Technical Review and Evaluation of Application for Air Quality Permit Number 44232

I. INTRODUCTION

This Class II Synthetic Minor Air Quality Control Renewal Permit is being issued to Mineral Park, Inc. ("MPI") for the operation of an existing copper leaching solvent extraction-electrowinning (SX/EW) process, and the construction and operation of a new 50,000 ton per day (maximum design basis) mining, milling and flotation recovery operation producing copper-silver and molybdenum concentrates. Mining operations will take place over existing quarry areas, with the amount of rock extracted and the depth of the pit area to increase over time.

Company Information

Source Location: Mineral Park Road, 5 miles east of Hwy 93
15 miles north of Kingman, Mohave County, AZ

Mailing Address: 8275 Mineral Park Road
Golden Valley, AZ 86413

Background

On July 7, 2005, Mineral Park, Inc. ("MPI") was issued a Class II permit renewal (#31989) for a stationary source that produces copper using the leach-solvent extraction-electrowinning (SX/EW) process. This Class II Synthetic Minor Renewal Permit #44232, supersedes Permit #31989.

Attainment Classification

The source is located in Mohave County, AZ which is designated as attainment for all criteria pollutants and lead.

II. FACILITY DESCRIPTION

A. Process Description

Existing operations

MPI currently operates an existing stationary source that produces copper cathodes using the heap leaching, SX/EW process. In this process, an aqueous solution of copper ions is created by application of a weak acid solution to ore piles. The available copper ions are then extracted from the aqueous solution using an organic reagent. The copper-bearing organic phase is then stripped of its copper using a sulfuric acid solution. Finally, electro-winning is used to produce

high purity copper cathodes from the electrochemical reduction of copper from copper sulfate solution.

The SX/EW process has a small impact on air quality because the process is completed using aqueous or organic solutions and the liquid streams are easily contained and recycled.

Proposed operations

Construction of the proposed units and operations will occur in two phases. Phase I will include the construction and operation of a new grinding and material handling circuit and two (2) ball mills. Phase II will include the construction and operation of a second grinding and material handling circuit that is identical to Phase I. The processing capacity of Phase I will be 25,000 tons of ore per day and completion of Phase II will increase the capacity of the proposed facility to a combined total of 50,000 tons of ore per day.

Run-of-mine ore will be transported to one of two (2) new, in-pit, primary crushing plants by up to ten, 100 ton net payload, rear-dump trucks and dumped into a crusher feed hopper (10-HO-100 or 10-HO-200). The feed hoppers discharge ore to apron feeders (10-AF-110 or 10-AF-210) that will transfer run-of-mine ore from the dump hopper to a grizzly screen (10-SN-115 or 10-SN-215). Oversized ore from the screen will be fed to a jaw crusher (10-CR-120 or 10-CR-220) and undersized ore will pass to a primary crusher discharge conveyer (10-CV-130 or 10-CV-230). The crushed ore and grizzly undersize will be transported to a crushed ore stockpile (equipped with a stationary stacker) via a transport conveyer (10-CV-160 or 10-CV-260).

Coarse ore will be reclaimed from the stockpile via sub-grade conveyors through a tunnel below the crushed ore stockpile using four reclaim belt feeders (10-BF-100, 10-BF-105, 10-BF-200, and 10-BF-205). From the four feeders, ore will be transported to two parallel semi-autogenous grinding (SAG) wet grinding mills by belt conveyors (15-CV-110 or 15-CV-210). Water, milk of lime, and various forming reagents will be added to the SAG mills to produce slurry. From this point through the remainder of the metal flotation/recovery process, the process involves wet slurry or suspensions, so there are no dust emissions.

The SAG mills discharge onto a vibrating screen and slurry will be transferred to two parallel fine grinding lines. SAG mill discharge will be pumped to a splitter where it will be split between two ball mill discharge pump boxes. The SAG discharge will be combined with the ball mill discharge and pumped into a cyclone for each ball mill. Cyclone overflow will flow by gravity to bulk copper-molybdenum flotation.

