ADEQ CLASS II MINOR PERMIT REVISION APPLICATION

Excelsior Mining Corporation

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1. EXECUTIVE SUMMARY

Excelsior Mining Corp. (Excelsior) is a mineral exploration and production company that owns and operates the Gunnison Copper Project (GCP) and Johnson Camp Mine (JCM) in Dragoon, Cochise County, Arizona. Excelsior is located in an area of Cochise County that is considered to be in attainment or unclassifiable for all regulated pollutants. Due to the proximity of GCP to JCM and common control by the parent company, emission sources at both projects are authorized pursuant to Arizona Department of Environmental Quality (ADEQ) Air Quality Class II Permit No. 71633. The combined operations at JCM and the GCP are referred to as the "Facility."

- The GCP consists of a copper in-situ recovery (ISR) operation. Emission sources at the GCP include draindown pond evaporators and heap leach evaporative sprays.
- Current operations at JCM include copper extraction and refining processes for the production of copper cathode. The copper ISR solution from GCP is sent to solvent extraction and electrowinning (SX-EW) processes at JCM. Ancillary activities are also performed to support copper cathode production. The following emission sources at JCM are currently authorized in Permit No. 7163:
  - SX-EW,
  - Electrolyte Heaters.

With this minor permit revision (MPR) application, Excelsior is proposing to authorize ore mining operations at the two (2) existing JCM open pits, Burro and Copper Chief[1]. The proposed changes are hereby referred to as the "Project." Prior mining operations were performed at JCM until mid-2010 and leaching operations were maintained until 2015. Excelsior acquired JCM in late 2015 and commenced processing of copper solutions at the SX-EW facilities in late 2020. The Project would result in additional emissions from the activities listed below.

- Drilling operations;
- Blasting operations;
- Material transfer drop points;
- Crushing;
- Screening;
- Stockpiles;
- Storage tanks; and
- Process vessels.

Excelsior is also seeking to authorize the use of Nuton bioleaching technology developed by Rio Tinto for copper extraction at JCM. Excelsior does not anticipate an increase of emissions of criterial pollutants nor Hazardous Air Pollutants (HAPs) from the implementation of Nuton technology.

Copper was recently designated as a critical material by the U.S. Department of Energy (DoE) due to its important role in the production of energy transition technologies. The additional copper production at JCM would help meet the growing domestic market demands.

[1] Historically mining operations have been performed at the JCM open pits by previous owners.

The revised Facility Potential to Emit (PTE) regulated air pollutants is estimated based on the maximum expected throughput considering anticipated mining conditions. The PTE estimates are summarized in **Table 1-1**. The non-fugitive PTE does not exceed the minor New Source Review (mNSR) thresholds for any regulated pollutant. As such, the Project is not subject to mNSR program requirements under Arizona Administrative Code (A.A.C.) R18-2-334, including an ambient impacts analysis and a control technology evaluation. Additionally, the sitewide PTE does not exceed the Title V major source thresholds [2], thus allowing Excelsior to maintain an ADEQ Class II permit.

Excelsior is therefore submitting this minor permit revision (MPR) application in accordance with the requirements contained in A.A.C. 18-2-302.01.D. The ADEQ Class II Permit Application Form is included in Error! Reference source not found. of this application.

[2] Pursuant to 40 CFR § 70.2 (Definition of Major Source).

Table 1-1. Johnson Camp Mine - Potential to Emit

Emissions Activity	Source type [1]	Controlled Emissions Summary - Annual (tpy)											
		PM	**PM_{10}**	**$PM_{2.5}$**	**Lead**	**NO_x**	**CO**	**SO_2**	**VOC**	**Max HAP - Toluene**	**Total HAPs**	**H_2SO_4 Mist**	**CO_2e**
Pre-Project PTE													
SX	Non-fugitive	--	--	--	--	--	--	--	0.18	0.0084	0.093	--	--
EW Cells	Non-fugitive	2.19	2.19	2.19	--	--	--	--	--	--	--	--	--
Electrolyte Heater	Non-fugitive	0.22	0.22	0.22	--	4.09	1.72	4.87E-05	1.16	--	--	--	5,437
Draindown Pond Evaporators + Heap Leach Evaporative Vertical Spray Nozzles	Non-fugitive	6.45	9.46	6.83	--	--	--	--	--	--	--	--	--
Gunnison Evap Pond	Non-fugitive	3.02	3.02	1.91	--	--	--	--	--	--	--	--	--
Pre-Project Non-Fugitive PTE (tpy) [2]		*11.88*	*14.90*	*11.16*	*0.00*	*4.09*	*1.72*	*0.00*	*1.34*	*0.01*	*0.09*	*0.00*	*5,437*
Pre-Project Fugitive PTE (tpy) [3]		*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
Project PTE Increase													
Drilling	Non-fugitive	1.33	0.63	0.10	--	--	--	--	--	--	--	--	--
Blasting	Fugitive	13.28	6.9	0.40	3.20E-05	2.76	70.79	3.07	--	--	--	--	585
Drop Points	Non-fugitive[6]	0.53	0.18	0.05	--	--	--	--	--	--	--	--	--
Crushing and Screening	Non-fugitive	3.36	1.26	0.15	--	--	--	--	--	--	--	--	--
Stockpiles	Fugitive	0.23	0.11	0.02	--	--	--	--	--	--	--	--	--
Roads	Fugitive	1,174	302	30.5	--	--	--	--	--	--	--	--	--
ANFO Delivery & Handling	Non-fugitive[6]	0.01	0.01	0.001	--	--	--	--	--	--	--	--	--
HAPs from Ore	Non-fugitive	--	--	--	1.15E-03	--	--	--	--	--	0.06	--	--
Storage Tanks	Non-fugitive	1.50E-01	1.50E-01	1.50E-01	--	--	--	--	0.01	0.91	2.11	1.50E-01	--
Total Project Non-Fugitive PTE Increase (tpy) [2]		*5.38*	*2.23*	*0.44*	*1.15E-03*	*0.0*	*0.0*	*0.0*	*0.01*	*0.91*	*2.17*	*0.15*	*0.0*
Total Project Fugitive PTE Increase (tpy) [3]		*1,188*	*308.52*	*30.92*	*3.20E-05*	*2.76*	*70.79*	*3.07*	*0.0*	*0.0*	*0.0*	*0.0*	*585*
Post-Project PTE													
Site-wide Post-Project Non-Fugitive PTE (tpy) [2]		*17.26*	*17.12*	*11.60*	*0.0*	*4.1*	*1.7*	*0.00*	*3.8*	*1.03*	*3.5*	*0.15*	*5,437*
Site-wide Post-Project Fugitive PTE (tpy) [3]		*1,188*	*309*	*30.92*	*0.0*	*2.8*	*71*	*3.1*	*0.0*	*0.0*	*0.0*	*0.0*	*585*
Minor NSR Evaluation													
Minor New Source Review (NSR) Source Threshold [4]		**--**	**7.50**	**5.00**	**0.30**	**20**	**50**	**20**	**20**	**--**	**--**	**--**	**100,000**
Does the Non-Fugitive Project PTE Increase Exceed Minor NSR Source Threshold?		**--**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Title V Evaluation													
Title V Major Source Threshold [5]		100	100	100	100	100	100	100	100	--	--	--	100,000
Does the Site-wide Post-Project PTE Exceed Title V Major Source Threshold?		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

[1] Fugitive emissions are defined by A.A.C. R-18-2-101.59 as those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening.
[2-3] Pursuant to the Arizona Administrative Code (A.A.C.) R-18-2-101.75.c., the fugitive emissions of a stationary source shall not be considered in determining whether it is a major stationary source for the purposes of section 302(j) of the Act, unless the source belongs to a section 302(j) category. As such, the facility total non-fugitive emissions are compared against the applicable regulatory thresholds.
[4] Per A.R.S. § 49-402(B).
[5] Pursuant to 40 CFR § 70.2 (Definition of Major Source).
[6] Conservatively assumed to be non-fugitive emission source types.

2. APPLICATION COMPLETENESS CHECKLIST AND ADEQ STANDARD PERMIT APPLICATION FORM

In accordance with A.A.C. R18-2-304.F, the enclosed application provides the "Standard Class II Permit Application Form" and the information requested in the "Application Packet for Class II Permit" prepared by the ADEQ Air Quality Division. Error! Reference source not found. provides a list of the requested permit application items along with a reference to where the information is located in this application.

Table 2-1. Location of ADEQ Requested Information

Application Packet Section	Information Required	Included in Application		Application Section
		Yes	No	
3.1	Standard Class II Permit Application Form	X		Section 2
3.2.A.	Description of Processes at the Facility	X		Section 3
3.2.B.	Flow Diagram for All Processes	X		Section 4
3.2.C.	Description of Alternate Operating Scenarios		X [a]	See footnote.
3.2.D.	Emission Calculations	X		Section 5
3.2.E.	Minor NSR Applicability Determination	X		Section 8.2.2
3.2.F.	Proposed Exemptions from Otherwise Applicable Requirements		X [b]	See footnote.
3.2.G.	Voluntary Limitations		X [c]	See footnote.
3.2.H.	Equipment List	X		Appendix C
3.2.I.	Insignificant Activities	X		Section 6
3.2.J.	Confidential Application Components		X [d]	See footnote.
3.2.K.	Compliance Schedule for Sources Not in Compliance		X [e]	See footnote.
3.2.L.	Suggested draft permit language must be included in minor permit revision applications.			See footnote.
-	Applicable Requirements	X [f]		Section 8

Notes:

a No alternate operating scenarios are proposed as part of this application.

b No exemptions from otherwise applicable requirements are being proposed.

c No voluntary limitations to avoid classification as a major source or a major modification are proposed.

d No confidential information is submitted with this application.

e Excelsior is in compliance with all applicable regulations.

f While applicable requirements are not requested by ADEQ's Application Packet for Class II Sources, the information is being provided for informational purposes.

3. PROCESS DESCRIPTION

3.1 Existing Operations

Excelsior owns and operates the Gunnison Copper Project (GCP) and Johnson Camp Mine (JCM) projects in Dragoon, Cochise County, Arizona pursuant to ADEQ Class II Permit No. 71633. The GCP consists of in-situ recovery (ISR) operations for copper and includes auxiliary equipment. The copper solution recovered at the GCP is currently processed at the standard solvent extraction and electrowinning (SX/EW) plant in JCM for production of copper cathode. The copper cathode plates obtained from EW step are then prepared for shipment to offsite facilities for further processing into copper products. Permit No. 71633 includes the following existing emission sources of regulated pollutants at the GCP and JCM:

- Two (2) SX Mixer-Settler trains (Equipment ID: SX-1 and SX-2) which each contain three (3) mixer vessels and three (3) settler tanks.
- Two (2) Electrowinning Cell Blocks (Equipment ID: EW-1 and EW-2) for the copper recovery process.
- Six (6) PLS/draindown Pond Evaporators (Equipment ID: EVAP-1 through EVAP 6), three (3) Gunnison Pond evaporators (Equipment ID: EVAP-7 through EVAP-9), and two (2) Heap Leach Evaporative Spray Nozzles (Equipment ID: HEAP-EVAP1 and HEAP-EVAP-2) to enhance the natural evaporation of the draindown/PLS.
- Two (2) electrolyte natural gas fired heaters (Equipment ID: HTR-3 and HTR-4) to support SX/EW operations.

3.2 Project Description

As part of the Project, Excelsior is proposing to resume ore mining operations at the two (2) existing JCM open pits, Burro and Copper Chief. JCM was a pre-existing mine that was acquired by Excelsior in late 2015 and commenced processing of copper solutions at the SX-EW facilities in late 2020. The Project would result in additional emissions from the following activities, which are further described in the following section.

- Drilling operations;
- Blasting operations;
- Material transfer drop points;
- Crushing;
- Screening;
- Stockpiles;
- Storage tanks; and
- Process vessels.

Excelsior is also seeking to authorize the use of Nuton technology for copper extraction processes at JCM. Nuton consists of a portfolio of state-of-the-art leach-related technologies developed by Rio Tinto which utilizes microorganisms to enhance copper extraction from low-grade assets. Excelsior does not anticipate an increase of emissions of criterial pollutants nor Hazardous Air Pollutants (HAPs) from the implementation of Nuton bioleaching technology.

The restarting of mining operations at JCM would allow Excelsior to produce up to 25 million pounds annually during the life of the mine through oxide, sulfide, and transition material recovery and processing. Copper was recently designated as a critical material by the U.S. Department of Energy (DoE) due to its important role in in the production of energy transition technologies such as electric vehicles (EVs). The additional copper production at JCM would help meet the growing domestic market demands.

3.2.1 Open Pit Mining Drilling, Blasting, Loading, and Unloading

Mining operations begin with drilling and blasting of ore at the two open pits – the Burro pit and the Copper Chief pit. Drilling is used to create holes for the placement of blasting charges. Blasting is accomplished with the use of ammonium nitrate and fuel oil (ANFO). Haul trucks then transfer the ore that requires crushing to the uncrushed sulfide ore stockpile (Emission Unit [EU] ID SP-01) before transferring to a mobile crusher[3] (EU ID SC-01,CR-01) via loader. Run of Mine (ROM) ore (i.e., material that does not require additional crushing and is deemed suitable for immediate heap leaching) will be directly delivered to the heap leach pads via haul trucks. Emissions from the drilling activities include particulate matter (PM), particulate matter with an aerodynamic diameter less than or equal to a nominal 10 microns (PM_{10}), and particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 microns ($PM_{2.5}$). Blasting results in emissions of nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2) PM, PM_{10}, $PM_{2.5}$, and various HAPs. Particulate emissions are produced during the ANFO delivery and handling, as well as the loading and unloading activities.

3.2.2 Primary Crushing and Screening Operations and Stockpiles

Haul trucks transport ore from the uncrushed sulfide ore stockpile to the mobile crusher. Subsequently, the material is loaded to the screen (EU ID SC-01) and primary crusher (EU ID CR-01), where it undergoes the crushing process before being conveyed to the crushed ore stockpile. The crushing operations and the uncrushed and crushed sulfide ore stockpiles will result in PM, PM_{10}, $PM_{2.5}$, and HAP emissions.

3.2.3 Heap Leaching

Dilute sulfuric acid is applied to the ore at the surface of the leach pad in large droplets close to the ground. The acid solution leaches through the ore to extract copper. The resulting pregnant leach solution (PLS) flows a collection system from where it is then routed to the solution extraction tanks located at the SX/EW plant.

3.2.4 Storage Tanks and Process Vessels

Additional storage and process tanks (proposed Equipment IDs TNK-01, through TNK-014) are being added to the Facility potential emissions to support copper ore processing operations. The emissions from additional storage tanks will include PM, PM_{10}, $PM_{2.5}$, VOC, and sulfuric acid mist (H_2SO_4).

3.2.5 Auxiliary Operations

3.2.5.1 Traffic on Unpaved Roads

Truck traffic associated with the proposed operations is expected to be from the following:

- Delivery vehicles, to transfer materials into and out of the site;
- Haul trucks for transport of ore within site;
- Fuel and maintenance vehicles;
- Watering trucks;
- Personnel transport vehicles.

[3] Note that the mobile crusher will be operated as a stationary source.

The unpaved road traffic will produce PM, PM_{10}, and $PM_{2.5}$ emissions. The unpaved road fugitive emissions will be mitigated by control measures such as watering.

4. SITE & PROCESS FLOW DIAGRAMS

The Johnson Camp Mine is located approximately 105 kilometers (~65 miles) east of Tucson, Arizona in Cochise County near Dragoon, Arizona. **Figure 4-1** provides general layout of the facility and the general location of certain Project sources. Excelsior has not decided on a final location for the proposed mobile crusher or the Nuton process. **Figure** 4-2 contains process flow diagrams (PFDs) of the proposed operations at Johnson Camp Mine.

