon bed inlet gas temperature is a maximum limit (Subpart EEEEEEE)
    - Baghouse pressure is a maximum limit (O&M)

35. Condition 4.3, Table 4.2: Please remove footnote (c) from NO_X, CO, VOC, and SO_2 as there is no testing required for these pollutants.

36. Condition 4.4: Please revise as discussed in Condition 1.2, Table 1.1, POX Boiler, above (Item 5).

37. Condition 4.11 through 4.16: Please remove "and in accordance with IDAPA 58.01.01.210.21." The rule states, "Additional procedures and requirements to demonstrate and ensure actual and continuing compliance may be required by the Department in the permit to construct." Conditions 4.11 through 4.16 establish procedures or requirements regarding compliance, and therefore it is not necessary to cite this rule. Including the citation suggests that there are more requirements than stated in the PTC, but any additional requirements are to be in the PTC according to the rule text.

38. Condition 4.28: Please add carbon filter monitoring requirements.

39. Conditions 5.1 and 5.2: Please revise as discussed in Condition 1.2, Table 1.1, Concrete Production, Central Mixer Loading, above (Item 9):

40. Condition 5.3: Please remove footnote (c) as there are no testing requirements for these pollutants.

41. Condition 5.8: Please revise as discussed in Condition 1.2, Table 1.1, Concrete Production, above (Item 8).

42. Condition 5.11: Please remove this condition. The crushers will be controlled by water sprays. No emission control credit was taken for the building, which will likely have openings.

Thank you for your consideration of these comments. We note that the updated Appendix B to the Statement of Basis was received via email from Morrie Lewis on July 31, 2020. Any additional comments that we have to the Statement of Basis will be submitted to IDEQ within the 10-day review period. We will notify you via email prior to that date if we have no additional comments.

If you have any questions regarding this submittal, please contact me at 208-901-3053 or ahaslam@midasgoldinc.com.

Sincerely,
MIDAS GOLD IDAHO, INC.

Alan Haslam
VP Permitting

Enclosure: Redlined Draft Permit

APPENDIX F – SUBSECTION 210.20 INTERPRETATION OF ADDRESSED

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1410 N Hilton Street, Boise, ID 83706
(208) 373-0502

Brad Little, Governor
Jess Byrne, Director

Examples of How DEQ Interprets the Word "Addressed" in Subsection 210.20

For example, 40 CFR 63 Subpart 6J - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources regulates HAP emissions from coal, biomass, and oil-fired boilers. However, the subpart specifically exempts gas-fired (i.e. natural gas-fired) boilers because EPA determined that HAP emissions from these sources were too inconsequential to be regulated by the Subpart. DEQ interprets this to mean EPA did "address" natural gas boiler HAP emissions by choosing to exempt them. Thus, HAP emissions that are also TAP emissions from coal, biomass, oil-fired boilers, and natural gas-fired boilers are not required to demonstrate compliance with IDAPA 58.01.01.210 per section 210.20.

For example, 40 CFR 63 Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines regulates HAP emissions from IC engines by regulating CO emissions as a surrogate for HAP emissions. Therefore, HAP emissions from IC engines are not directly regulated by the Subpart. DEQ interprets this to mean EPA "addressed" HAP emissions by regulating CO emissions as a surrogate. Therefore HAP emissions that are also TAP emissions from IC engines are not required to demonstrate compliance with IDAPA 58.01.01.210 per section 210.20.

For example, HAP/TAP emissions from lumber drying kilns were evaluated in promulgating 40 CFR 63 Subpart DDDD - National Emission Standard for Hazardous Air Pollutants: Plywood and Composite Wood Products (PCWP). This Subpart regulates major sources of HAP emissions and includes lumber drying kilns at PCWP manufacturing facilities and "at any other kind of facility" as affected sources, even though this subpart does not include any substantive requirements to control or limit emissions from the kilns. In developing Subpart DDDD EPA stated "…we know of no other lumber kilns that are controlled for HAP, and we know of no cost effective HAP controls for lumber kilns…" (see Fed. Reg. /Vol 68, No. 6/Thursday, Jan 9, 2003/Proposed Rules page 1285). DEQ interprets this to mean EPA "addressed" HAPS that are also TAPS for both major and minor sources of HAP emissions; and therefore, lumber kilns are not required to demonstrate compliance with IDAPA 58.01.01.210, per section 210.20.