The fine ground ore slurry will be sent to large, mechanically-agitated, rougher flotation cells. Rougher concentrate will be routed to a copper-molybdenum regrind circuit. From the rougher flotation cells, bulk copper-molybdenum material will be fed to several stages of cleaner and re-cleaner flotation cells. Copper-molybdenum bulk concentrate product will be thickened in agitated vessels in which sodium hydrosulfide will be added as a depressant for the copper mineralization. Copper tailings from the flotation cells, with an average moisture content of 8%, will be fed to the copper concentrate thickener and filter. A belt conveyer (50-CV-120) will transfer the copper concentrate filter cake onto a stockpile enclosed in a storage building (50-SB-150). These steps of processing involve agitation of slurries with dilute reagent solutions, and air pollutant emissions are negligible.

Molybdenum-bearing slurry material will be processed through a series of mechanically-agitated rougher, cleaning, and regrind cells, followed by several stages of recleaning cells to produce the finished concentrate grade. Slurry containing the final molybdenum concentrate will be fed through a pressure filter to dewater the slurry. Tailings from the molybdenum flotation cells will be fed to a concentrate thickener and distributed into a tailings stockpile. The wet filter cake (8% moisture) will be conveyed to the dryer feed hopper which will dispense the concentrate to an electrically heated oil circuit dryer (55-HE-175). Molybdenum concentrate, which will be dried to typical product moisture content (3-5%), will be transported along a screw transfer conveyer (55-CV-120) to a completely-sealed load out system (55-ZM-140) where it will be packaged for distribution. A molybdenum dust scrubber (55-DC-170) will be used to control molybdenum concentrate particulate emissions that are captured from the concentrate dryer, transfer points, and bagging equipment.

Attachment "C" to the permit contains a table of existing and proposed equipment.

B. Air Pollution Control Equipment

Dust emissions within the primary crusher stations are to be controlled using a combination of water suppression sprays, a "dry fog" water aerosol fogging system and wind barriers. The dry fog system produces a very dense fog of 1-10 micron size water droplets by use of specialized nozzles, compressed air and ultrasonic shock waves. These aerosols form a fog blanket which will agglomerate dust particles causing them to become too heavy to rise and become airborne. A dry fog and water spray suppression system will be installed at the crusher feed hopper dump point (FE1/FE2) to alleviate dust from this source. In addition to the fog/spray system, a double-winged wind barrier will be provided at the entrance to the truck dump hopper to help isolate the fog/spray zone from ambient wind. Dust at the transfer point where the crushed ore is transferred from the crushing station conveyor to the stacker conveyor (MH5/MH6) will be controlled by a combination of the dry fog system and water sprays.

Dust emissions from the remaining primary crushing transfer points (MH1, MH2, MH3, MH4, MH7 & MH8), which includes the primary crushers, grizzly discharge, and transfer conveyor, are controlled by a number of fogger assemblies. The fogging systems are designed and located to suppress dust at the transfer points by filling the hopper, chutes, head boxes and skirtboard covers with fog droplets, which will attach to the airborne dust particles and settle them out.

Baghouse dust collection systems will be utilized at the SAG mill feed conveyors, the lime silo and the dry solids lab, as it is one of the most effective ways to reduce particulate matter and dust emissions. A baghouse traps particulate matter by filtering gas streams through cylindrical fabric bags or cartridge filters. Properly sized and operated, and equipped with up-to-date fabric/media, these units can achieve a collection efficiency of more than 99% of fine particles.

III. COMPLIANCE HISTORY

There have been one file review and one report review for the Mineral Park Mine since 2004. No Air Quality cases or violations appear to have been developed for this facility as a result of those inspections.

A site inspection was conducted on April 16, 2009. An inspection report was sent to the company on May 28, 2009. Conclusions from this recent inspection are still under review.

IV. LEARNING SITES POLICY

In accordance with ADEQ's Environmental Permits and Approvals near Learning Sites Policy, the Department conducted an evaluation to determine if any nearby learning sites would be adversely impacted by the facility. Learning sites consist of all existing public schools, charter schools and private schools at the K-12 level, and all planned sites for schools approved by the Arizona School Facilities Board. The learning sites policy was established to ensure that the protection of children at learning sites is considered before a permit approval is issued by ADEQ.

There are no learning sites within a two-mile radius of the Mineral Park Mine facility.

V. EMISSIONS

A summary of the controlled potential to emit (PTE), including fugitive emissions, of the proposed facility is presented in Table 1 below. Per the memo, dated October 16, 1995, titled "Definition of Regulated Pollutant for Particulate Matter for Purposes of Title V", from Lydia Wegman, Deputy Director of Office of Air Quality Planning and Standards; EPA has concluded that PM_{10} is the regulated air pollutant under Title V. Therefore PM emissions have not been counted when classifying this source. Additionally, the source does not belong to one of the listed categories in A.A.C. R18-2-101.64.c, therefore fugitive emissions are not considered in the determination of major source applicability.