Figure 4-1. Johnson Camp Mine – Site Map

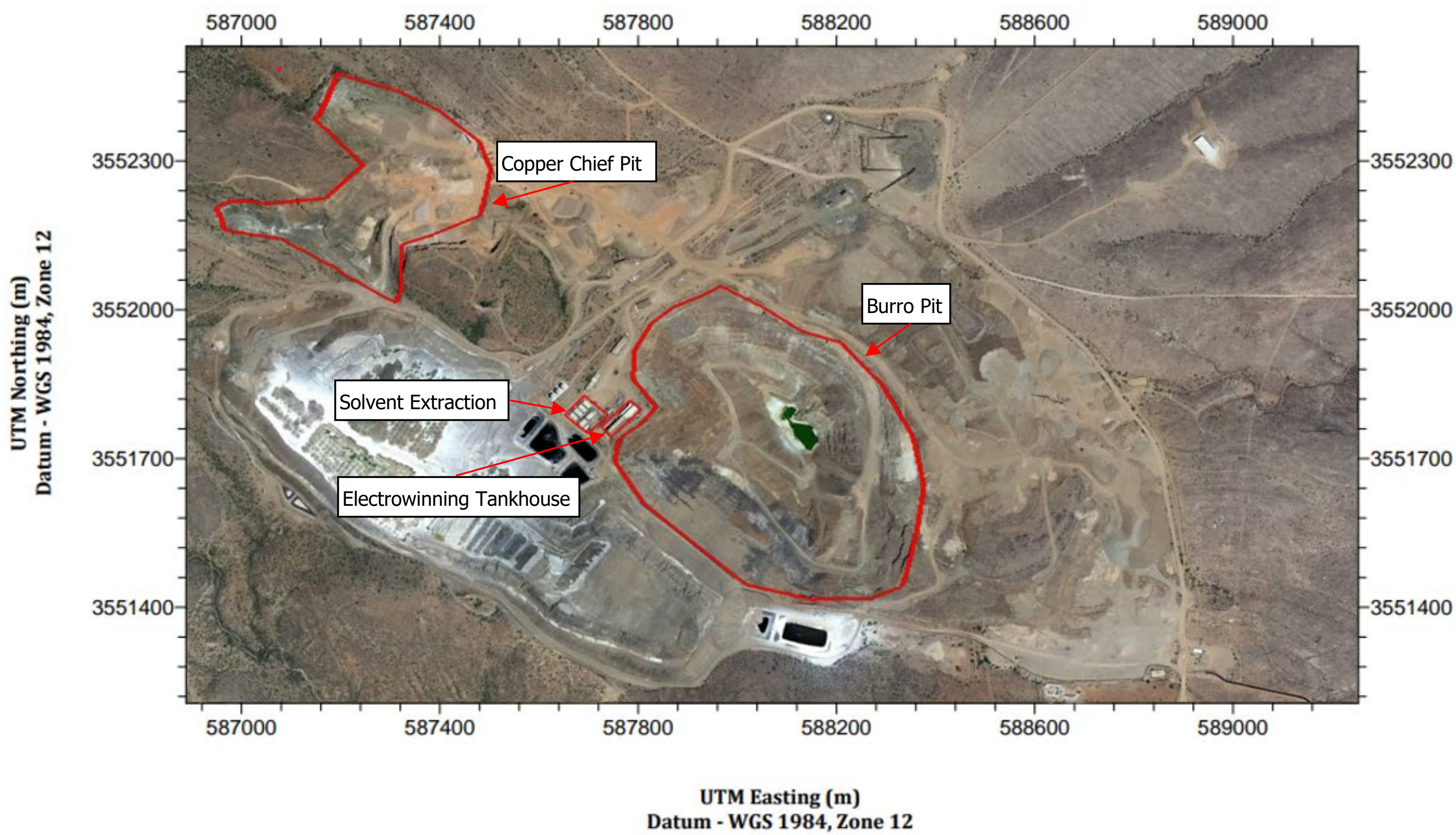
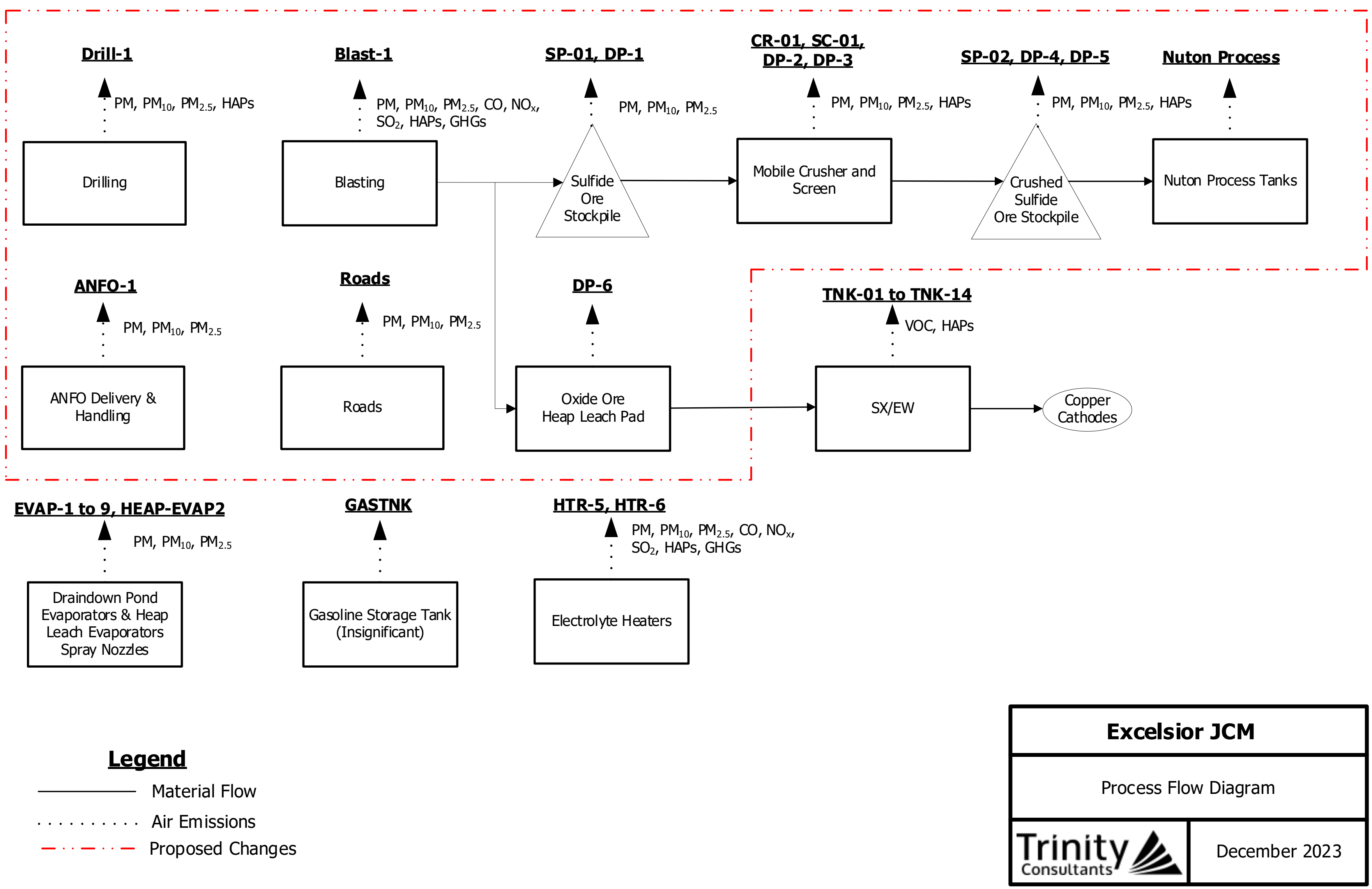


Figure 4-2. Johnson Camp Mine – Process Flow Diagrams



5. EMISSION CALCULATIONS

The Project will result in emissions increases of the following air pollutants at the Facility:

- Particulate matter (PM);
- Particulate matter with an aerodynamic diameter of less than 10 microns (PM_{10});
- Particulate matter with an aerodynamic diameter of less than 2.5 microns ($PM_{2.5}$);
- Nitrogen oxides (NO_X);
- Carbon monoxide (CO);
- Volatile organic compounds (VOCs);
- Sulfur dioxide (SO_2);
- Greenhouse gases (GHGs), including carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O);
- Sulfuric acid (H_2SO_4); and
- Hazardous Air Pollutants (HAPs).

Hourly, daily, and annual emissions of these pollutants are calculated using emission unit process rates, emission factors, engineering judgement, and pollution control efficiencies (if applicable). Calculations have been developed for years representing the highest throughput for the life of the mine for each emissions unit.

The following sections contain a detailed description of the methodology used to calculate emissions for the proposed operations. Detailed emission calculations are included in **9.Appendix A**.

5.1 Drilling

Particulate matter emissions, including total PM, PM_{10}, and $PM_{2.5}$ emissions, are generated from drilling operations. Drilling emissions were estimated based on material throughput, emission factors, and control efficiencies.

5.1.1 Material Throughput

The number of holes to be drilled on an hourly and annual basis was determined based on the process rates necessary for the quantity of blasts described in Section 5.2.

5.1.2 Emission Factor

An uncontrolled PM emission factor for drilling was obtained from AP-42, Section 11.9, Table 11.9-4 (7/98) for Drilling of Overburden at Western Surface Coal Mines. The uncontrolled PM and $PM_{2.5}$ emission factors were calculated using particle size multipliers from AP-42, Section 13.2.4 (November 2006).

5.1.3 Control Efficiency

Drilling emissions of particulates will be controlled via dust collector filter on the drill. A control efficiency of 95% was applied on PM, PM_{10} and $PM_{2.5}$ emissions, consistent with other mines other mines with similar operations.

5.1.4 Equations used for Emissions Estimations

$$PM\ Hourly\ Emissions\ \left(\frac{lb}{hr}\right) = \#\ of\ Holes\ \left(\frac{holes}{hr}\right) x\ Emission\ Factor\ \left(\frac{lb}{hole}\right) x\ (1 - Control\ Efficiency\ (\%))$$

$$PM\ Daily\ Emissions\ \left(\frac{lb}{day}\right) = PM\ Hourly\ Emissions\ \left(\frac{lb}{hr}\right) x\ 24 \frac{hours}{day}$$

$$PM\ Annual\ Emissions\ (tpy) = \#\ of\ Holes\ \left(\frac{holes}{yr}\right) x\ Emission\ Factor\ \left(\frac{lb}{hole}\right) x\ (1 - Control\ Efficiency\ (\%))\ x\ \left(\frac{1\ ton}{2{,}000\ lbs}\right)$$

5.2 Blasting

Emissions of PM, PM_{10}, $PM_{2.5}$, NO_x, CO, SO_2, HAPs and GHGs are generated from blasting operations. PM, PM_{10}, and $PM_{2.5}$ emissions from blasting were estimated based on blast area, number of blasts, and appropriate emission factors. NO_x, CO, H_2S and SO_2 emissions from blasting were estimated based on the usage of ANFO and emission factors. Greenhouse gas emissions from blasting were estimated based on diesel fuel usage, diesel fuel high heating value (HHV), and emission factors. Greenhouse gas emissions were converted to the emissions of CO_2 equivalent (CO_{2e}) based on the global warming potential (GWP) for each greenhouse gas.

5.2.1 Process Rate

Blasting agent usage rates, rate of blasting, and blasting cross-sectional area were estimated based on Excelsior engineering evaluations. The No. 2 diesel fuel usage rate was estimated based on ammonium nitrate blasting product usage rate and a diesel fuel oil to ammonium nitrate blasting product ratio of 6%.

5.2.2 Emission Factor

Excelsior proposes to use ANFO Detonation-based blasting products, and thus, emissions calculations are based on emission factors for ANFO Detonation[4]. Below is a list of references for the emission factors:

- The NO_x emission factor is based on "NOx emissions from blasting operations in open-cut coal mining". Published by Elsevier Ltd. and dated 2008.
- CO emission factor is based on "A Technique for Measuring Toxic Gases Produced by Blasting Agents", NIOSH, 1997.
- The SO_2 emission factors were obtained from AP-42 Section 13.3, Explosives Detonation (February 1980), Table 13.3-1.

[4] Per "Chemical And Physical Factors That Influence NOx Production During Blasting - Exploratory Study" - Sapko et al., 2002 NIOSH Study, page 5:

Explosives like ANFO contain relatively large grains of ammonium nitrate (AN) which tend to decompose and yield NO_X. In emulsion explosives, the nitrate is mainly found in solution and more intimately in contact with the emulsified fuel droplets. As a result the NO_X produced from the thermal decomposition of AN will tend to react with hydrocarbons to yield nitrogen and water rather than remaining as NO after the detonation. Thus emulsions typically generate less emissions that ANFO.

- The PM, PM_{10}, and $PM_{2.5}$ emission factors from blasting were calculated using the following expression from AP-42, Section 11.9, Western Surface Coal Mining (October 1998), Table 11.9-1 for Blasting at Western Surface Coal Mines:

$$EF = (k)(0.000014)(A)^{1.5}$$

Where:

EF = ANFO Detonation factor (lb/blast)
k = scaling factor (1 for PM, 0.52 for PM_{10}, 0.03 for $PM_{2.5}$)
A = horizontal area of the blast (ft^2), with blasting depth ≤ 70 ft.

- The GHG emission factors were obtained from 40 CFR 98 Subpart C, Tables C-1 and C-2, and converted from kg/MMBtu to lb/MMBtu. The diesel fuel HHV was obtained from 40 CFR 98 Subpart C Table C-1. Diesel throughput was estimated based a fuel oil to ANFO ratio from a NIOSH study titled "Thermal Study of ANFO made with Recycled Oil" [5].
- HAP emission factors were obtained from AP-42, Section 1.3 (Fuel Oil Combustion), Tables 1.3-8 and 1.3-10.

5.2.3 Equations and Emissions Estimations

The following equations were used to estimate hourly and annual emissions from all HAPs and criteria pollutants except $PM/PM_{10}/PM_{2.5}$:

$$Hourly\ Emissions\ \left(\frac{lb}{hr}\right) = Usage\ Rates\ \left(\frac{ton\ ANFO}{hr}\right) x\ EF\ \left(\frac{lb}{ton\ ANFO}\right)$$

$$Annual\ Emissions\ (tpy) = Usage\ Rates\ \left(\frac{ton\ ANFO}{yr}\right) x\ EF\ \left(\frac{lb}{ton\ ANFO}\right) x\ \left(\frac{1\ ton}{2{,}000\ lbs}\right)$$

The following equations were used to estimate hourly and annual emissions from $PM/PM_{10}/PM_{2.5}$:

$$Hourly\ Emissions\ \left(\frac{lb}{hr}\right) = Blasting\ Rates\ \left(\frac{blasts}{hr}\right) x\ EF\ \left(\frac{Max\ lb}{blast}\right)$$

$$Annual\ Emissions\ (tpy) = Blasting\ Rates\ \left(\frac{blasts}{yr}\right) x\ EF\ \left(\frac{Max\ lb}{blast}\right) x\ \left(\frac{1\ ton}{2{,}000\ lbs}\right)$$

5.3 Crushing and Screening

Particulate matter emissions, including total PM, PM_{10}, and $PM_{2.5}$ emissions, are generated from sulfide ore crushing and screening operations via Mobile Crusher. Crushing and screening emissions were estimated based on material throughput, emission factors, and control efficiencies.

5.3.1 Material Throughput

The material throughput for crushing and screening was based on the proposed tons of sulfide ore material crushed on an hourly and annual basis, per Excelsior engineering judgement.

[5] https://www.cdc.gov/niosh/mining/UserFiles/works/pdfs/anfo.pdf

5.3.2 Emission Factor

Controlled screening PM, PM_{10} and $PM_{2.5}$ emission factors obtained from AP-42 19.2.2, Table 11.19.2-2, were conservatively used for the mobile screener located at the Facility.

Controlled tertiary wet crushing PM, PM_{10} and $PM_{2.5}$ emission factors obtained from AP-42 19.2.2, Table 11.19.2-2) were conservatively used for the mobile crusher located at the Facility. The emission factors are inclusive of emissions generated by the stone-to-stone attrition during the crushing process.

5.3.3 Control Efficiency

The mobile crusher and screen have no additional control factors applied because an inherent controlled emission factor is being used.

5.3.4 Equations used for Emissions Estimations

$$Hourly\ Emissions\ \left(\frac{lb}{hr}\right) = Material\ Throughput\ \left(\frac{ton\ rock}{hr}\right) x\ Emission\ Factor\ \left(\frac{lb}{ton\ rock}\right)$$

$$Annual\ Emissions\ (tpy) = Material\ Throughput\ \left(\frac{ton\ rock}{yr}\right) x\ Emission\ Factor\ \left(\frac{lb}{ton\ rock}\right) x \left(\frac{1\ ton}{2{,}000\ lbs}\right)$$

5.4 Material Loading, Unloading, and Drop Points

Emissions of PM, PM_{10} and $PM_{2.5}$ result from material handling operations, including oxide and sulfide ore drop points and ANFO unloading into a storage bunker.

5.4.1 Material Throughput

Material throughput for material transfer sources were based on Excelsior engineering judgement.

5.4.2 Emission Factor

PM, PM_{10}, and $PM_{2.5}$ emission factors for ore drop points (DP-1 to 6) were developed using AP-42, Section 11.19.2 - Crushed Stone Processing and Pulverized Mineral Processing for Conveyor Transfer Point (controlled). For ANFO unloading, the PM_{10} emission factor was obtained from AP-42 Section 8.3-3, Bulk Loading Operations (July 1993), Table 8.3-2. PM emissions from ANFO unloading were assumed to equal PM, and $PM_{2.5}$ emissions were calculated by applying a factor of 0.15 to PM_{10} emissions.

5.4.3 Control Efficiency

The mobile crusher drop points have no additional control factors applied because an inherent wet emission factor is being used. For the ANFO unloading transfer point, a control efficiency of 70% was applied due to the inherent partial enclosure provided by the storage bunker. The value was obtained from the TCEQ Draft RG 058 Rock Crushing Plants document dated February 2002, for partial enclosure.

5.4.4 Equations Used for Emissions Estimations

$$Hourly\ Emissions\ \left(\frac{lb}{hr}\right) = Material\ Throughput\ \left(\frac{ton}{hr}\right) x\ EF\ \left(\frac{lb}{ton}\right)$$

$$Annual\ Emissions\ (tpy) = Material\ Throughput\ \left(\frac{ton}{yr}\right) x\ EF\ \left(\frac{lb}{ton}\right) x\ \left(\frac{1\ ton}{2{,}000\ lbs}\right)$$

5.5 Unpaved Road Travel

5.5.1 Emissions From Truck Traffic on Roads (Delivery of Materials /Loader/Ore Transport/Support Vehicles etc.)

PM, PM_{10}, and $PM_{2.5}$ emissions are generated from vehicles traveling on unpaved roads. Road emissions were calculated based on vehicle miles travelled (VMT), emission factors, and control efficiencies.