For example, when EPA regulated Phosphoric Acid Manufacturing for new sources, only the wet-process phosphoric acid line, superphosphoric acid process line, phosphate rock dryer, and the phosphate rock calciner have specific emissions limits in the rule. However, other emissions sources at facility were also looked at but they were determined by EPA to be insignificant and were not regulated in the rule. Therefore, when EPA looks at a source category to regulate, all emissions sources associated with the source category are "addressed" whether EPA establishes specific emissions limits for the emissions sources or not.

In sum, the term "addressed" is interpreted to mean EPA (1) specifically regulated, (2) specifically regulated by a surrogate, (3) reviewed, or (4) evaluated, the HAP emissions that are also TAPs.

Please note that in all cases it is presumed that EPA evaluated the 187 HAPs when developing the emission standards for new, modified or existing stationary sources regulated by 40 CFR Part 63 Subparts. Therefore, in all cases IDAPA Toxic Air Pollutants that are not one of the 187 Hazardous Air Pollutants will still need to be evaluated for compliance with IDAPA 58.01.01 Section 210.

APPENDIX G – T-RACT ANALYSIS

6.0 T-RACT ANALYSIS

Per IDAPA 58.01.01.210.14(a), this section documents the T-RACT control technologies.

6.1 Drilling Dust Control System

As discussed in Section 5.1, Perpetua Resources will install and operate drilling rigs mounted with dust collection systems. The following paragraphs evaluate this control as T-RACT:

Identification of all possible control technologies

Drilling operations create dust-related metal TAP emissions. The possible control technologies for these emissions are as follows:

- Applying best management practices
- Wet drilling with water injection
- Dry drilling with dust collectors

Best management practices include: (1) avoiding drilling operations during high dust conditions, and (2) shrouding drill areas to limit dust emissions.

Wet drilling includes injected water flows through the center of the drill and out though the drill bit to reduce dust emissions by 96% to 98%.[10]

Dry drilling includes rigs equipped with dust collection systems that shroud dust generated from the drilling area, capture, and remove dust through a dust collection system composed of an exhaust fan and filters that can achieve up to 99% control efficiency (CDC 2012).

Elimination of technologically infeasible or unreasonable technologies

Wet drilling at the SGP has the following disadvantages:

- It is subject to freezing at the low temperatures expected for the SGP location.
- It can result in drill bit plugging, drill rotation binding, and drill bit degradation.
- A wet drill hole can interfere with the blasting agent.

Based on the above disadvantages of wet drilling, it is considered an infeasible or unreasonable technology for the SGP.

[10] *Testing has demonstrated that dust control efficiencies of up to 98 percent can be obtained using the water separator sub while dust control efficiencies of wet drilling without the water separator sub were 96 percent* (CDC 2012).

Ranking the remaining technologies by control effectiveness

The ranking of the possible control technologies for drilling by control effectiveness is as follows (highest to lowest):

1. Dry drilling with dust collectors – up to 99% control efficiency

2. Best management practices

Evaluation of the most effective control technology and selection of T-RACT

Perpetua Resources selects the top (most effective) control technology of dry drilling with dust collectors as T-RACT. Selecting the top control negates the need for considering economic, energy, and environmental impacts regarding the other control technologies.

6.2 Haul Road Dust and Arsenic Control

Dust emissions from unpaved roads are caused by vehicle traffic on these roads. Particles are lifted and dropped from the rolling wheels, and the turbulent wake behind the vehicles causes these particulates to become air borne. Dust control options include surface improvement (paving) or surface treatment (chemical suppressant application or watering).

As discussed in the SOB from February 18, 2021, Perpetua Resources will control dust emissions from haul roads by treating the surface with frequent watering and the periodic application of a chemical suppressant. Reducing dust emissions reduces dust-related metal TAP emissions. In addition, Perpetua Resources will reduce arsenic emissions by capping the haul roads outside of the pits and DRSFs with clean (low arsenic) development rock, as discussed in Section 5.2. The following sections evaluate these control measures as T-RACT.

6.2.1 Dust Control Technologies

Identification of all possible control technologies

Vehicle traffic on unpaved haul roads creates dust-related metal TAP emissions. The possible control technologies for these emissions are as follows:

- Paving

- Application of a chemical dust suppressant

- Watering

Paving: *The control efficiencies achievable by paving can be estimated by comparing emission factors for unpaved and paved road conditions* (EPA 2006). The particulate emission factor for a paved road with a silt loading of 0.2 g/m^2 (based on the EPA default value for the SGP average daily traffic of 500–5,000 trips per day) (EPA 2011a) and the SGP average vehicle weight of 182.6 tons is

0.515 lb/VMT. The SGP unpaved road particulate emission factor is 14.43 lb/VMT (uncontrolled). Based on these emission factors, the estimated control efficiency of paving the haul roads is 96%.