Considering the above mentioned exclusions and the acceptance of enforceable emission limits, the facility is classified as a Synthetic Minor Source pursuant to Arizona Administration Code (A.A.C.) R18-2-301.20.

Table 1
Emissions (Controlled PTE)

Pollutant	Controlled Potential to Emit (tpy)		
	Non-Fugitive	Fugitive	Combined Total
PM	182	82	264
PM_{10}	86	19	105
CO	Less than 1	94	94
NO_x	3.3	24	27
SO_2	Less than 1	2.8	3.1
VOC	Less than 1	13.6	13.8
H_2SO_4	1.5	none	1.5
HAP	Less than 1	Less than 1	Less than 1

VI. APPLICABLE REGULATIONS

The applicable regulations were identified by the agency as part of the permit review process. If necessary, the source is required to list any additional regulations that maybe applicable. Table 2, below, lists the requirements that are applicable to each piece of equipment at the facility.

Table 2
Applicable Regulations

Unit or Operation	Control Device	Rule	Verification
LPG Boiler	Not Applicable	AAC R18-2-724	Pursuant to AAC R18-2-724(A), the boiler is subject to the requirements of the rule because the source has a total rated capacity greater than 0.5 MMBtu/hr and the boiler has a rated capacity less than 250 MMBtu/hr.
Solvent Extraction (SX) and Electro-winning (EW) Operations	Not Applicable	AAC R18-2-730	Pursuant to AAC R18-2-730(A), these operations are subject to certain requirements of the rule because they are not subject to other standards of performance under Articles 7, 9 or 11.
		AAC R18-2-730(D)	
		AAC R18-2-730(F)	
		AAC R18-2-730(G)	
		AAC R18-2-730(H)	
		AAC R18-2-730(K)	
Crushing, Conveying and Material Handling Operations	Dust Fogging System	40 CFR Part 60, Subpart LL	Pursuant to 40 CFR 60.380(a), these operations are subject to the requirements of 40 CFR Part 60, Subpart LL because the respective units are affected facilities at a metallic mineral processing plant.

Unit or Operation	Control Device	Rule	Verification
Post-Milling Material Handling and Drying Operations	Dust Collectors, Wet Scrubber	40 CFR Part 60, Subpart LL	Pursuant to 40 CFR 60.380(a), these operations are subject to the requirements of 40 CFR Part 60, Subpart LL because the respective units are affected facilities at a metallic mineral processing plant.
Drilling and Blasting	Wet Drilling Techniques	Article 6	Blasting and drilling operations are nonpoint sources.
Compression Ignition Internal Combustion Engines	Fuel Restrictions	40 CFR Part 60, Subpart IIII	Pursuant to 40 CFR 60.4200 these operations are subject to the requirements of 40 CFR Part 60, Subpart IIII because the respective unit was manufactured after April 1, 2006.
		AAC R18-2-719	These rules are applicable to existing stationary rotating machinery
		40 CFR Part 63, Subpart ZZZZ	The engines are affected sources under 40 CFR 63 Subpart ZZZZ, but meet the requirements of Subpart ZZZZ through 40 CFR 60 Subpart IIII.
Gasoline Storage and Dispensing	None	AAC R18-2-710(B) AAC R18-2-710(D) AAC R18-2-710(E)	These rules are applicable to petroleum storage tanks,
		40 CFR Part 63, Subpart CCCCCC	Pursuant to 40 CFR 63.11111(a) these operations are subject to the requirements of 40 CFR Part 63, Subpart CCCCCC because the respective operations are affected facilities at an area source.
Mobile Sources	Dust Suppression	AAC R18-2-801 AAC R18-2-802 AAC R18-2-804	These rules are applicable to off-road mobile sources, which either move while emitting air pollutants or are frequently moved during the course of their utilization.
Periodic Activities	None	AAC R18-2-726	This rule is applicable to abrasive blasting activities.
		AAC R18-2-727	This rule is applicable to spray painting activities.
Demolition and Renovation	None	AAC R18-2-1101.A.8	This rule is applicable to asbestos-related activities.
Other Non-point Sources Including Open areas, Roadways, Storage Piles, and Mineral Tailings	Dust Suppression Through Water Spraying	AAC R18-2-604 AAC R18-2-605 AAC R18-2-606 AAC R18-2-607 AAC R18-2-608 AAC R18-2-612	Pursuant to AAC R18-2, Article 6, the source is subject to these rules because it utilizes the operations covered by these rules.