5.5.1.1 Vehicle Miles Traveled - Roads

The VMT was calculated by multiplying number of trips and round-trip distance traveled by the vehicle. The number of trips was estimated based on material throughput, truck capacities, and estimated vehicle miles traveled at the project site. These values were considered representative of anticipated traffic patterns at the Facility and were provided by Excelsior based engineering judgement.

5.5.1.2 Emission Factor

Uncontrolled PM, PM_{10}, and $PM_{2.5}$ emission factors for vehicles traveling on unpaved roads were calculated using the following equations from AP-42, Section 13.2.2 (November 2006):

$$E = (k)\left(\frac{s}{12}\right)^a \left(\frac{W}{3}\right)^b$$

$$E_{ext} = E[(365 - P)/365]$$

Where:

E = size-specific hourly and daily emission factor (lb/VMT)
E_{ext} = size-specific annual emission factor (lb/VMT)
k = particle size multiplier, per AP-42 Table 13.2.2-2 (November 2006)
s = surface material silt content (%), per Excelsior engineering judgement
W = mean vehicle weight (tons)
a, b = constants, per AP-42 Table 13.2.2-2 (November 2006)
P = days per year with at least 0.01-inch precipitation, per processed onsite meteorological data collected in 2019, 2020 and 2021. The most conservative year was used.

5.5.1.3 Control Efficiency

Per the EPA document *Control of Open Fugitive Dust Sources* [6], sufficient watering of unpaved roads can result in a control efficiency up to 95%. For emission estimations purposes, a conservative control efficiency

[6] EPA, Control of Open Fugitive Dust Sources, EPA-450/3-88/008, September 1988.

of 75% has been used. For emission estimations purposes, a conservative control efficiency of 75% has been used. Excelsior proposes to implement the necessary control measures (including watering and/or chemical dust suppressant use) to achieve a particulate emissions control efficiency of at least 75% for vehicle travel on unpaved roads. and meet the meets applicable opacity limitations and other applicable requirements to comply in the A.A.C.

5.5.1.4 Equations Used for Emissions Estimations

$$Hourly\ Emissions\ \left(\frac{lbs}{hr}\right) = EF\ \left(\frac{lb}{VMT}\right) x\ Total\ Miles\ Traveled\ \left(\frac{VMT}{hr}\right) x(1 - Control\ Efficiency\ (\%))$$

$$Annual\ Emissions\ (tpy) = EF\ \left(\frac{lb}{VMT}\right) x\ Total\ Miles\ Traveled\ \left(\frac{VMT}{yr}\right) x\ \left(1 - Control\ Efficiency\ (\%)\right) x\ \left(\frac{1\ ton}{2{,}000\ lbs}\right)$$

5.6 Storage Tanks

Excelsior will utilize storage tanks to store sulfuric acid, electrolytes, diluent, and organics needed to support onsite activities. Emissions from all tanks were calculated using the EPA approved TankESP software which is based on AP-42 Section 7.1, Liquid Storage Tanks (June 2020).

5.7 Stockpile Wind Erosion

Emissions from wind erosion associated with stockpiles include PM, PM_{10}, and $PM_{2.5}$.

5.7.1 Area of Stockpiles

The area of the two (2) stockpiles was provided by Excelsior based on engineering judgement and ore processing rates during the life of the mine.

5.7.2 Emission Factor

The emission factor for the calculation of the emissions of the different stockpiles was based on methodology found in "Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures," EPA-450/2-92-004, September 1992. Silt content is conservatively based on AP-42 Ch 13.2.4 Table 13.2.4-1 for overburden (mean value). PM emission factors were calculated using the following equation. The PM_{10} emission factor was assumed to be 50% of the PM value. The $PM_{2.5}$ emission factor was calculated from the PM_{10} value based on the particle size multipliers contained in AP-42, Section 13.2.4, November 2006.

$$EF\left(\frac{\frac{lb}{day}}{acre}\right) = 1.7 \times \frac{s\ (\%)}{1.5} \times \frac{365 - P\ (days)}{235} \times \frac{f(\%)}{15}$$

Where:

EF = PM emission factor (lb/day/acre)
S = Silt content (%)
f = % of time the unobstructed wind speed exceeds 12 mph at the stockpile height
P = Days per year with at least 0.01-inch precipitation (days)

f above is calculated per the surface wind speed data obtained from the Tucson International Airport for 2017-2021 and using the following equation:

$$\left(\frac{U_{hub}}{U_{anem}}\right) = \left(\frac{\ln\left(\frac{z_{hub}}{z_0}\right)}{\ln\left(\frac{z_{anem}}{z_0}\right)}\right)$$

Where:

U_{hub} (m) = Adjusted wind speed at stockpile height
U_{anem} (m) = Adjusted wind speed at anemometer height
Z_0 (m) = Surface roughness length. Control of Open Fugitive Dust Sources - EPA (1988). 0.3 cm for overburden (used for coarse ore pile) and 0.01 for ground coal (used for fine ore pile).
z_{hub} (m) = Adjusted stockpile height
z_{anem} (m)= Anemometer height, 10 m

5.7.3 Equations Used for Emissions Estimations

$$Hourly\ Emissions\left(\frac{lb}{hr}\right) = Annual\ Emissions\left(\frac{tons}{yr}\right) x\ 2000\left(\frac{lb}{ton}\right) x\ \frac{1}{8{,}760}\left(\frac{yr}{hr}\right)$$

$$Annual\ Emissions\ (tpy) = Maximum\ Stockpile\ Area\ (acre) x\ EF\left(\frac{\frac{lb}{day}}{acre}\right) x\ 365\left(\frac{days}{yr}\right)\ x\ \left(\frac{1\ ton}{2{,}000\ lbs}\right)$$

5.8 Site-Wide Metal HAP Emissions

Metal HAP emissions were calculated based on the maximum content of metal HAPs in the ore by multiplying the mass fraction of each HAP constituent by the PM emissions in relevant mining processes. Metal HAP emissions are conservatively assumed to be generated from drilling, blasting, crushing, screening, stockpiles, and material transfer. This calculation is represented for the aforementioned processes by the following equation. Blasting HAP emissions are quantified separately as described in Section 5.2.

$$Metal\ HAP\ emissions\ = Metal\ HAP\ Percentage\ (\%)\ x\ PM\ emissions$$

6. LIST OF INSIGNIFICANT ACTIVITIES

Pursuant to A.A.C. R18-304.F.8, a complete application for a minor permit revision must identify activities which are insignificant pursuant to R18-2-101.68. Excelsior proposes to carry out the following insignificant activities at the Facility as a result of the Project, in addition to any insignificant activities currently performed.

- Liquid Storage and Piping
  - Petroleum product storage tanks containing the following substances, provided Excelsior lists and identifies the contents of each tank with a volume of 350 gallons or more and provides threshold values for throughput or capacity or both for each such tank: diesel fuels and fuel oil in storage tanks with capacity of 40,000 gallons or less, lubricating oil, transformer oil, and used oil;
    - Tanks details are contained in Appendix A.
  - Gasoline storage tanks with capacity of 10,000 gallons or less.
  - Storage and piping of natural gas, butane, propane, or liquefied petroleum gas, provided that Excelsior lists and identifies the contents of each stationary storage vessel with a volume of 350 gallons or more and provides threshold values for throughput or capacity or both for each such vessel;
  - Piping of fuel oils, used oil and transformer oil, provided Excelsior includes a system description.
  - Storage and handling of drums or other transportable containers where the containers are sealed during storage, and covered during loading and unloading, including containers of waste and used oil regulated under RCRA. Excelsior must provide a description of material in the containers and the approximate amount stored;
  - Storage tanks of any size containing exclusively soaps, detergents, waxes, greases, aqueous salt solutions, aqueous solutions of acids that are not regulated air pollutants, or aqueous caustic solutions, provided Excelsior specifies the contents of each storage tank with a volume of 350 gallons or more;
  - Electrical transformer oil pumping, cleaning, filtering, drying and the re-installation of oil back into transformers;
- Internal combustion engine-driven compressors, internal combustion engine-driven electrical generator sets, and internal combustion engine-driven water pumps used for less than 500 hours per calendar year for emergency replacement or standby service, provided Excelsior keeps records documenting the hours of operation of this equipment;
- Low Emitting Processes
  - Batch mixers with rated capacity of 5 cubic feet or less;
  - Equipment using water, water and soap or detergent, or a suspension of abrasives in water for purposes of cleaning or finishing;
  - Blast-cleaning equipment using a suspension of abrasive in water and any exhaust system or collector serving them exclusively;
  - Plastic pipe welding;
- Site Maintenance
  - Housekeeping activities and associated products used for cleaning purposes, including collecting spilled and accumulated materials at the including operation of fixed vacuum cleaning systems specifically for such purposes;
  - Sanding of streets and roads to abate traffic hazards caused by ice and snow;
  - Architectural painting and associated surface preparation for maintenance purposes;
- Sampling and Testing

- Noncommercial (in-house) experimental, analytical laboratory equipment, which is bench scale in nature, including quality control/quality assurance laboratories supporting Excelsior operations and research and development laboratories;
- Individual sampling points, analyzers, and process instrumentation, whose operation may result in emissions but that are not regulated as emission units;

► Ancillary Non-Industrial Activities
- General office activities, such as paper shredding, copying, photographic activities, and blueprinting, but not to include incineration;
- Use of consumer products, including hazardous substances where the product is used at the Johnson Camp Mine in the same manner as normal consumer use;
- Activities directly used in the diagnosis and treatment of disease, injury or other medical condition;

► Miscellaneous Activities
- Installation and operation of potable, process and wastewater observation wells, including drilling, pumping, filtering apparatus;
- Transformer vents.

7. LIST OF EQUIPMENT AND CONTROL DEVICES

An updated list of equipment has been provided in Appendix C with the proposed equipment shown in red.

8. REGULATORY APPLICABILITY

Excelsior is subject to certain federal and state air regulations. This section summarizes the key air quality regulations that may apply to Excelsior as a result of the Project (i.e., proposed updates to historical representations).

8.1 Title V (Class I) Applicability

Per A.A.C. R18-2-302.B.1, a Class I permit shall be required for a "major source". This includes a source that directly emits or has the potential to emit, 100 tpy or more of any regulated air pollutant (see A.A.C. R18-2-101.75.c), 10 tons per year (tpy) or more of any hazardous air pollutant or 25 tpy or more of any combination of hazardous air pollutants (see A.A.C. R18-2-101.75.c). Note that because Excelsior is not a categorical source, only non-fugitive emissions are assessed against the 100 tpy Title V/Class I major source threshold, and fugitive emissions are excluded from the major source applicability determination.

As summarized in in **Table 1-1**, the site-wide non-fugitive PTE following the Project (i.e., post-Project PTE) will remain below 100 tpy for all regulated air pollutants. Therefore, the Facility will be able to continue operating under a Class II permit.

8.2 New Source Review Applicability

The New Source Review (NSR) permitting program generally requires that a stationary source obtain a permit and undertake other obligations prior to construction of a new facility or modification of an existing facility if the proposed Project results in PTE increases of regulated NSR pollutants in excess of certain threshold levels. The federal NSR program is listed in 40 CFR §51-52. ADEQ is delegated by the EPA to enforce federal NSR program requirements for all regulated NSR pollutants except GHGs via A.A.C. Article 4 provisions.

8.2.1 Major NSR Applicability

Two distinct federal NSR permitting programs apply depending on whether the facility is located in an attainment/maintenance or nonattainment area for a particular regulated pollutant. Prevention of Significant Deterioration (PSD) program requirements are potentially applicable in attainment and maintenance areas, while the Nonattainment Area NSR (NNSR) program requirements are potentially applicable in nonattainment areas. Excelsior is located in an area of Cochise County which is classified as attainment or unclassified with the National Ambient Air Quality Standards (NAAQS) for all regulated pollutants. A section of Cochise County is classified as nonattainment for PM_{10} in the Paul Spur/Douglas planning area.[7] However, the Project at JCM will occur outside the Paul Spur/Douglas planning area. Accordingly, NNSR program provisions are not applicable.

Under PSD permitting rules, the major source threshold is 250 tpy unless the facility is listed as a categorical source under A.A.C. R18-2-101.23, which has a lower 100 tpy threshold under A.A.C. R18-2-401.13.b. The Facility is not a categorical source and therefore 250 tpy is the applicable PSD major source threshold for increases of regulated NSR pollutants.

[7] Per EPA Greenbook https://www3.epa.gov/airquality/greenbook/anayo_az.html.

Note that because Excelsior is not a categorical source, only non-fugitive emissions are assessed against the 250 tpy major source threshold, and fugitive emissions are excluded from the major source applicability determination.[8] As summarized in **Table 1-1**, the Project PTE increase of regulated NSR pollutants does not exceed the 250 tpy threshold. Therefore, the Project does not qualify as a new major PSD source nor major modification and is not required to comply with PSD program requirements.

8.2.2 Minor New Source Review Applicability

ADEQ's minor NSR program applies to any "minor NSR modification" to a Class I or Class II source.[9] ADEQ's rules define "minor NSR modification" to mean any of the following changes that do not qualify as a major source or major modification:

1. Any physical change in or change in the method of operation of an emission unit or a stationary source that either:

    a. Increases the potential to emit of a regulated minor NSR pollutant by an amount greater than the permitting exemption thresholds; or
    b. Results in emissions of a regulated minor NSR pollutant not previously emitted by such emission unit or stationary source in an amount greater than the permitting exemption thresholds.

2. Construction of one or more new emissions units that have the potential to emit regulated minor NSR pollutants at an amount greater than the permitting exemption thresholds.[10]

As summarized in **Table 1-1**, the non-fugitive Project PTE increase of regulated mNSR pollutants will not exceed the corresponding permitting exemption thresholds and therefore the proposed changes do not constitute a minor NSR modification.

8.3 New Source Performance Standards

New Source Performance Standards (NSPS), located in 40 CFR Part 60, set performance standards for new, modified, or reconstructed sources of the regulated pollutant. The following section details the applicability of NSPS regulations to Excelsior's proposed operations (i.e., the Project).

8.3.1 40 CFR 60 Subpart A – General Provisions

Pursuant to the requirements of 40 CFR § 60.1, all affected sources subject to source-specific NSPS are subject to the general provisions of NSPS Subpart A unless specifically excluded by the source-specific NSPS. NSPS Subpart A requires initial notification, performance testing, recordkeeping and monitoring, provides reference methods, and mandates general control device requirements for all other subparts as applicable.

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[8] *See* A.A.C. R18-2-401.13.e.

[9] *See* A.A.C. R18-2-334.A.

[10] *See* A.A.C. R18-2-301.14. Pursuant to A.A.C. R18-2-301.14.e.ii, in determining PTE, fugitive emissions are not to be considered unless the source belongs to a section 302(j) category (i.e., a "categorical" source). As noted above, the Miami Smelter is considered a categorical source and therefore potential to emit is based on fugitive as well as non-fugitive emissions.

8.3.2 40 CFR 60 Subpart Kb – Volatile Organic Liquid Storage Vessels

Pursuant to the requirements of 40 CFR § 60.110b(a), NSPS Subpart Kb, *Standards of Performance for Volatile Organic Liquid Storage Vessels*, regulates storage vessels with a capacity greater than 75 cubic meters (m^3) (19,813 gallons), that are used to store volatile organic liquids for which construction, reconstruction, or modification is commenced after July 23, 1984.

NSPS Subpart Kb states that the subpart "*does not apply to storage vessels with a capacity greater than or equal to 151 m^3 (39,890 gallons) storing a liquid with a maximum true vapor pressure less than 3.5 kilopascals (kPa) or with a capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure less than 15.0 kPa*."

Excelsior will have multiple sulfuric acid (H_2SO_4) storage tanks with capacities greater than 151 m^3. However, H_2SO_4 is not an organic liquid, therefore NSPS Kb is not applicable. The Project includes several organic containing storage tanks (EU IDS TNK-08 to 011), however, these have a capacity less than 75 m^3. Therefore, this subpart is not applicable.

8.3.3 40 CFR 60 Subpart LL – Standards of Performance for Metallic Mineral Processing Plants

Pursuant to the requirements of 40 CFR § 60.380(a), NSPS Subpart LL, Standards of Performance for Metallic Mineral Processing Plants, regulates "… 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 …"

The NSPS Subpart LL provisions in 40 CFR § 60.381 defines "metallic mineral processing plants" as "any combination of equipment that produces metallic mineral concentrates from ore." The Project will involve production of metallic mineral concentrates from ore at JCM since there will be one (1) operational mobile crusher with a screen. Therefore, the Facility will be subject to NSPS LL requirements for that equipment. In regard to opacity, the project will adhere to the particulate matter standards outlined in § 60.382. According to this standard, once performance tests are completed, no stack emissions shall be released with: (1) particulate matter exceeding 0.05 grams per dry standard cubic meter (g/dscm) and (2) opacity greater than seven (7) percent, unless the emissions originate from an affected facility equipped with a wet scrubbing emission control device. Beyond the sixtieth day following the attainment of the maximum production rate, but no later than 180 days after the initial startup, the discharge of process fugitive emissions into the atmosphere from an affected facility shall not exhibit opacity exceeding ten (10) percent. The facility will assess compliance with § 60.382 through the following test methods and procedures: (1) employing Method 5 or 17 to ascertain particulate matter concentration; (2) utilizing Method 9 and the procedures in 60.11 to determine opacity from both stack and process fugitive emissions; and (3) employing the monitoring devices specified in § 60.384(a) and (b) to determine the pressure loss of the gas stream through the scrubber and the flow rate of scrubbing liquid at any point during each particulate matter run. The average of these three determinations shall be computed. Note that the mobile screen and crusher will be operated as a stationary source.