Dust suppressant and watering: The SGP dust emissions from unpaved haul roads are calculated based on a surface treatment control efficiency of 90% (annual basis) for the application of a chemical dust suppressant supplemented with frequent watering. As discussed in the SGP Application, this control efficiency is supported by EPA's AP-42 13.2.2 referenced test reports, which show that a chemical dust suppressant alone can achieve 90% to 99% control efficiency and 98% for magnesium chloride in particular (Air Sciences 2020, Appendix A to Attachment A). A control efficiency of 90% is also supported by the control efficiency limits established under Reasonable Achievable Control Technology (RACT), Best Available Control Technology (BACT), and Lowest Achievable Emission Rate (LAER) determinations under EPA's New Source Review permitting program.

The EPA RACT/BACT/LAER Clearinghouse (RBLC) database contains case-specific information on the air pollution technologies required by major stationary sources seeking a permit under EPA's New Source Review (NSR) program. This database was queried for all listings of air pollution technologies for unpaved roads using chemical dust suppressants or a combination of chemical dust suppressants and watering. The results of the query identified 10 projects containing a control efficiency of 90% or greater for unpaved roads. These determinations are listed in Table 10.

Table 10. EPA RBLC Determinations for 90% or Greater Control Efficiency of Unpaved Roads

State	Facility Name	RBLC-ID	Dust Control	Dust Control Efficiency
AK	Donlin Gold Project	AK-0084	water/chem	90%
AR	Turk Power Plant	AR-0094	water/chem	90%
CO	Rio Grande Portland Cement Corp.	CO-0043	water/chem	90%
IN	Nucor Steel	IN-0034	chem	90%
LA	Nucor Steel Louisiana	LA-0239	water/chem	90%
MO	Lafarge Corp.	MO-0048	chem	90%
NV	Sloan Quarry	NV-0045	chem	98%
NV	Nellis Air Force Base	NV-0047	water/chem	90%
OH	Unlimited Concrete	OH-0126	water/chem	90%
OH	Unlimited Concrete	OH-0131	water/chem	90%

(EPA 2021)

Elimination of technologically infeasible or unreasonable technologies

Paving haul roads at the SGP has the following disadvantages:

- The paving of haul roads is not conventional practice at mining operations.
- Paved highway weight limits are only approximately 20,000 pounds (10 tons).
- Paving is costly.

The conventional practice for mining operations is to utilize unpaved haul roads with treated surfaces to control fugitive dust. Haul trucks are single axle vehicles with a gross loaded weight of 60 tons to 685 tons. The loaded weight range for the SGP haul trucks is 60 to 260 tons. These weights significantly exceed regulatory weight limits for paved highways of 10 tons. Furthermore, the SGP mining activity locations move as mining progresses. This requires haul roads to be rerouted as necessary. Due to the temporary nature of hauling routes and the heavy weight of haul trucks, paving is considered an infeasible or unreasonable technology for the SGP.

Ranking the remaining technologies by control effectiveness

The ranking of the possible control technologies for drilling by control effectiveness is as follows (highest to lowest):

1. Application of a chemical dust suppressant – 90% to 99% control efficiency

2. Watering – 75% to 95% control efficiency (EPA 2006, Figure 13.2.2-2)

Evaluation of the most effective control technology and selection of T-RACT

After eliminating paving as a viable control option, Perpetua Resources selects the next most effective control technologies of the application of a chemical dust suppressant supplemented with frequent watering as T-RACT.

6.2.2 Arsenic Control Technologies

After applying T-RACT for dust control, as discussed in Section 6.2.1, dust-related arsenic emissions can only be further reduced by capping the haul roads with clean (low-arsenic) development rock. The median arsenic concentration of the SPG onsite material is 667 ppm (Midas Gold 2017c). However, there are quartzite rock deposits at the West End pit that have significantly lower mineralization and, thus, lower arsenic levels. The median arsenic concentration of this quartzite rock is 90 ppm (Perpetua 2021g), and there is approximately 3 million tons of this material available. Figure 6 shows the locations of the quartzite rock deposits.

Figure 6. Quartzite Rock Areas

Perpetua Resources proposes capping the haul roads that are outside of the pits and DRSFs with clean (low-arsenic) development rock as a T-RACT work practice, in addition to the T-RACT dust control measures discussed in Section 6.2.1. Haul roads within the pits and DRSFs cannot be capped with this material because of steep grades and periodic road rerouting as mining areas develop.