VII. PREVIOUS PERMIT CONDITIONS

All terms and conditions of permit #31989 have been either incorporated as originally stated or revised by this permit.

VIII. MONITORING REQUIREMENTS

A. Periodic opacity monitoring of process sources

1. Within 90 days of initial operation of the process sources identified in

Sections III and IV of the permit, the Permittee must conduct certified Method 9 observations to establish a baseline opacity level. Within 30 days of establishing baseline opacity, the Permittee must incorporate the results into the permit through the appropriate permitting revision process.

2. After the baseline opacity is established, a certified Method 9 observer must conduct a bi-weekly (once every two weeks) visual survey of emissions from the process sources when they are in operation.

3. If the observer sees a plume that on an instantaneous basis appears to exceed the baseline opacity level, then the observer must take a six-minute EPA Method 9 observation of the plume.

4. If necessitated by the results of the bi-weekly monitoring, the Permittee may re-establish the baseline opacity level(s). Re-establishment of the baseline(s) must be performed utilizing the same procedures used in setting up the initial baseline level(s). Within 30 days of re-establishing the baseline opacity, the Permittee must report the results through the appropriate permitting revision process. The report shall also contain a description of the need for re-establishing the baseline(s).

B. Opacity monitoring for fugitive dust sources

1. A certified Method 9 observer is required to conduct a twice per week visual survey of the fugitive dust sources.

2. If the observer sees a visible emission from a fugitive dust source that on instantaneous basis appears to exceed the applicable standard, then the observer must, if practical, take a six-minute Method 9 observation of the plume.

C. Monitoring of operational limits for crushing, conveying and material handling processes subject to Sections III & IV of Attachment "B" of the Permit

1. Monitoring devices must be in place to determine the daily material throughput for the process units subject to Section III.

2. Monitoring devices must be in place to determine both the hourly and daily material throughput for the process units Subject to Section IV.

D. 4.0 MMBtu/hr Boiler

1. A certified Method 9 observer must conduct an annual survey of visible emissions from the stack of the boiler when in operation.

2. If the opacity of the emissions observed appears to exceed the standard, the observer must conduct a Method 9 observation.

IX. TESTING REQUIREMENTS

The Permittee is required to perform testing on various baghouses as indicated below, to verify compliance with the applicable standards.

Table 3
Baghouse Testing Schedule

Equipment I.D.	Process	Test	Frequency
15-DC-170/15-DC171	SAG mill feed conveyors	EPA Methods 5 and 201A or 202	No later than 180 days after initial start-up, again in the third and fifth years of the permit term
15-DC-270/15-DC-271			
60-DC-100	Lime Bin		

X. IMPACTS TO AMBIENT AIR QUALITY

A. Introduction

An air quality impact modeling analysis was conducted to predict whether any criteria pollutant emissions associated with the facility might cause or contribute to a violation of any National Ambient Air Quality Standard (NAAQS).

B. Modeling Analysis Overview

1. Air Quality Model

The dispersion modeling analysis was run using the following EPA approved modeling programs: SCREEN3 for the boiler and emergency generator emissions, OBODM for gaseous emissions from blasting and AERMOD for all other sources. Emissions from combustion of LPG at the boiler were modeled for continuous operation. Gaseous emissions from blasting were modeled at a frequency of blasting that is four times the frequency permitted. All other sources were modeled at the throughput rate and operating hours as is limited by permit conditions.

2. Modeled Emissions

The modeling results, summarized in Table 4 below, showed no pollutants are expected to exceed the referenced standards.