8.3.4 40 CFR 60 Subpart OOO – Standards of Performance for Nonmetallic Mineral Processing Plants

Pursuant to the requirements of 40 CFR § 60.670(a)(1), NSPS Subpart OOO, Standards of Performance for Nonmetallic Mineral Processing Plants, regulates "… 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."

The NSPS Subpart OOO provisions in 40 CFR § 60.671 defines "Nonmetallic mineral processing plants" as "any combination of equipment that is used to crush or grind any nonmetallic mineral wherever located, including lime plants, power plants, steel mills, asphalt concrete plants, Portland cement plants, or any other facility processing nonmetallic minerals except as provided in §60.670 (b) and (c)." The Project does not include processing of nonmetallic minerals. Therefore, this subpart does not apply to Excelsior.

8.4 National Emission Standards for Hazardous Air Pollutants for Source Categories

National Emission Standards for Hazardous Air Pollutants (NESHAPs) for Source Categories, located in 40 CFR Part 63, have been promulgated for source categories that emit hazardous air pollutants (HAP). A facility that is a major source of HAP is defined as having potential emissions greater than 25 tpy of total HAPs and/or 10 tpy of a single HAP. Facilities with a potential to emit HAP at an amount less than the major source thresholds are otherwise considered an "area source."

Excelsior is currently classified as an area source of HAPs. Following the Project, the Facility will remain an area source because it will HAP PTE below the applicable major source thresholds. Pursuant to the requirements of 40 CFR § 63.1(a)(2), all affected sources subject to source-specific NESHAP are subject to the general provisions of NESHAP Subpart A unless specifically excluded by the source-specific NESHAP. There are no new applicable NESHAP regulations to Excelsior as a result of the Project.

8.4.1 Arizona Administrative Code (A.A.C.)

Excelsior is subject to regulations contained in A.A.C. R18 Chapter 2 (Air Pollution Control). All the current A.A.C. requirements will continue to apply to the existing emission units at the Facility which are not modified as part of the Project. Potentially applicable A.A.C. regulations applicable to Excelsior as a result of the Project modifications are summarized in **Table 8-1** and further described in the sections below.

Table 8-1. New Potentially Applicable Arizona Administrative Code Requirements

Affected New Emission Source	Potentially Applicable Rule Name	Potentially Applicable Rule	A.A.C. Citations	Comment
Haul roads	Roadways and Streets	R18-2-605	R18-2-605.A	Excelsior will ensure that fugitive dust emissions from road-related construction activities or transport on roadways are minimized. Note that these provisions are already included in the existing air quality permit.
			R18-2-605.B	

Affected New Emission Source	Potentially Applicable Rule Name	Potentially Applicable Rule	A.A.C. Citations	Comment
New fugitive dust sources	Evaluation of Nonpoint Source Emissions	R18-2-614	R18-2-614	Opacity of an emission from any new nonpoint source will not exceed 40%. If a more stringent opacity standard is applicable as a result of source-specific applicability, then Excelsior will comply with the more stringent opacity requirement. Excelsior will conduct an initial visual assessment, and if any visible emissions are detected, will follow-up with an EPA Method 9 evaluation. Note that these provisions are already included in the existing air quality permit.
Mobile crusher, storage piles, and all material transfer points for ore and ANFO	Material Handling	R18-2-606	R18-2-606	For ore and ANFO material transfer points, Excelsior will comply with the requirements of this section. Note that these provisions are already included in the existing air quality permit.
	Storage Piles	R18-2-607	R18-2-607.A R18-2-607.B	Excelsior will comply with the requirements of this section. Note that these provisions are already included in the existing air quality permit.
	Standards of Performance for Existing Nonferrous Metals Industry Sources	R18-2-721	R18-2-721	Article 7 provisions are only applicable to those sources that meet the definition of "existing" as defined in R18-2-701(16), i.e., any source which does not have an applicable new source performance standard under Article 9 of this Chapter. The mobile crusher is subject to NSPS LL and will therefore comply with applicable provisions under that Subpart. As such, R18-2-721 is not applicable. The storage piles and all material transfer points for ore and ANFO will comply with all applicable provisions under this R18-2-721.
	Standards of Performance for New Stationary Sources	A.A.C. R18-2-901	A.A.C. R18-2-901	Excelsior will comply with the requirements of this section for the mobile crusher by complying with applicable NSPS described in Section 8.3 above, including R18-2-901.1 (A) and 46 (LL).
All new point sources subject to Article 7	General Provisions	R18-2-702	R18-2-702.B.3 R18-2-702.C	Opacity of an emission from these stationary point sources will not exceed 20%. Excelsior will conduct an initial visual assessment, and if any visible emissions are detected, will follow-up with an EPA Method 9 evaluation.

8.5 Permit Revision Procedures

Minor permit revision procedures may be used by a source with a Class I and Class II permit if the proposed changes satisfy the requirements in A.A.C R18-2-319.A. Each type of these requirements is set forth below followed by a discussion of whether it applies to the proposed changes in this application.

1. *Do not violate any applicable requirement*

The proposed changes do not cause the source to violate any applicable requirement.

2. *Do not involve substantive changes to existing monitoring, reporting, or recordkeeping requirements in the permit;*

The proposed changes do not involve any changes - substantive or otherwise - to existing monitoring, reporting, or recordkeeping conditions (applicable requirements are simply being incorporated).

3. *Do not require or change a case-by-case determination of an emission limitation or other standard, or a source-specific determination of ambient impacts, or an analysis of impacts on visibility or maximum increases allowed under R18-2-218;*

The proposed changes do not require a case-by-case determination of an emission limitation or standard, a source-specific determination of ambient impacts, or an analysis of impacts on visibility or maximum allowable increases allowed under A.A.C R18-2-218 (modeling analyses are not required).

4. *Do not seek to establish or change a permit term or condition for which there is no corresponding underlying applicable requirement and that the source has assumed in order to avoid an applicable requirement to which the source would otherwise be subject. The terms and conditions include:*
   a. *A federally enforceable emissions cap that the source would assume to avoid classification as a modification under any provision of Title I of the Act; and*
   b. *An alternative emissions limit approved under regulations promulgated under the section 112(i)(5) of the Act.*

The application does not seek to establish or change a permit term or condition for which there is no corresponding underlying applicable requirement and that the source has assumed in order to avoid an applicable requirement to which the source would otherwise be subject (e.g., to avoid CAA Title I, related to Major NSR, or Hazardous Air Pollutants (HAPs) requirements in CAA 112(i)(5), as contained in 40 CFR Part 63).

5. *Are not modifications under any provision of Title I of the Act;*

The proposed changes do not involve any CAA Title I "modifications."

6. *Are not changes in fuels not represented in the permit application or provided for in the permit;*

The proposed changes do not involve any change to fuels used at the Facility.

7. *Are not minor NSR modifications subject to R18-2-334; and*

The proposed changes are not considered a "minor NSR modification" (as discussed in subsection 8.1.2 above).

8. *Are not required to be processed as a significant permit revision under R18-2-320.*

The proposed changes do not trigger significant permit revisions under A.A.C R18-2-320.A.

Accordingly, Excelsior is requesting that minor permit revision procedures be used in accordance with A.A.C R18-2-319.

9. PERMIT PROCESSING FEE

In accordance with A.A.C R18-2-326, Fees Related to Individual Permits, and the ADEQ Permit Fee Schedule (effective November 1, 2023)[11], no fee is being submitted with this Class II MPR application. However, Excelsior agrees to pay the $196.40 per hour processing fee required based on the total actual time spent by ADEQ staff on processing this application.

[11] https://static.azdeq.gov/aqd/aqd_class_fees.pdf

APPENDIX A. EMISSIONS CALCULATIONS

Process Information

Parameter	Value	Unit	Source
Facility-wide Info			
Total Projected Material Mined (ore) - 20 Years	85,244,000	tons	"Sulphide Ore Crush Tons"
Maximum Annual Material Mined (oxide ore)	1533	tph	"Sulphide Ore Crush Tons"
	5,394,000	tpy	"Sulphide Ore Crush Tons"
Maximum Annual Material Mined (sulfide ore)	527	tph	"Sulphide Ore Crush Tons"
	1,974,000	tpy	"Sulphide Ore Crush Tons"
Maximum Annual Material Mined (waste rock)	1,183	tph	Per Nord 2013 permit application throughput value for same material.
	8,636,486	tpy	Per Nord 2013 permit application throughput value for same material.
Oxide Ore - Moisture Content	2	%	Per Nord 2013 permit application throughput value for same material.
Oxide Ore - Silt Content	7.5	%	Based on AP42 Ch 13.2.4 Table 13.2.4-1 for overburden (mean value)
Sulfide Ore - Moisture Content	2	%	Per Nord 2013 permit application throughput value for same material.
Sulfide Ore - Silt Content	7.5	%	Based on AP42 Ch 13.2.4 Table 13.2.4-1 for overburden (mean value)
Waste Rock - Moisture Content	2	%	Per Nord 2013 permit application throughput value for same material.
Waste Rock - Silt Content	7.5	%	Based on AP42 Ch 13.2.4 Table 13.2.4-1 for overburden (mean value)
Drilling			
Holes	112	holes/hr	Nord Feb 2013 Renewal
	40,880	holes/yr	Nord Feb 2013 Renewal
Control Type	Baghouse on drill	--	Per RFI response from Excelsior (Robert Winton) received on 10/10/2023.
Control Efficiency	95	%	Based on control efficiency for drilling with filter at other mines with similar operations.
Blasting			
ANFO Throughput	3,066	tpy	Nord Feb 2013 Renewal
ANFO Throughput	8.4	tph	Nord Feb 2013 Renewal
Total Blasts - Maximum	1	blasts/hr	Nord Feb 2013 Renewal
	1	blasts/day	Nord Feb 2013 Renewal
	365	blasts/yr	Nord Feb 2013 Renewal
Largest Cross-sectional Blast Area	30,000	ft^2	Nord Feb 2013 Renewal
Control Type	None	--	
Drop Points			
Drop Points - Sulfide Ore			
Unload Sulfide Ore to Sulfide Ore Stockpile	527	tph	"Sulphide Ore Crush Tons"
	1,974,000	tpy	"Sulphide Ore Crush Tons"
Sulfide Ore Stockpile to Screen Via Loader	527	tph	"Sulphide Ore Crush Tons"
	1,974,000	tpy	"Sulphide Ore Crush Tons"
Screen to Crusher Feed Hopper	527	tph	"Sulphide Ore Crush Tons"
	1,974,000	tpy	"Sulphide Ore Crush Tons"
Crusher Feed Hopper to Crusher	527	tph	"Sulphide Ore Crush Tons"
	1,974,000	tpy	"Sulphide Ore Crush Tons"
Crusher to Output Conveyor	527	tph	"Sulphide Ore Crush Tons"
	1,974,000	tpy	"Sulphide Ore Crush Tons"
Conveyor to Crushed Sulfide Ore Stockpile	527	tph	"Sulphide Ore Crush Tons"
	1,974,000	tpy	"Sulphide Ore Crush Tons"
Drop Points - Oxide Ore			
Unload Oxide Ore to Heap Leach Pad	1,533	tph	"Sulphide Ore Crush Tons"
	5,394,000	tpy	"Sulphide Ore Crush Tons"
Stockpiles			
Uncrushed Sulfide Ore	0.72	acre	Nord Feb 2013 Renewal
Crushed Sulfide Ore	0.72	acre	Nord Feb 2013 Renewal
Uncrushed Sulfide Ore	300	ft	Per email from Robert Winton on 10/19/2023
Crushed Sulfide Ore	300	ft	Per email from Robert Winton on 10/19/2024
SX-EW			
SX Mixer-Settler Train A - Number of Extraction Settlers	3	--	Class II Permit Renewal (July 5, 2023)
SX Mixer-Settler Train A - Number of Mixers	3	--	Class II Permit Renewal (July 5, 2023)
SX Mixer-Settler Train 1 - Total Surface Area	5,177.0	ft^2	Class II Permit Renewal (July 5, 2023)
SX Mixer-Settler Train B - Number of Extraction Settlers	3	--	Class II Permit Renewal (July 5, 2023)
SX Mixer-Settler Train B - Number of Mixers	3	--	Class II Permit Renewal (July 5, 2023)
SX Mixer-Settler Train 2 - Total Surface Area	5,299.0	ft^2	Class II Permit Renewal (July 5, 2023)
SX Organic Recovery Sump Tank	725	ft^2	Class II Permit Renewal (July 5, 2023)
Number of Electrowinning Cells in Block 1	56	--	Class II Permit Renewal (July 5, 2023)
Number of Electrowinning Cells in Block 2	32	--	Class II Permit Renewal (July 5, 2023)
PLS/Draindown Pond Evaporators	45	gal/min	Class II Permit Renewal (July 5, 2023)
Heap Leach Evaporative Spray Nozzles	6	gal/min	Class II Permit Renewal (July 5, 2023)

Table A-1a. Annual Potential-to-Emit (PTE) Summary

Emissions Activity	Source type [1]	Controlled Emissions Summary - Annual (tpy)											
		PM	PM_{10}	$PM_{2.5}$	Lead	NO_x	CO	SO_2	VOC	Max HAP - Toluene	Total HAPs	H_2SO_4 Mist	CO_2e
Pre-Project PTE													
SX	Non-fugitive	--	--	--	--	--	--	--	2.62	0.1219	1.347	--	--
EW Cells	Non-fugitive	2.19	2.19	2.19	--	--	--	--	--	--	--	--	--
Electrolyte Heater	Non-fugitive	0.22	0.22	0.22	--	4.09	1.72	4.87E-05	1.16	--	--	--	5,437
Draindown Pond Evaporators + Heap Leach Evaporative Vertical Spray Nozzles	Non-fugitive	6.45	9.46	6.83	--	--	--	--	--	--	--	--	--
Gunnison Evap Pond	Non-fugitive	3.02	3.02	1.91	--	--	--	--	--	--	--	--	--
Pre-Project Non-Fugitive PTE (tpy) [2]		***11.88***	***14.90***	***11.16***	***0.00***	***4.09***	***1.72***	***0.00***	***3.78***	***0.12***	***1.35***	***0.00***	***5,437***
Pre-Project Fugitive PTE (tpy) [3]		***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
Project PTE Increase													
Drilling	Non-fugitive	1.33	0.63	0.10	--	--	--	--	--	--	--	--	--
Blasting	Fugitive	13.28	6.9	0.40	3.20E-05	2.76	70.79	3.07	--	--	--	--	585
Drop Points [6]	Non-fugitive	0.53	0.18	0.05	--	--	--	--	--	--	--	--	--
Crushing and Screening	Non-fugitive	3.36	1.26	0.15	--	--	--	--	--	--	--	--	--
Stockpiles	Fugitive	0.23	0.11	0.02	--	--	--	--	--	--	--	--	--
Roads	Fugitive	1,174	302	30.5	--	--	--	--	--	--	--	--	--
ANFO Delivery & Handling[6]	Non-fugitive	0.01	0.01	0.001	--	--	--	--	--	--	--	--	--
HAPs from Ore	Non-fugitive	--	--	--	1.42E-03	--	--	--	--	--	0.07	--	--
Storage Tanks	Non-fugitive	1.50E-01	1.50E-01	1.50E-01	--	--	--	--	0.01	0.91	2.11	1.50E-01	--
Total Project Non-Fugitive PTE Increase (tpy) [2]		***5.38***	***2.23***	***0.44***	***1.42E-03***	***0.0***	***0.0***	***0.0***	***0.01***	***0.91***	***2.18***	***0.15***	***0.0***
Total Project Fugitive PTE Increase (tpy) [3]		***1,188***	***308.52***	***30.92***	***3.20E-05***	***2.76***	***70.79***	***3.07***	***0.0***	***0.0***	***0.0***	***0.0***	***585***
Post-Project PTE													
Site-wide Post-Project Non-Fugitive PTE (tpy) [2]		***17.26***	***17.12***	***11.60***	***0.0***	***4.1***	***1.7***	***0.00***	***3.8***	***1.03***	***3.5***	***0.15***	***5,437***
Site-wide Post-Project Fugitive PTE (tpy) [3]		***1,188***	***309***	***30.92***	***0.0***	***2.8***	***71***	***3.1***	***0.0***	***0.0***	***0.0***	***0.0***	***585***
Minor NSR Evaluation													
Minor New Source Review (NSR) Source Threshold [4]		**--**	**7.50**	**5.00**	**0.30**	**20**	**50**	**20**	**20**	**--**	**--**	**--**	**100,000**
Does the Non-Fugitive Project PTE Increase Exceed Minor NSR Source Threshold?		**--**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Title V Evaluation													
Title V Major Source Threshold [5]		100	100	100	100	100	100	100	100	--	--	--	100,000
Does the Site-wide Post-Project PTE Exceed Title V Major Source Threshold?		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

[1] Fugitive emissions are defined by A.A.C. R-18-2-101.59 as those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening.

[2-3] Pursuant to the Arizona Administrative Code (A.A.C.) R-18-2-101.75.c., the fugitive emissions of a stationary source shall not be considered in determining whether it is a major stationary source for the purposes of section 302(j) of the Act, unless the source belongs to a section 302(j) category. As such, the facility total non-fugitive emissions are compared against the applicable regulatory thresholds.