Table 4
Modeling Analysis NAAQS Summary

Pollutant	Background ($\mu g/m^3$)	Total ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	% of NAAQS
NO_2 - Annual	4	7.0	100	7.0 %
CO - 1-hour	582	786	40,000	2.0%
8-hour	582	854	10,000	8.5 %
PM_{10} - 24-hour	50.7	141	150	94.0 %
Annual	21.6	30	50	60.0 %
SO_2 - 3-hour	170	177	1,300	13.6 %
24-hour	54	55	365	15.1 %
Annual	7	7.2	80	9.0 %

XI. INSIGNIFICANT ACTIVITIES

In the permit application, MPI proposed that several activities be classified as insignificant activities under A.A.C. R18-2-101.57. Table 8, below, lists the proposed insignificant activities at the Mineral Park Mine, along with the Department's determination as to whether or not the activity qualifies as insignificant.

Table 5
Insignificant Activities

Equipment Description	Number of Equipment Items	Maximum Size or Capacity	Verification of Insignificance
SAG, ball and lime plant ball mills	2 SAG mills, 4 Ball mills, 1 lime ball mill	Not applicable	A.A.C. R18-2-101(57)(j)
Rougher, cleaner and re-cleaner flotation cells	Multiple cells	Not applicable	A.A.C. R18-2-101(57)(j)
Regrind cyclones off the SAGs and ball mills	4	Not applicable	A.A.C. R18-2-101(57)(j)
Thickener tanks with agitators for mixing ore concentrates and reagents	3	Not applicable	A.A.C. R18-2-101(57)(j)
Tailings Thickener Tanks	2	Not applicable	A.A.C. R18-2-101(57)(j)

Equipment Description	Number of Equipment Items	Maximum Size or Capacity	Verification of Insignificance
Wet lab for assaying ores and concentrates	Not applicable	Not applicable	A.A.C. R18-2-101(57)(i)
Electric Oil heater	1	205 gallons & 57.3 gpm	A.A.C. R18-2-101(57)(j)
Orfom® MCO flotation oil tanks	3 (storage, circulation & day use)	Not applicable	A.A.C. R18-2-101(57)(j)
Orfom® R200 collector tanks	3 (storage, circulation & day use)	Not applicable	A.A.C. R18-2-101(57)(j)
AERO A-3302 promoter tanks	3 (storage, circulation & day use)	Not applicable	A.A.C. R18-2-101(57)(j)
Milk of lime tank	1	Not applicable	A.A.C. R18-2-101(57)(j)
Sodium hydrosulfide solution tank	3 (storage, circulation & day use)	Not applicable	A.A.C. R18-2-101(57)(j)
Dust collector discharge back to conveyors	4	Not applicable	A.A.C. R18-2-101(57)(j)
LPG storage tanks	3	1,000, 3,000 & 6,000 gallons	A.A.C. R18-2-101(57)(j)
Diesel Tanks	1	25,000 gallons	A.A.C. R18-2-101(57)(c)
Kerosene Tanks	1	10,000 gallons	A.A.C. R18-2-101(57)(c)
Sulfuric Acid Tanks	1	5,000 gallons	A.A.C. R18-2-101(57)(j)
Sulfuric Acid Tanks	1	10,000 gallons	A.A.C. R18-2-101(57)(j)

XII. LIST OF ABBREVIATIONS

A.A.C. ..... Arizona Administrative Code
ADEQ ..... Arizona Department of Environmental Quality
AZ ..... Arizona
CAM ..... Compliance Assurance Monitoring
CO ..... carbon monoxide
EPA ..... Environmental Protection Agency
g ..... gram(s)
g/kWh ..... gram(s) per kilowatt hour
g/bhp-hr ..... gram(s) per brake horsepower hour
HAP ..... Hazardous Air Pollutant
hr ..... hour(s)
lb ..... pound(s)
LPG ..... liquefied petroleum gas
$MMBtu/ft^3$ ..... million British Thermal Units per cubic foot
MPI ..... Mineral Park Inc.
$\mu g/m^3$ ..... micrograms per cubic meter
NAAQS ..... National Ambient Air Quality Standard
NMHC ..... nonmethane hydrocarbons
NO_2 ..... nitrogen dioxide
NO_x ..... nitrogen oxides
PM ..... particulate matter
PM_{10} ..... particulate matter with an aerodynamic diameter less than or equal to 10 micrometers
PSD ..... Prevention of Significant Deterioration
PSEU ..... Pollutant Specific Emission Unit
PTE ..... Potential to Emit
s ..... second(s)
SAG ..... semi-autogenous grinding
SO_2 ..... sulfur dioxide
SX/EW ..... solvent extraction electrowinning
tpy ..... ton(s) per year
VOC ..... Volatile Organic Compound
yr ..... year(s)