[4] Per A.R.S. § 49-402(B).

[5] Pursuant to 40 CFR § 70.2 (Definition of Major Source).

[6] Conservatively assumed to be non-fugitive emission source types.

Table A-2a. Annual HAP Potential-to-Emit (PTE) Summary

HAP Pollutant	CAS	HAP Annual Emissions					
		HAPs from Ore [1]	Blasting	Storage Tanks	SX	EW Fugitives	Total
		(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)
2-Methylnaphthalene	91-57-6	--	--	--	--	--	0.00E+00
3-Methylchloranthrene	56-49-5	--	--	--	--	--	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	--	--	--	--	--	0.00E+00
Acenaphthene	83-32-9	--	--	--	--	--	0.00E+00
Acenaphthylene	203-96-8	--	--	--	--	--	0.00E+00
Anthracene	120-12-7	--	--	--	--	--	0.00E+00
Benz(a)anthracene	56-55-3	--	--	--	--	--	0.00E+00
Benzo(a)pyrene	50-32-8	--	--	--	--	--	0.00E+00
Benzo(b)fluoranthene	205-99-2	--	--	--	--	--	0.00E+00
Benzo(g,h,i)perylene	191-24-2	--	--	6.44E-15	--	--	6.44E-15
Benzo(k)fluoranthene	205-82-3	--	--	--	--	--	0.00E+00
Chrysene	218-01-9	--	--	--	--	--	0.00E+00
Dibenzo(a,h)anthracene	53-70-3	--	--	--	--	--	0.00E+00
Fluoranthene	206-44-0	--	--	--	--	--	0.00E+00
Fluorene	86-73-7	--	--	--	--	--	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	--	--	--	--	--	0.00E+00
Phenanthrene	85-01-8	--	--	--	--	--	0.00E+00
Pyrene	129-00-0	--	--	--	--	--	0.00E+00
Benzene	71-43-2	--	--	9.11E-02	8.21E-03	--	9.93E-02
Dichlorobenzene	25321-22-6	--	--	--	--	--	0.00E+00
Formaldehyde	50-00-0	--	1.57E-03	--	--	--	1.57E-03
Hexane	110-54-3	--	--	1.80E-01	--	--	1.80E-01
Naphthalene	91-20-3	--	--	5.15E-03	--	--	5.15E-03
Toluene	108-88-3	--	--	9.12E-01	1.22E-01	--	1.03
Antimony Compounds	7440-36-0	1.31E-04	--	--	--	--	1.31E-04
Arsenic Compounds	7440-38-2	2.40E-04	1.42E-05	--	--	--	2.54E-04
Beryllium Compounds	7440-41-7	5.17E-03	1.07E-05	--	--	--	5.18E-03
Cadmium Compounds	7440-43-9	6.53E-05	1.07E-05	--	--	--	7.60E-05
Chromium Compounds	7440-47-3	3.92E-02	1.07E-05	--	--	--	3.92E-02
Cobalt Compounds	7440-48-4	7.19E-03	2.13E-05	--	--	--	7.21E-03
Lead Compounds	7439-92-1	1.42E-03	3.20E-05	--	--	--	1.45E-03
Manganese Compounds	7439-96-5	1.20E-02	--	--	--	--	1.20E-02
Mercury Compounds	7439-97-6	--	1.07E-05	--	--	--	1.07E-05
Nickel Compounds	7440-02-0	8.93E-03	1.07E-05	--	--	--	8.94E-03
Selenium Compounds	7782-49-2	2.29E-04	5.33E-05	--	--	--	2.82E-04
Ethylbenzene	100-41-4	--	--	2.93E-01	5.15E-01	--	8.07E-01
Xylenes	1330-20-7	--	--	6.26E-01	7.03E-01	--	1.33E+00
Benzene	71-43-2	--	--	--	--	--	0.00E+00
1,3-Butadiene	106-99-0	--	--	--	--	--	0.00E+00
Acetaldehyde	75-07-0	--	--	--	--	--	0.00E+00
Acrolein	107-02-8	--	--	--	--	--	0.00E+00
Naphthalene	91-20-3	--	--	--	--	--	0.00E+00
Total PAH (includes POM)	Total PAH	--	8.49E-05	--	--	--	8.49E-05
Cumene	98-82-8	--	--	0.00E+00	--	--	0.00E+00
Iso-octane (2,2,4-Trimethylpentane)	540-84-1	--	--	0.00E+00	--	--	0.00E+00
PACs	PACs	--	--	--	--	--	0.00E+00

[1] Includes HAP emissions from drilling, material handling drop points, stockpiles, and crushing.

Table A-3a. Drilling Emission Factors

Emission Unit ID	Emission Unit Description	Throughput [1]		Uncontrolled Emission Factor[3]			Control [4]	
		(holes/hr)	(holes/year)	PM (lb/hole)	PM_{10} [2] (lb/hole)	$PM_{2.5}$ (lb/hole)	Type	Efficiency (%)
DRILL-1	Drilling	112	40,880	1.30	0.61	0.09	Baghouse	95%

[1] Per Excelsior response dated dated 10/10/2023.

[2] PM emission factor obtained from AP-42, Section 11.9, Table 11.9-4 (7/98) for drilling of overburden at western surface coal mines.

[3] Per U.S. EPA AP-42, Section 13.2.4 (Aggregate Handling and Storage Piles), November 2006, the particle size multiplier used for calculating emission factors for PM_{10} and $PM_{2.5}$ is as follows:

PM: 0.74
PM_{10}: 0.35
$PM_{2.5}$: 0.053

[4] Based on control efficiency for drilling with filter at other mines with similar operations.

Table A-3b. Drilling Emissions

Emission Unit ID	Emission Unit Description	Controlled Emissions [1]								
		Hourly Emissions (lb/hr)			Daily Emissions (lb/day)			Annual Emissions (tpy)		
		PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
DRILL-1	Drilling	7.28	3.44	0.52	174.72	82.64	12.51	1.33	0.63	0.10

[1] Potential emissions (lb/hr) = Throughput (holes/hr) × Emission factor (lb/hole)

Potential emissions (tpy) = Throughput (holes/yr) × Emission factor (lb/hole) × (1 - Control Efficiency (%))/2,000 (lbs/ton)

Table A-4a. Blasting Input Parameters

Emission Unit ID	Emission Unit Description	Blast Area (ft^2/blast) [1]	ANFO Usage Rates [1]		Blasting Rates [1]		
		Maximum	(ton/hr)	(ton/yr)	(blasts/hr)	(blasts/day)	(blasts/yr)
BLAST-1	Blasting	30,000	8.40	3,066	1	1	365

[1] Per Excelsior response dated dated 10/10/2023.

Table A-4b. Blasting Emissions

Emission Unit ID	Emission Unit Description	Pollutant	CAS No.	Uncontrolled Emission Factor	Unit	Uncontrolled Emissions			Footnote
						(lb/hr)	(lb/day)	(tpy)	
BLAST-1	Blasting	NO_x	-	1.8	(lb/ton ANFO)	15.12	15.12	2.76	1
		CO	-	46.18	(lb/ton ANFO)	387.91	388	70.79	2
		SO_2	-	2	(lb/ton ANFO)	16.80	16.80	3.07	3
		PM	-	72.75	(Max lb/Blast)	72.75	72.75	13.28	4
		PM_{10}	-	37.83	(Max lb/Blast)	37.83	37.83	6.90	4
		$PM_{2.5}$	-	2.1824	(Max lb/Blast)	2.18	2.18	0.40	4
		CO_2	-	163.08	(lb/MMBtu)	133.13	3,195	583.11	5, 7
		CH_4	-	0.0066	(lb/MMBtu)	0.01	0.13	0.02	5, 7
		N_2O	-	0.0013	(lb/MMBtu)	0.00	0.03	0.00	5, 7
		CO_2e	-	-	-	133.59	3206.08	585.11	8
		Lead	7439-92-1	2.08E-05	(lb/ton ANFO)	7.30E-06	1.75E-04	3.20E-05	6
		POM	POM	5.54E-05	(lb/ton ANFO)	1.94E-05	4.65E-04	8.49E-05	6
		Formaldehyde	50-00-0	1.02E-03	(lb/ton ANFO)	3.58E-04	8.60E-03	1.57E-03	6
		Arsenic	7440-38-2	9.26E-06	(lb/ton ANFO)	3.24E-06	7.78E-05	1.42E-05	6
		Beryllium	7440-41-7	6.95E-06	(lb/ton ANFO)	2.43E-06	5.84E-05	1.07E-05	6
		Cadmium	7440-43-9	6.95E-06	(lb/ton ANFO)	2.43E-06	5.84E-05	1.07E-05	6
		Chromium	7440-47-3	6.95E-06	(lb/ton ANFO)	2.43E-06	5.84E-05	1.07E-05	6
		Manganese	7440-48-4	1.39E-05	(lb/ton ANFO)	4.86E-06	1.17E-04	2.13E-05	6
		Mercury	7439-97-6	6.95E-06	(lb/ton ANFO)	2.43E-06	5.84E-05	1.07E-05	6
		Nickel	7440-02-0	6.95E-06	(lb/ton ANFO)	2.43E-06	5.84E-05	1.07E-05	6
		Selenium	7782-49-2	3.47E-05	(lb/ton ANFO)	1.22E-05	2.92E-04	5.33E-05	6
		Ammonia	7664-41-7	7.60E-02	(lb/ton ANFO)	2.66E-02	6.38E-01	1.17E-01	6
					Total HAP	4.17E-04	1.00E-02	1.83E-03	-

[1] NOx emission factors per "*NOx emissions from blasting operations in open-cut coal mining*" 2008 Published by Elsevier Ltd.
[2] CO emission factors per "*A Technique for Measuring Toxic Gases Produced by Blasting Agents*," NIOSH, 1997.
[3] SO_2 emission factor was obtained from AP-42 Table 13.3-1 (02/80) for the detonation of ANFO
[4] PM emission factor calculated per AP-42 Section 11.9, Table 11.9-1 for blasting (July 1998)

$0.000014(A)^{1.5}$ where, A = horizontal area (ft^2), with blasting depth ≤ 70 ft

The following scaling factors are applied to PM emission factor to calculate PM_{10} and $PM_{2.5}$ emission factors per AP-42 Table 11.9-1: PM_{10}: 0.52 $PM_{2.5}$: 0.03

[5] CO_2, N_2O, and CH_4 emission factors converted to lb/MMBtu based on a factor of: 2.205 lb/kg

73.96	kg CO_2/MMBtu	per 40 CFR 98 Subpart C Table C–1
3.00E-03	kg CH_4/MMBtu	per 40 CFR 98 Subpart C Table C–2
6.00E-04	kg N_2O/MMBtu	per 40 CFR 98 Subpart C Table C–2

[6] HAP emission factors per AP-42, Section 1.3, Tables 1.3-8 and 1.3-10.
[7] CO_2, N_2O, and CH_4 emissions calculated based on diesel fuel HHV of

0.138	MMBtu/gal	Per 40 CFR 98 Subpart C Table C–1
19,300	Btu/lb	Per AP-42, Section 3.3, October 1996

Diesel usage:	51,820 gal/yr	
Diesel fuel oil to ANFO ratio:	6%	Conservative assumption based on typical ANFO formulations, based on NIOSH study accessed at https://www.cdc.gov/niosh/mining/UserFiles/works/pdfs/anfo.pdf
Diesel fuel density:	7.10 lb/gal	

[8] CO_2e emission calculated based on Global Warming Potentials (GWP) per 40 CFR 98 Subpart A Table A-1:

GWP of CO_2:	1	lbs CO_2e/lb CO_2
GWP of CH_4:	25	lbs CO_2e/lb CH_4
GWP of N_2O:	298	lbs CO_2e/lb N_2O

Table A-5a. Material Handling Drop Points Inputs

Emission Drop Point ID	Transfer	Maximum Throughput [1] (ton/hr)	Maximum Throughput [1] (tons/yr)
DP-1	Unload Sulfide Ore to Sulfide Ore Stockpile	527	1,974,000
DP-2	Screen to Crusher Feed Hopper	527	1,974,000
DP-3	Crusher Feed Hopper to Crusher	527	1,974,000
DP-4	Crusher to Output Conveyor	527	1,974,000
DP-5	Conveyor to Crushed Sulfide Ore Stockpile	527	1,974,000
DP-6	Unload Oxide Ore to Heap Leach Pad	1,533	5,394,000

[1] Annual Throughput based on maximum annual throughput for sulfide ore and oxide ore.

Table A-5b. Material Handling Drop Points Emission Factors

Emission Drop Point ID	Transfer To	Uncontrolled Emission Factor (lb/ton) [1]		
		PM	PM_{10}	$PM_{2.5}$
DP-1	Unload Sulfide Ore to Sulfide Ore Stockpile	7.00E-05	2.30E-05	6.50E-06
DP-2	Screen to Crusher Feed Hopper	7.00E-05	2.30E-05	6.50E-06
DP-3	Crusher Feed Hopper to Crusher	7.00E-05	2.30E-05	6.50E-06
DP-4	Crusher to Output Conveyor	7.00E-05	2.30E-05	6.50E-06
DP-5	Conveyor to Crushed Sulfide Ore Stockpile	7.00E-05	2.30E-05	6.50E-06
DP-6	Unload Oxide Ore to Heap Leach Pad	7.00E-05	2.30E-05	6.50E-06

[1] Emission factors based on U.S. EPA AP-42, Section 11.19.2 (Crushed Stone Processing and Pulverized Mineral Processing) for Conveyor Trasnfer Point (controlled)

Table A-5c. Material Handling Drop Points - Emissions

Emission Drop Point ID	Transfer To	Annual Emissions (tpy) [1]			Hourly Emissions (lb/hr) [1]			Daily Emissions (lb/day) [1]		
		PM	PM_{10}	$PM_{2.5}$	PM	PM10	PM2.5	PM	PM10	PM2.5
DP-1	Unload Sulfide Ore to Sulfide Ore Stockpile	0.07	0.02	0.01	0.04	0.01	0.00	0.89	0.29	0.08
DP-2	Screen to Crusher Feed Hopper	0.07	0.02	0.01	0.04	0.01	0.00	0.89	0.29	0.08
DP-3	Crusher Feed Hopper to Crusher	0.07	0.02	0.01	0.04	0.01	0.00	0.89	0.29	0.08
DP-4	Crusher to Output Conveyor	0.07	0.02	0.01	0.04	0.01	0.00	0.89	0.29	0.08
DP-5	Conveyor to Crushed Sulfide Ore Stockpile	0.07	0.02	0.01	0.04	0.01	0.00	0.89	0.29	0.08
DP-6	Unload Oxide Ore to Heap Leach Pad	0.19	0.06	0.02	0.11	0.04	0.01	2.58	0.85	0.24
	Total	**0.53**	**0.18**	**0.05**	**0.29**	**0.10**	**0.03**	**7.00**	**2.30**	**0.65**

[1] Hourly Emissions (lb/hr) = Max Hourly Throughput (ton/hr) x Emission Factor (lb/ton).
Annual Emissions (tpy) = Annual Throughput (tpy) x Emission Factor (lb/ton)/ 2,000 (lb/ton).

Table A-6a. Crushing and Screening - Emissions

Emission Unit ID	Emission Unit Description	Throughput [1]		Control	Controlled Emission Factor (lb/ton) [2]			Hourly Emissions (lb/hr) [3]			Annual Emissions (tpy) [3]		
		(tph)	(tpy)	Type	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Primary Crushing and Screening													
SC-01	Screen	527	1,974,000	Water Sprays	2.20E-03	7.40E-04	5.00E-05	1.16E+00	3.90E-01	2.64E-02	2.17	7.30E-01	4.94E-02
CR-01	Mobile Crusher	527	1,974,000	Water Sprays	1.20E-03	5.40E-04	1.00E-04	6.32E-01	2.85E-01	5.27E-02	1.18	5.33E-01	9.87E-02
							Total	1.79	0.67	0.08	3.36	1.26	0.15

[1] Per Excelsior response dated 10/10/2023.

[2] The PM, $PM_{10,}$ and $PM_{2.5}$ emission factors were obtained from AP-42 Chapter 11.19.2 Table 11.19.2-2 for "Screening (controlled)" and "Tertiary Crushing (controlled)". The emission factors are inclusive of emissions generated by the drop into the equipment unit and the stone-to-stone attrition during crushing and screening processes.

[3] Hourly Emissions (lb/hr) = Max Hourly Throughput (ton/hr) x Emission Factor (lb/ton) x (1- Control Effiency (%)).
Annual Emissions (tpy) = Annual Throughput (tpy) x Emission Factor (lb/ton) x (1- Control Efficiency (%))/ 2,000 (lb/ton).

Table A-7a. Stockpiles - Emissions

Emission Unit ID	Description	Max. Stockpile Area [1]	Silt Content [2]	Emission Factor [3, 4] (lb/day/acre)			Hourly Emissions (lb/hr)			Annual Emissions (tpy)		
		(acre)	(%)	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
SP-01	Uncrushed Sulfide Ore	0.72	7.5	9.51E-01	4.76E-01	7.20E-02	2.85E-02	1.43E-02	2.16E-03	1.25E-01	6.25E-02	9.46E-03
SP-02	Crushed Sulfide Ore	0.72	7.5	7.71E-01	3.85E-01	5.84E-02	2.31E-02	1.16E-02	1.75E-03	1.01E-01	5.06E-02	7.67E-03
						Total	**0.05**	**0.03**	**0.00**	**0.23**	**0.11**	**0.02**

[1] Area of the coarse, fine, and tertiary ore stockpiles provided by Excelsior - Emission Calculations RFI dated 10/10/2023.

[2] Silt Content is conservatively based on P42 Ch 13.2.4 Table 13.2.4-1 for overburden (mean value).

[3] Emission factors for storage stockpiles per Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, EPA-450/2-92-004, September 1992.
The PM_{10} emission factor is half the PM emission.

$$EF = 1.7\left(\frac{s}{1.5}\right)\left(\frac{365-P}{235}\right)\left(\frac{f}{15}\right)$$

where
EF = PM Emission factor (lb/day/acre)
s = Silt Content (%)
f = % of time the unobstructed wind speed exceeds 12 mph at the stockpile height
1.16
0.94
Per the surface wind speed data obtained from the Tucson Internation Airport for 2017-2021

$$\frac{U_{hub}}{U_{anem}} = \frac{\ln(z_{hub}/z_0)}{\ln(z_{anem}/z_0)}$$

Where
U_{hub} (m) = Adjusted wind speed at stockpile height
z_0 (m) Surface roughness length. Control of Open Fugitive Dust Sources - EPA (1988). 0.3 cm for overburden (used for coarse ore pile) and 0.01 for ground coal (used for fine ore pile).
z_{hub} (m) = Adjusted stockpile height
z_{anem} (m)= Anemometer height
P = Days per year with at least 0.01 inch precipitation (days)
25 Based on precipitation obtained from the Cochise 4 SSE meteorological station (COOP:021870) for the 2010-2012 period.

[4] Per AP-42, Section 13.2.4, November 2006, the particle size multiplier used for calculating emission factors is as follows:
PM_{10} = 0.35
$PM_{2.5}$ = 0.053

Table A-8a. Haul Trucks, Graders, and Support Vehicles - Parameters and Emission Factors

Vehicle Type	Road Surface	Make/Model	Round Trip Vehicle Miles Traveled (VMTs) [1]			Vehicle Weight (tons) [2]	Emission Factor [3] (lb/VMT)			Control [4]	
			Hourly (VMT/hr)	Daily (VMT/day)	Annual (VMT/yr)	Average	PM	PM_{10}	$PM_{2.5}$	Type	Efficiency (%)
Haul trucks	Unpaved	CAT777	77	1,842	672,330	128	13.39	3.44	0.344	Watering	75%
Graders	Unpaved	CAT MG16	5	15	368	39	7.84	2.02	0.20	Watering	75%
General Manager's SUV	Unpaved	SUV	0.36	8.60	2,215	3	2.47	0.64	0.06	Watering	75%
Mine Manager's Pickup	Unpaved	Pickup	0.86	20.70	5,393	3	2.47	0.64	0.06	Watering	75%
Plant Manager's Pickup	Unpaved	Pickup	0.81	19.30	5,003	3	2.47	0.64	0.06	Watering	75%
Ore Control/Geologist's Pickup	Unpaved	Pickup	0.64	15.30	3,968	3	2.47	0.64	0.06	Watering	75%
Foreman's Pickup 1	Unpaved	Pickup	1.69	40.50	14,741	3	2.47	0.64	0.06	Watering	75%
Plant Labor's Pickup	Unpaved	Pickup	1.38	33.20	12,088	3	2.47	0.64	0.06	Watering	75%
Leach Pad Labor's Pickup	Unpaved	Pickup	1.86	44.70	16,262	3	2.47	0.64	0.06	Watering	75%
Service Trucks 1	Unpaved	CAT777	0.29	7.20	2,607	6	3.38	0.87	0.09	Watering	75%
Leach Pad ATVs	Unpaved	ATV	0.70	16.90	6,157	1	1.51	0.39	0.04	Watering	75%
Backhoe	Unpaved	Backhoe	0.02	0.50	135	15	5.10	1.31	0.13	Watering	75%
Skid Steer	Unpaved	Skid Steer	0.02	0.50	135	3	2.47	0.64	0.06	Watering	75%
Loader - Cat 992	Unpaved	CAT 992	0.36	8.70	2,258	105	12.25	3.15	0.31	Watering	75%
Water Truck	Unpaved	CAT777	1.29	30.90	8,042	55	9.16	2.35	0.24	Watering	75%
Service Truck 2	Unpaved	CAT777	0.18	4.30	1,128	6	3.38	0.87	0.09	Watering	75%
Tire Truck	Unpaved	CAT777	0.18	4.30	1,128	3	2.47	0.64	0.06	Watering	75%
Foreman's Pickup 2	Unpaved	Pickup	0.73	17.40	4,515	3	2.47	0.64	0.06	Watering	75%
Blasthole Drills	Unpaved	Sandvik	0.01	0.20	45	3	2.47	0.64	0.06	Watering	75%
ANFO Truck	Unpaved	CAT777	0.21	5.20	1,362	3	2.47	0.64	0.06	Watering	75%
Stemming Truck	Unpaved	CAT777	0.04	0.90	234	50	8.77	2.25	0.23	Watering	75%
Delivery Trucks	Unpaved	CAT777	1.27	30.50	7,932	28	6.70	1.72	0.17	Watering	75%
Copper Cathode Shipment Truck	Unpaved	CAT777	0.20	4.68	1,705	29	6.86	1.76	0.18	Watering	75%

[1] The calculated VMTs for haul trucks, graders, and support vehicles were obtained from the Excelsior Class II Air Permit Application dated 2/15/2013.

[2] Vehicle weights are based on the fleet information from Excelsior Class II Permit Application dated 2/15/2013

[3] Emission factors were calculated per Equations 1a and 2 from U.S. EPA AP-42, Section 13.2.2 (Unpaved Roads), November 2006 for vehicle travel on unpaved surfaces at industrial sites.

$$Emissions = k\left(\frac{s}{12}\right)^a\left(\frac{W}{3}\right)^b$$

$$E_{ext} = E\ [(365 - P)/365]$$

Where

E = size-specific emission factor (lb/VMT)

k, a, b = Constants for equation 1a

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

Per AP-42 Table 13.2.2-2, November 2006

s = surface material silt content (%)

5 Consisitent with 2013 Nord Permit

W = mean vehicle weight (tons)

P = Days per year with at least 0.01 inch precipitation

25

Based on precipitation obtained from the Cochise 4 SSE meteorological station (COOP:021870) for the 2010-2012 period.

For graders, emission factors were calculated per Equations 1a and 2 from U.S. EPA AP-42, Section 13.2.2 (Unpaved Roads), November 2006 for vehicle travel on unpaved surfaces at industrial sites.

Table A-8b. Haul Trucks, Graders, and Support Vehicles - Emissions

Vehicle Type	Road Surface	Make/Model	Hourly Emissions (lb/hr)			Annual Emissions (tpy)		
			PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Haul trucks	Unpaved	CAT777	256.92	66.02	6.602	1,125	289.15	28.91
Graders	Unpaved	CAT MG16	9.80	2.52	0.25	0.36	0.09	0.01
General Manager's SUV	Unpaved	SUV	0.22	0.06	0.01	0.68	0.18	0.02
Mine Manager's Pickup	Unpaved	Pickup	0.53	0.14	0.01	1.67	0.43	0.04
Plant Manager's Pickup	Unpaved	Pickup	0.50	0.13	0.01	1.55	0.40	0.04
Ore Control/Geologist's Pickup	Unpaved	Pickup	0.40	0.10	0.01	1.23	0.32	0.03
Foreman's Pickup 1	Unpaved	Pickup	1.04	0.27	0.03	4.56	1.17	0.12
Plant Labor's Pickup	Unpaved	Pickup	0.85	0.22	0.02	3.74	0.96	0.10
Leach Pad Labor's Pickup	Unpaved	Pickup	1.15	0.30	0.03	5.03	1.29	0.13
Service Trucks 1	Unpaved	CAT777	0.24	0.06	0.01	1.10	0.28	0.03
Leach Pad ATVs	Unpaved	ATV	0.26	0.07	0.01	1.16	0.30	0.03
Backhoe	Unpaved	Backhoe	0.03	0.01	0.00	0.09	0.02	0.00
Skid Steer	Unpaved	Skid Steer	0.01	0.00	0.00	0.04	0.01	0.00
Loader - Cat 992	Unpaved	CAT 992	1.10	0.28	0.03	3.46	0.89	0.09
Water Truck	Unpaved	CAT777	2.95	0.76	0.08	9.20	2.36	0.24
Service Truck 2	Unpaved	CAT777	0.15	0.04	0.00	0.48	0.12	0.01
Tire Truck	Unpaved	CAT777	0.11	0.03	0.00	0.35	0.09	0.01
Foreman's Pickup 2	Unpaved	Pickup	0.45	0.12	0.01	1.40	0.36	0.04
Blasthole Drills	Unpaved	Sandvik	0.01	0.00	0.00	0.01	0.00	0.00
Blasting Agent Truck	Unpaved	CAT777	0.13	0.03	0.00	0.42	0.11	0.01
Stemming Truck	Unpaved	CAT777	0.09	0.02	0.00	0.26	0.07	0.01
Delivery Trucks	Unpaved	CAT777	2.13	0.55	0.05	6.65	1.71	0.17
Copper Cathode Shipment Truck	Unpaved	CAT777	0.34	0.09	0.01	1.46	0.38	0.04
		Total	279.43	71.80	7.18	1,170	300.68	30.07

Table A-8c. Dozers - Parameters and Emission Factors

Vehicle Type	Road Surface	Hours of Operation [1] Daily (hr/day)	Hours of Operation [1] Annual (hr/yr)	Emission Factor [2] (lb/hr) PM	Emission Factor [2] (lb/hr) PM_{10}	Emission Factor [2] (lb/hr) $PM_{2.5}$	Control [2] Type	Control [2] Efficiency [4] (%)	Hourly Emissions (lb/hr) PM	Hourly Emissions (lb/hr) PM_{10}	Hourly Emissions (lb/hr) $PM_{2.5}$	Annual Emissions (tpy) PM	Annual Emissions (tpy) PM_{10}	Annual Emissions (tpy) $PM_{2.5}$
Dozer	Unpaved	8	2,080	15.97	3.18	1.68	Watering	75%	3.99	0.79	0.42	4.15	0.83	0.44

[1] Per the ASCU PCAQCD Class II Air Permit Application dated 10/10/2022 (Appendix C).

[2] Emission factors per Table 11.9-1, U.S. EPA AP-42, Section 11.9 (Western Surface Coal Mining), October 1998 for bulldozing overburden, as represented by the equation below.

$$Emission\ Factor\left(\frac{lb}{hr}\right) = \frac{k\,(s)^a}{(M)^b}$$

Where:

Parameter	Description	Units	Pollutant PM/TSP	Pollutant PM_{10}	Pollutant $PM_{2.5}$
s	Silt content	%	5.0	-	-
M	Moisture content	%	2.0	-	-
k	Factor	dimensionless	5.7	-	-
a	Factor	dimensionless	1.2	-	-
b	Factor	dimensionless	1.3	-	-
-	Scaling Factor	dimensionless	-	0.75	0.105

Table A-8d. Total Road Emissions

Vehicle Type	Emissions (tpy) PM	Emissions (tpy) PM_{10}	Emissions (tpy) $PM_{2.5}$
Haul trucks	1,125	289	29
Graders	0.36	0.09	0.01
Dozer	4.15	0.83	0.44
Support Vehicles	44.52	11.44	1.14
Total	**1,174**	**301.51**	**30.50**

Table A-9a. Storage Tanks - Parameters and Emissions

Tank ID	Tank Description	Tank Capacity (gal)	Annual Throughput (gal/yr)	Tank Type	Stock [1]	Emissions (tpy) [2]			
						VOC Losses			H_2SO_4/PM/PM_{10}/$PM_{2.5}$ [3,4]
						Standing	Working	Total	Total
TNK-01	Plant Sulfuric Acid Tanks	338,309	338,432	Vertical	99% Sulfuric Acid	--	--	--	1.32E-02
TNK-02	Plant Sulfuric Acid Tanks	338,309	338,432	Vertical	99% Sulfuric Acid	--	--	--	1.32E-02
TNK-03	Plant Sulfuric Acid Tanks	338,309	338,432	Vertical	99% Sulfuric Acid	--	--	--	1.32E-02
TNK-04	Crusher Acid Tank	100,000	289,080,000	Vertical	99% Sulfuric Acid	--	--	--	1.10E-01
TNK-05	Strong Electrolyte Storage Tank	6,785	346,896,000	Vertical	Electrolyte	--	--	--	3.02E-15
TNK-06	Tank House Feed Storage Tank	16,000	1,261,440,000	Vertical	Electrolyte	--	--	--	2.35E-13
TNK-07	Barren Electrolyte Storage Tank	16,000	346,896,000	Vertical	Electrolyte	--	--	--	6.43E-14
TNK-08	Kerosene (Diluent) Tank	13,000	90,000	Vertical	Kerosene	5.08E-03	2.06E-03	7.14E-03	-
TNK-09	Loaded Organic Tank	33,000	1,608,000,000	Vertical	Organics	No Emissions from Organics			
TNK-10	Cone Bottom Tank on Legs in Organic Recovery Area	7,600	720,000	Vertical	Organics	No Emissions from Organics			
TNK-11	Settler type Storage Tank in Organic Recovery Area	22,800	720,000	Settler type	Organics	No Emissions from Organics			
TNK-12	Electrolyte Filter Tank 1	2,650	115,632,000	Vertical	Electrolyte	--	--	--	2.03E-12
TNK-13	Electrolyte Filter Tank 2	2,650	115,632,000	Vertical	Electrolyte	--	--	--	2.03E-12
TNK-14	Electrolyte Filter Tank 3	2,650	115,632,000	Vertical	Electrolyte	--	--	--	2.03E-12
					Total	**0.01**	**0.00**	**0.01**	**1.50E-01**

[1] The stock for the loaded organic tank and crud holding tank is modeled as kerosene (the diluent) as it is the most volatile component in those tanks. The electrolyte is modeled as a 20 wt% sulfuric acid solution .
[2] Emissions per BREEZE TankESP Software output using U.S. AP-42 Chapter 7 (Liquid Storage Tanks) methodology.
[3] H_2SO_4 and SO_3 emissions will be generated from the storage tanks. Once in the air, SO_3 reacts with water vapor to form H_2SO_4, but some SO_3(g) remains available. However, it is conservatively assumed that all generated non-water emissions are H_2SO_4 mist.
[4] H_2SO_4 aerosols are conservatively assumed to be PM, PM_{10}, and $PM_{2.5}$.

Table A-9b. Storage Tanks - HAP Emissions

Tank ID	Tank Description	HAP Emissions (tpy) [1,2]										Total
		Benzene	Benzo(g,h,i)perylene	Cumene	Ethylbenzene	Hexane	Iso-octane (2,2,4-Trimethylpentane)	Naphthalene	PAC's	Toluene	Xylenes	
TNK-01	Plant Sulfuric Acid Tanks	--	-	-	-	-	-	-	-	-	-	-
TNK-02	Plant Sulfuric Acid Tanks	--	-	-	-	-	-	-	-	-	-	-
TNK-03	Plant Sulfuric Acid Tanks	--	-	-	-	-	-	-	-	-	-	-
TNK-04	Crusher Acid Tank	--	-	-	-	-	-	-	-	-	-	-
TNK-05	Strong Electrolyte Storage Tank	--	-	-	-	-	-	-	-	-	-	-
TNK-06	Tank House Feed Storage Tank	--	-	-	-	-	-	-	-	-	-	-
TNK-07	Barren Electrolyte Storage Tank	--	-	-	-	-	-	-	-	-	-	-
TNK-08	Kerosene (Diluent) Tank	9.11E-02	6.44E-15	-	2.93E-01	1.80E-01	-	5.15E-03	8.99E-13	9.12E-01	6.26E-01	2.11E+00
TNK-09	Loaded Organic Tank	No Emissions from Organics										-
TNK-10	Cone Bottom Tank on Legs in Organic Recovery Area	--	-	-	-	-	-	-	-	-	-	-
TNK-11	Settler type Storage Tank in Organic Recovery Area	--	-	-	-	-	-	-	-	-	-	-
TNK-12	Electrolyte Filter Tank 1	-	-	-	-	-	-	-	-	-	-	-
TNK-13	Electrolyte Filter Tank 2	-	-	-	-	-	-	-	-	-	-	
TNK-14	Electrolyte Filter Tank 3	-	-	-	-	-	-	-	-	-	-	
	Total	**9.11E-02**	**6.44E-15**	**-**	**2.93E-01**	**1.80E-01**	**0.00E+00**	**5.15E-03**	**8.99E-13**	**9.12E-01**	**6.26E-01**	**2.11E+00**

[1] Emissions per BREEZE TankESP Software output using U.S. AP-42 Chapter 7 (Liquid Storage Tanks) methodology.

Table A-10a. Ammonium Nitrate Prill (ANFO) Delivery and Handling - Emissions

Emission ID Number	Activity	Throughput [1] (ton/yr)	Control Efficiency (%)	Emission Factor [1] (lb/ton)		
				PM	PM_{10}	$PM_{2.5}$
ANFO-1	ANFO Delivery & Handling	3,066	70%	0.02	0.02	0.003
				Emission Rate (lb/hr)		
				PM	PM_{10}	$PM_{2.5}$
				2.10E-03	2.10E-03	3.15E-04
				Emission Rate (tpy)		
				PM	PM_{10}	$PM_{2.5}$
				0.01	0.01	0.00

[1] PM_{10} emission factor obtained from AP-42, Section 8.3-3, Table 8.3-2, dated July 1993 for "Bulk loading operations".
Assuming PM = PM_{10}
$PM_{2.5}$ = 0.15

[2] Control Efficiency of 70% per TCEQ Draft RG 058 Rock Crushing Plants, February 2002, for partial enclosure.

Table A-11a. HAP Composition in Ore

HAP Metallic Compound	Weight Percent in Ore (%) [1]
Antimony Compounds	2.40E-05
Arsenic Compounds	4.40E-05
Beryllium Compounds	9.50E-04
Cadmium Compounds	1.20E-05
Chromium Compounds	7.20E-03
Cobalt Compounds	1.32E-03
Lead Compounds	2.60E-04
Manganese Compounds	2.20E-03
Mercury Compounds	1.00E-06
Nickel Compounds	1.64E-03
Selenium Compounds	4.20E-05

[1] HAP ore composition data was obtained from Excelsior RFI dated 10/12/2023.

Table A-11b. HAP Emissions from Ore Processes

Emission Point Number	Source Type	Annual PM Emissions (tpy)	HAP Annual Emissions (tpy) [1]									
			Antimony Compounds	Arsenic Compounds	Beryllium Compounds	Cadmium Compounds	Chromium Compounds	Cobalt Compounds	Lead Compounds	Manganese Compounds	Nickel Compounds	Selenium Compounds
DRILL-1	Fugitive	1.33	3.19E-05	5.85E-05	1.26E-03	1.59E-05	9.57E-03	1.75E-03	3.45E-04	2.92E-03	2.18E-03	5.58E-05
DP-1	Non-fugitive	0.07	1.66E-06	3.04E-06	6.56E-05	8.29E-07	4.97E-04	9.12E-05	1.80E-05	1.52E-04	1.13E-04	2.90E-06
DP-2	Non-fugitive	0.07	1.66E-06	3.04E-06	6.56E-05	8.29E-07	4.97E-04	9.12E-05	1.80E-05	1.52E-04	1.13E-04	2.90E-06
DP-3	Non-fugitive	0.07	1.66E-06	3.04E-06	6.56E-05	8.29E-07	4.97E-04	9.12E-05	1.80E-05	1.52E-04	1.13E-04	2.90E-06
DP-4	Non-fugitive	0.07	1.66E-06	3.04E-06	6.56E-05	8.29E-07	4.97E-04	9.12E-05	1.80E-05	1.52E-04	1.13E-04	2.90E-06
DP-5	Non-fugitive	0.07	1.66E-06	3.04E-06	6.56E-05	8.29E-07	4.97E-04	9.12E-05	1.80E-05	1.52E-04	1.13E-04	2.90E-06
DP-6	Non-fugitive	0.19	4.53E-06	8.31E-06	1.79E-04	2.27E-06	1.36E-03	2.49E-04	4.91E-05	4.15E-04	3.10E-04	7.93E-06
Crushing and Screening												
CR-01	Non-fugitive	1.18	2.84E-05	5.21E-05	1.13E-03	1.42E-05	8.53E-03	1.56E-03	3.08E-04	2.61E-03	1.94E-03	4.97E-05
SC-01	Non-fugitive	2.17	5.21E-05	9.55E-05	2.06E-03	2.61E-05	1.56E-02	2.87E-03	5.65E-04	4.78E-03	3.56E-03	9.12E-05
Stockpiles												
SP-01	Fugitive	1.25E-01	3.00E-06	5.50E-06	1.19E-04	1.50E-06	9.00E-04	1.65E-04	3.25E-05	2.75E-04	2.05E-04	5.25E-06
SP-02	Fugitive	1.01E-01	2.43E-06	4.46E-06	9.62E-05	1.22E-06	7.29E-04	1.34E-04	2.63E-05	2.23E-04	1.66E-04	4.25E-06
		Total	1.31E-04	2.40E-04	5.17E-03	6.53E-05	3.92E-02	7.19E-03	1.42E-03	1.20E-02	8.93E-03	2.29E-04

[1] HAP Annual Emissions (tpy) = PM Annual Emissions (tpy) x HAP Wt %

Table A-12a. SX Tanks Diffusivity

Emission Unit ID	Component	Concentration (ppm)	Vapor Pressure (mmHg)	Molecular Weight (M_i)	Diffusion Volume (V_i)	Diffusivity ($D_{i\text{-}air}$) (cm^2/s)
SXTNKS	Air	-	-	28.97	20.10	-
	Benzene	25	77.20	78.11	90.68	0.09
	Toluene	350	22.40	92.13	111.14	0.08
	Ethylbenzene	1,400	7.50	106.16	131.60	0.07
	m-Xylene	410	6.40	106.16	131.60	0.07
	o-Xylene	770	4.97	106.16	131.60	0.07
	p-Xylene	732	6.90	106.16	131.60	0.07
	Octane	2,300	10.60	114.22	167.64	0.07
	Heptane	66.67	36.40	100.20	147.18	0.07
	Hexane	66.67	126.60	86.17	129.72	0.08
	Pentane	66.67	430.70	72.15	106.26	0.08
	Naphthalene	-	0.05	-	-	-
	1,2,4 trimethylbenzene	385	2.04	120.19	172.26	0.06
	1,3,5 trimethylbenzene	385	7.34	120.19	172.26	0.06

[1] Per "Quantification of Volatile Organic Compound Emissions from the Solution Extraction Process," BHP Copper, San Manuel Operations, July 15, 1997.
Naphthalene is not considered due to its low vapor pressure.

Table A-12b. SX Tanks - Diffusive Flux

Emission Unit ID	Component	Diffusivity ($D_{i\text{-}air}$)	Concentration at [1]				Diffusive Flux [2] (F_i)	
			Surface [2] (Ci^0)		H = 1 m (Ci^H)			
		(cm^2/s)	(ppmv)	(g/m^3)	(ppmv)	(g/m^3)	(g/m^2-s)	(lb/ft^2-hr)
SXTNKS	Benzene	0.09	25	0.08	0.002	5.75E-06	7.14E-07	5.26E-07
	Toluene	0.08	350	1.32	0.07	2.52E-04	1.06E-05	7.82E-06
	Ethylbenzene	0.07	1,400	6.08	0.06	2.47E-04	4.47E-05	3.30E-05
	Xylenes	0.07	1,912	8.30	0.04	1.61E-04	6.11E-05	4.50E-05
	Others	0.07	2,500	11.68	16.92	0.08	8.60E-05	6.34E-05
	1,2,4 trimethylbenzene	0.06	385	1.89	0.02	1.13E-04	1.22E-05	9.00E-06
	1,3,5 trimethylbenzene	0.06	385	1.89	0.01	4.96E-05	1.22E-05	9.00E-06

[1] Per "Quantification of Volatile Organic Compound Emissions from the Solution Extraction Process," BHP Copper, San Manuel Operations, July 15, 1997.
[2] F_i calculated per equation contained in "Quantification of Volatile Organic Compound Emissions from the Solution Extraction Process," BHP Copper, San Manuel Operations, July 15, 1997.

Table A-12c. SX Tanks - Units

Emission Unit ID	Nominal Capacity [1]		Control [2]	
	Value	Unit	Type	Efficiency (%)
SX Mixer-Settler Train 1 - Total Surface Area	5,177.0	ft^2	Tank Cover	66%
SX Mixer-Settler Train 2 - Total Surface Area	5,299.0	ft^2	Tank Cover	66%
Total Area	10,476	ft^2	Tank Cover	66%

[1] Per Excelsior - Emission Calculations RFI dated 10/10/2023.
[2] SX tank will have a tank cover. Control efficiency value per study "Hydrometallurgy of Copper" (1999)

Table A-12d. SX Tanks - Emissions

Emission Unit ID	Controlled VOC and HAP Emissions [1]													
	Benzene		Toluene		Ethylbenzene		Xylenes		Others		1,2,4 trimethylbenzene		1,3,5 trimethylbenzene	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Total SX Tanks	0.0019	0.0082	0.0278	0.1219	0.1175	0.5146	0.1604	0.7028	0.2258	0.9890	0.0321	0.1404	0.0321	0.1404

[1] Controlled HAP and VOC emissions calculated based on diffusive flux, total surface area, and control efficiency.

Table A-13a. Electrowinning (EW) - Surface Area

Emission Point Number	Location	No. of Cells	Surface Area (ft^2)
EWCELLS	Electrowinning Cell Block 1 Electrowinning Cell Block 2	56 32	1,628 1,560
Total			***3,188***

[1] Per ADEQ Permit 57694, Attachment "C", Equipment List, dated December 19, 2016.

Table A-13b. Electrowinning (EW) - - Emissions

Emission Point Number	Pollutant	Emission Factor [1]	Units	Controlled Emissions	
				(lb/hr)	(tpy)
EWCELLS	$PM/PM_{10}/PM_{2.5}/H_2SO_4$	1.57E-04	lb/hr-ft²	0.50	2.19

[1] Emission factor per "Measurement of Sulfuric Acid Mist emissions from the Cyprus Twin Buttes Copper Company Electrowinning Tankhouse" report (02/98), as submitted by Rosemont Copper Company on March 19, 2012, and approved by ADEQ.

Table A-14.a Electrolyte Heater Emission Factors

Emission Unit ID	Emission Unit Description	Capacity (MMBtu/hr)	Emission Factors [1,2,3]									
			NO_x (lb/MMBtu)	CO (lb/MMBtu)	PM (lb/MMBtu)	PM_{10} (lb/MMBtu)	$PM_{2.5}$ (lb/MMBtu)	SO_2 (lb/MMBtu)	VOC (lb/MMBtu)	CO_2 (kg/MMBtu)	CH_4 (kg/MMBtu)	N_2O (kg/MMBtu)
HTR-5	Electrolyte Heater	5.30	0.088	0.04	0.0048	0.0048	0.0048	1.05E-06	0.025	53.06	1.03E-03	1.00E-04
HTR-6	Backup Electrolyte Heater	5.30	0.088	0.04	0.0048	0.0048	0.0048	1.05E-06	0.025	53.06	1.03E-03	1.00E-04

[1] Based on Excelsior Permit Renewal dated July 5th, 2023

[2] Emission factors per Power Flame Inc. Typical Flue Product Product Emissions Data for Power Flame Burners.

[3] GHG Emissions per 40 CFR Part 98 Subpart C, Tables C-1 and C-2

Table A-14.b Electrolyte Heater Emissions

Emission Unit ID	Emission Unit Description	Emissions (tpy)[1]										
		NO_x	CO	PM	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2	CH_4	N_2O	CO_2e
HTR-5	Electrolyte Heater	2.04	0.86	0.11	0.11	0.11	2.44E-05	0.58	2715.51	0.05	0.01	2718.35
HTR-6	Backup Electrolyte Heater	2.04	0.86	0.11	0.11	0.11	2.44E-05	0.58	2715.51	0.05	0.01	2718.35
Total		4.09	1.72	0.22	0.22	0.22	4.87E-05	1.16	5431.02	0.11	0.01	5436.71

[1] Global Warming Potentials (GWP) values per 40 CFR Part 98, Table A-1

CO_2	1
CH_4	25
N_2O	298

Table A-15a: Evaporation Pond Mechanical Evaporators - Summary of Sampling Campaigns

Sample No.	Location	Permitting Agency	Evaporator Type	TDS Concentration (mg/L)	System Flow Rate (gpm)	Sampled Emission Rate (lb/hr)	
						PM_{10}	$PM_{2.5}$
1	NM	NMED	Fracture	12,000	80.1	0.61	0.52
2	AZ	ADEQ	Atomizer	41,000	80.1	0.074	0.05
3	AZ	ADEQ	Atomizer	41,000	80.1	0.11	0.05
4	AZ	ADEQ	Atomizer	41,000	80.1	0.10	0.08
5	MT	MDEQ	Atomizer	58,200	350.0	0.51	0.42
6	MT	MDEQ	Atomizer	58,200	80.7	0.16	0.15
7	AZ	ADEQ	Atomizer	110,000	65.0	0.47	0.18
8	AZ	ADEQ	Atomizer	110,000	65.0	0.50	0.18
9	AZ	MCAQD	Fracture	240,000	22.0	0.89	0.29

Table A-15b: Evaporation Pond Mechanical Evaporators - Summary of Most Representative Sampling Campaigns

Sample No.	Location	Permitting Agency	Evaporator Type	TDS Conc. (mg/L)	System Flow Rate (gpm)	Sampled Emission Rate	
						PM_{10}	$PM_{2.5}$
2	AZ	ADEQ	Atomizer	41,000	80.1	0.074	0.05
3	AZ	ADEQ	Atomizer	41,000	80.1	0.11	0.05
4	AZ	ADEQ	Atomizer	41,000	80.1	0.10	0.08
Average	AZ	ADEQ	Atomizer	41,000	80.1	0.093	0.059

*These monitors were selected since they are located in Arizona and have the most simiar TDS concentration to the pond at the Excelsior facility. Atomizer evaporators are likely the most similar to the nozzle evaporators located at Excelsior.

Table A-15c: Evaporation Pond Mechanical Evaporators - PM Emissions

Unit	Evaporator Type	TDS Conc. (mg/L)	System Flow Rate[2] (gpm)	Operation Time (hr/yr)	Calculated Emission Rate (lb/hr)[1]		Calculated Emission Rate (lb/day)[1]		Calculated Emission Rate (tpy)[1]	
					PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
EVAP-7 through EVAP-9	Gunnison Pond Evaporators	46,500	522	8,760	0.689	0.436	16.53	10.46	3.02	1.91
				Total	0.69	0.44	16.53	10.46	3.02	1.91

1 Adapted emission rates are scaled to emission rates from the sample periods listed in Table A-12b using the following equation:

$$ER = ER_0 * \frac{TDS}{TDS_0} * \frac{Q}{Q_0}$$

Where:
ER - Adapted Emission Rate
ER_0 - Emission Rate from Study
TDS - Excelsior TDS Concentration
TDS_0 - Study TDS Concentration
Q - Excelsior Flow Rate
Q_0 - Study Flow Rate

2 Volume (gpm) calculated based on gpm provided by Excelsior Mining Class II Air Permit Renewal datedJuly 5, 2023 .

Table A-16a. Excelsior JCM - PLS/Draindown Pond Evaporators - Emissions

Location	No. of Units	Make	Model	Design [1, 2] Pressure (psi)	Design [1, 2] Flow Rate (gpm)	Total Dissolved Solids [1, 3] (mg/L)	Specific Gravity [4] (G_f)	Flow Coefficient [5] (C_v)	Maximum Emission Rate [9] (lb/1,000 gal) [6, 7] PM/PM_{10}	(lb/1,000 gal) $PM_{2.5}$	(lb/hr) PM/PM_{10}	(lb/hr) $PM_{2.5}$	(tpy) [8] PM/PM_{10}	(tpy) $PM_{2.5}$
Griffith Energy	1	Turbo-Mister	S30FP	150	80.1	41,000	1.03	6.64	0.022	0.017	-	-	-	-
Excelsior JCM	1	SMI	420F	45	45	50,000	1.04	6.83	0.023	0.017	0.061	0.047	0.27	0.20

[1] Griffith Energy Turbo-Mister parameters per the following documents
Griffith Energy, LLC, Kingman, Arizona - Development of Pond Evaporation System Site-Specific Emission Factors - July 2015
Griffith Energy, LLC, Kingman, Arizona - Turbo-Mister Minor Permit Revision - September 2015
[2] Excelsior JCM SMI 420F parameters per January 2015 addendum to November 2015 minor permit revision application.
[3] Excelsior JCM draindown TDS content per email from Rebecca Sawyer, Excelsior JCM, on February 19, 2016.
[4] Specific gravity calculated at 15.6 °C (60 F) for the corresponding TDS value of the water using online calculation tool (http://www.csgnetwork.com/h2odenscalc.html)
[5] Flow Coefficient calculated using the following equation for orifices (obtained from http://www.smithvalve.com/technical/flow-coefficient.aspx)

$$Cv = Q \bullet \sqrt{\frac{Gf}{DP}}$$

[6] Maximum emission rate for Griffith Energy pond evaporator based on the maximum for each of the following tested nozzles:

Nozzle Type	Emission Factor (lb/10³ gal) [a] PM_{10}	Emission Factor (lb/10³ gal) [a] $PM_{2.5}$
TF6M	0.015	0.0103
TF10M	0.022	0.0097
TF14M	0.020	0.0168

[a] Per *Development of Pond Evaporation System Site-Specific Emission Factors* report (submitted July 2015),

[7] Proposed emission rate for Excelsior JCM Draindown Pond Evaporators is based on a ratio of the flow coefficient relative to the Griffith Energy Turbo-Mister emission factor.
[8] Annual emission based on continuous operation 8,760 hr/yr
[9] It is conservatively assumed that emissions of PM_{10} = emissions of PM.

Table A-16b. Excelsior JCM - Heap Leach Evaporative Vertical Spray Nozzles - Emissions

ID	Equipment	No. of Units [1]	Make	Model	Design [2] Pressure (psi)	Design [2] Flow Rate (gpm)	Total Dissolved Solids (mg/L)	Specific Gravity [3] (G_f)	Flow Coefficient [4] (C_v)	Maximum Emission Rate [6] (lb/1,000 gal) [5] PM/PM_{10}	(lb/1,000 gal) $PM_{2.5}$	(lb/hr) PM/PM_{10}	(lb/hr) $PM_{2.5}$	(tpy) PM/PM_{10}	(tpy) $PM_{2.5}$
EVAP-1 through 6	Draindown Pond Evaporator	1	SMI	420F	45	45	50,000	1.04	6.83	0.023	0.017	0.061	0.047	0.27	0.20
HEAP-EVAP1	Heap Leach Evap. Spray Nozzles	1	Senninger	Super Spray	30	5.61	50,000	1.04	1.04	0.0035	0.0026	0.0012	0.00089	0.0051	0.0039
HEAP-EVAP2	Heap Leach Evap. Spray Nozzles	1	BETE	TF8M	40	2.61	50,000	1.04	0.42	0.0014	0.0011	0.0002	0.00017	0.0010	0.0007

[1] Per email from Rebecca Sawyer, Excelsior JCM, on February 19, 2016, Excelsior JCM will utilize 500 heap leach evaporative spray nozzles
[2] Excelsior JCM Senninger Super Spray sprinkler heads parameters per January 2015 addendum to November 2015 minor permit revision application.
[3] Specific gravity calculated at 15.6 °C (60 F) for the corresponding TDS value of the water using online calculation tool (http://www.csgnetwork.com/h2odenscalc.html)
[4] Flow Coefficient calculated using the following equation for orifices (obtained from http://www.smithvalve.com/technical/flow-coefficient.aspx)

$$Cv = Q \bullet \sqrt{\frac{Gf}{DP}}$$

[5] Proposed emission rate for Excelsior JCM Heap Leach Evap. Spray Nozzles is based on a ratio of the flow coefficient relative to the Excelsior JCM Draindown Pond Evaporator emission factor.
[6] Annual emission based on continuous operation 8,760 hr/yr

Table A-16c. Excelsior JCM - Draindown Pond Evaporators & Heap Leach Evaporative Vertical Spray Nozzles - Options

Option	PLS/Draindown Pond Evaporators No. of Units	Emissions (lb/hr) PM/PM_{10}	(lb/hr) $PM_{2.5}$	(tpy) PM/PM_{10}	(tpy) $PM_{2.5}$	Heap Leach Evap Vertical Spray Nozzles No. of Units	Emissions (lb/hr) PM/PM_{10}	(lb/hr) $PM_{2.5}$	(tpy) PM/PM_{10}	(tpy) $PM_{2.5}$	BETE TF8M Heap Leach Evap Vertical Spray Nozzles No. of Units	Emissions (lb/hr) PM/PM_{10}	(lb/hr) $PM_{2.5}$	(tpy) PM/PM_{10}	(tpy) $PM_{2.5}$	Draindown Pond Evaps + Heap Leach Evap Vertical Spray Nozzles Emissions (lb/hr) PM/PM_{10}	(lb/hr) $PM_{2.5}$	(tpy) PM/PM_{10}	(tpy) $PM_{2.5}$
A	1	0.061	0.047	0.27	0.20	1,200	1.40	1.07	6.12	4.67	1,200	0.26	0.20	2.50E-04	1.46E-04	1.72	1.31	6.38	4.88
B	2	0.12	0.093	0.54	0.41	1,150	1.34	1.02	5.86	4.48	1,150	0.25	0.19	2.39E-04	1.40E-04	1.71	1.31	6.40	4.88
C	3	0.18	0.14	0.80	0.61	1,100	1.28	0.98	5.61	4.28	1,100	0.24	0.18	2.29E-04	1.33E-04	1.70	1.30	6.41	4.89
D	4	0.24	0.19	1.07	0.82	1,050	1.22	0.93	5.35	4.09	1,050	0.23	0.17	2.18E-04	1.27E-04	1.70	1.29	6.42	4.90
E	5	0.31	0.23	1.34	1.02	1,000	1.16	0.89	5.10	3.89	1,000	0.22	0.17	2.08E-04	1.21E-04	1.69	1.29	6.44	4.91
F	6	0.37	0.28	1.61	1.23	950	1.11	0.84	4.84	3.70	950	0.21	0.16	1.98E-04	1.15E-04	1.68	1.28	6.45	4.92
Max																**1.72**	**1.31**	**6.45**	**4.92**

APPENDIX B. DRAFT PERMIT LANGUAGE

Per the ADEQ Class II permit application form, suggested draft permit language must be included in minor permit revision applications. Excelsior proposes to update permit language to include updates to the equipment list in Attachment C of Permit No. 71633 as identified in Appendix C for this application. Additionally, Excelsior proposes to include monitoring, reporting, and recordkeeping requirements associated with the new applicable regulations identified in Section 8.

VIII. METALLIC MINERAL PROCESSING

A. Applicability

This section applies to the material handling between the mobile crusher, stockpiles, and the drop points.

B. Particulate Matter and Opacity

1. Emission Limitations/Standards

a. The Permittee shall not cause, allow or permit the discharge of particulate matter into the atmosphere in any one hour from any process source subject to the provisions of this Section in total quantities m excess of the amounts calculated by one of the following equations:

1. For process sources having a process weight rate of 30 tons per hour or Jess, the maximum allowable emissions shall be determined by the following equation:

$E = 4.10P^{0.67}$

Where:

E = the maximum allowable particulate emissions rate in pounds-mass per hour.

P = the process weight rate in tons-mass per hour.

[A.A.C. RI8-2-721.B.I]

2. For process sources having a process weight rate greater than 30 tons per hour, the maximum allowable emissions shall be determined by the following equation:

$E=55.0P^{0.11}-40$

Where E and P are defined as indicated in VIII.B.1.a.(1)

[A.A.C. R 18-2-721.8.2]

b. For purposes of this Section, the total process weight from all similar units employing a similar type process shall be used in determining the maximum allowable emissions of particulate matter.

[A.A.C. R18-2-721.D]

c. The opacity of any plume or effluent from any process source subject to the provisions of this Section shall not be greater than 20%.

[A.A.C. R18-2-702.8 .3]

d. If the presence of uncombined water is the only reason for an exceedance of the visible emissions requirements in III.B.I.c above, the exceedance shall not constitute a violation of the applicable opacity limit.

[A.A.C. R18-2-702.C]

2. Air Pollution Control Equipment

The Permittee shall. to the extent practicable. operate and maintain water sprays to control particulate matter emissions from the following sources:

a. Mobile Crusher and associated drop points

[A.A. C. R18-2-306.01]

3. Monitoring, Reporting and Recordkeeping Requirements

a. The Permittee shall, within 60 days of achieving the maximum production rate and every week after startup, conduct a visual survey of emissions from all the sources covered by this Section while they are in operation. The Permittee shall keep a record of the name of the observer, the date on which the observation was made, and the results of the observation.

[A.C.C. R 18-2-306.A.3.c]

b. If the observer sees a plume that on an instantaneous basis appears to exceed the applicable opacity standard of 20%, then the observer shall take a six-minute Method 9 observation of the plume. If visibility or other conditions prevent the observation, then the observer. shall document these conditions.

[A.A.C. R18-2-306.A.3.c]

c. If the six-minute opacity of the plume is less than the applicable opacity standard of 20%, then the observer shall make a record of the results of the Method 9 observation.

[A.A.C. R 18-2-306.A.3.c]

d. If the six-minute opacity of the plume exceeds the applicable opacity standard of 20%, the Permittee shall adjust or repair the equipment as necessary to reduce opacity to a level below 20% and report the incident as an excess emission for opacity. The Permittee shall make a record of the results of the Method 9 observation, the corrective action taken, and the excess emissions report.

[A.A. C. R 18-2-306.A.3.c]

APPENDIX C. EQUIPMENT LIST

Equipment List

Emission Unit ID	Description	Make	Model	Maximum Hourly Process Rates		Annual Process Rates		Annual Hours of Operation	Control 1 Type	Control 2 Type
				Value	Unit	Value	Unit			
Mining										
DRILL-1	Drilling	TBD	TBD	112	holes	40,880	holes	8,760	--	--
BLAST-1	Blasting	TBD	TBD	1	blast	365	blast	8,760	--	--
	ANFO Detonation	TBD	TBD	8	tons	3,066	tons	8,760		
Primary Crushing and Screening										
CR-01	Mobile Crusher	TBD	TBD	527	tons	1,974,000	tons	8,760	Water Sprays	--
SC-01	Mobile Crusher Screen	TBD	TBD	527	tons	1,974,000	tons	8,760	Water Sprays	--
Stockpiles										
SP-01	Uncrushed Sulfide Ore	--	--	0.72	acre	0.72	acre	8,760	--	--
SP-02	Crushed Sulfide Ore	--	--	0.72	acre	0.72	acre	8,760	--	--
Solution Extraction and Electrowinning (SXEW)										
SX-1	SX Mixer Settler Train A (3 mixer/settler units)	Excelsior	Excelsior	--	--	--	--	8,760		
SX-2	SX Mixer Settler Train B (3 mixer/settler units)	Excelsior	Excelsior	--	--	--	--	8,760		
CST-1	SX Organic Recovery Sump Tank	Excelsior	Excelsior	--	--	--	--	8,760		
EW-1	Electrowinning Cell Block 1 (56 cells)	N/A	N/A	--	--	--	--	8,760		
EW-2	Electrowinning Cell Block 2 (32 cells)	N/A	N/A	--	--	--	--	8,760		
EVAP-1 through EVAP-6	PLS/Draindown Pond Evaporators	SMI	420F	--	--	--	--	8,760		
EVAP-7 through EVAP-9	Gunnison Pond Evaporators	SMI	Mega PoleCat	--	--	--	--	8,760		
HEAP-EVAP1	Heap Leach Evaporative Spray Nozzles	Senninger	N/A	--	--	--	--	8,760		
HEAP-EVAP2	Heap Leach Evaporative Spray Nozzles	BETE	TF8M	--	--	--	--	8,760		
Vehicle Travel										
T1a	Other Vehicle Traffic in Pits	N/A	N/A	3	VMT	23,122	VMT	8,760	Road Watering	--
T1b	Other Vehicle Traffic Out of the Pits	N/A	N/A	12	VMT	99,343	VMT	8,760	Road Watering	--
T2	Haul Trucks	N/A	N/A	77	VMT	672,330	VMT	8,760	--	--
T3	Dozers	N/A	N/A	2	hour	4,160	hour	8,760	Road Watering	--
T4	Road Graders	N/A	N/A	5	VMT	491	VMT	8,760	Road Watering	--

Storage Tanks

Tank ID	Description	Type	Vertical/Horizontal	Type	Capacity (gallons)	Throughput (gallons)	Height (ft)	Diameter (ft)	Material
TNK-01	Plant Sulfuric Acid Tanks	Fixed Roof	Vertical	Carbon Steel	338,309	338,432	32	42	Sulfuric Acid
TNK-02	Plant Sulfuric Acid Tanks	Fixed Roof	Vertical	Carbon Steel	338,309	338,432	32	42	Sulfuric Acid
TNK-03	Plant Sulfuric Acid Tanks	Fixed Roof	Vertical	Carbon Steel	338,309	338,432	32	42	Sulfuric Acid
TNK-04	Crusher Acid Tank	Fixed Roof	Vertical	Carbon Steel	100,000	289,080,000	16	34	Sulfuric Acid
TNK-05	Strong Electrolyte Storage Tank	Fixed Roof	Vertical	316SS	6,785	346,896,000	8	12	Electrolyte
TNK-06	Tank House Feed Storage Tank	Fixed Roof	Vertical	316SS	16,000	1,261,440,000	11	16	Electrolyte
TNK-07	Barren Electrolyte Storage Tank	Fixed Roof	Vertical	316SS	16,000	346,896,000	11	16	Electrolyte
TNK-08	Kerosene (Diluent) Tank	Fixed Roof	Vertical	Poly	13,000	90,000	15	12	Kerosene
TNK-09	Loaded Organic Tank	Fixed Roof	Vertical	Carbon w/ PVC liner	33,000	1,608,000,000	10	24	Organics
TNK-10	Cone Bottom Tank on Legs in Organic Recovery Area	Floating Roof	Vertical	316SS	7,600	720,000	18	10	Organics
TNK-11	Settler type Storage Tank in Organic Recovery Area	Floating Roof	Settler type	Concrete with 316SS liner	22,800	720,000	4	19 x 40	Organics
TNK-12	Electrolyte Filter Tank 1	Fixed Roof	Vertical	316SS	2,650	115,632,000	7	9	Electrolyte
TNK-13	Electrolyte Filter Tank 2	Fixed Roof	Vertical	316SS	2,650	115,632,000	7	9	Electrolyte
TNK-14	Electrolyte Filter Tank 3	Fixed Roof	Vertical	316SS	2,650	115,632,000	7	9	Electrolyte

APPENDIX D. CLASS II FORM

SECTION 3.1

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Air Quality Division

1110 West Washington • Phoenix, AZ 85007 • Phone: (602) 771-2338

STANDARD CLASS II PERMIT APPLICATION FORM

(As required by A.R.S. § 49-426, and Chapter 2, Article 3, Arizona Administrative Code)

1. Permit to be issued to (Business license name of organization that is to receive permit): Excelsior Mining Corporation

2. Mailing Address: Concord Place, Suite 300 - 2999 North 44th Street
   City: Phoenix State: Arizona ZIP: 85018

3. Name (or names) of Responsible Official: Robert Winton
   Phone: (931)266-6856 Fax: ______ Email: rwinton@excelsiormining.com

4. Facility Manager/Contact Person and Title: Robert Winton
   Phone: (931)266-6856 Fax: ______ Email: rwinton@excelsiormining.com

5. Facility Name: Johnson Camp Mine
   Facility Location/Address (Current/Proposed): Township 15 South, Range 22 East Gila and Salt River Meridian
   City: Dragoon County: Cochise ZIP: 85609
   Indian Reservation (if applicable, which one): ______
   Latitude/Longitude, Elevation: 32° 01' 40" N Latitude/110° 02' 16" W Longitude, 4,633 feet Elevation

6. General Nature of Business: Processing leach solution to produce copper cathode

7. Type of Organization:
   ☑ Corporation ☐ Individual Owner ☐ Partnership ☐ Government Entity ☐ LLC
   ☐ Other ______

8. Permit Application Basis: ☐ New Source ☑ Revision ☐ Renewal of Existing Permit
   For renewal or modification, include existing permit number (and exp. date): 71633, 9/5/2023
   Date of Commencement of Construction or Modification: N/A
   Primary Standard Industrial Classification Code: 1021

9. I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by ADEQ as public record. I also attest that I am in compliance with the applicable requirements of the Permit and will continue to comply with such requirements and any future requirements that become effective during the life of the Permit. I will present a certification of compliance to ADEQ no less than annually and more frequently if specified by ADEQ. I further state that

I will assume responsibility for the construction, modification, or operation of the source in accordance with Arizona Administrative Code, Title 18, Chapter 2 and any permit issued thereof.

Signature of Responsible Official: ____________________

Printed Name of Signer/Official Title: Robert Winton, Senior Vice President

Date: 2023-12-22 Telephone Number: (931)266-6856

Section 3.5 - Equipment List

Type of Equipment	Maximum Rated Capacity [1]	Make	Model	Serial Number	Date of Manufacture	Equipment ID Number
See Appendix C.						

[1} For generator sets, enter the maximum rated capacity of the engine rather than the maximum rated capacity of the generator.

All relevant equipment utilized at the facility should be included in the equipment list. Please complete all fields.
The date of manufacture must be included in order to determine applicability of regulations.
Indicate the units (tons/hour, horsepower, etc.) when recording the maximum rated capacity.
Make additional copies of this form if necessary.
***Submit photographs of the faceplates for all engines listed above.**
***If an engine is certified, please also include a copy of the engine certification with the application.**
***For any newly added equipment, include a copy of the specification sheet.**
***These documents will be used to verify equipment information and determine applicable regulations.**

SECTION 3.6 - EMISSION SOURCE FORM

Emission Point		Regulated Air Pollutant Name	PTE		USE THIS SECTION FOR MODIFICATIONS ONLY: PTE AFTER MODIFICATION		CHANGE IN PTE
Number	Name		lbs/hr	tons/yr	lbs/hr	tons/yr	tons/yr
	See Appendix A.						

****Submit emission calculations spreadsheet with your application****

SECTION 5.0 -APPLICATION ADMINISTRATIVE COMPLETENESS CHECKLIST

	REQUIREMENT	MEETS REQUIREMENTS			COMMENT
		YES	NO	N/A	
1	Has the standard application form been completed?	✓			
2	Has the responsible official signed the standard application form?	✓			
3	Has a process description been provided?	✓			
4	Are the facility's emissions documented with all appropriate supporting information?	✓			
5	Is the facility subject to Minor NSR requirements? If the answer is "YES" , answer 6a, 6b and 6c as applicable. If the answer is "NO", skip to 7.		✓		
6.a	If the facility chooses to implement RACT, is the RACT determination included for the affected pollutants for all affected emission units?				
6.b	If the facility chooses to demonstrate compliance with NAAQS by screen modeling, is the modeling analysis included?				
6.c	If refined modeling has been conducted, is a comprehensive modeling report along with all modeling files included?				
7	Does the application include an equipment list with the type, name, make, model, serial number, maximum rated capacity, and date of manufacture?	✓			
8	Does the application include an identification and description of Pollution Controls? (if applicable)			✓	
9	For any application component claimed as confidential, are the requirements of AR.S. 49-432 and A.A.C. R18-2-305 addressed?			✓	
10	For any current non-compliance issue, is a compliance schedule attached?			✓	
11	For minor permit revision that will make a modification upon submittal of application, has a suggested draft permit been attached?	✓			