



**TECHNICAL REVIEW AND EVALUATION
OF APPLICATION FOR
AIR QUALITY PERMIT No. 90574**

I. INTRODUCTION

This Class I Renewal Permit is for the continued operation of Golden Vertex's Moss Mine. Permit No. 90574 renews and supersedes Permit No. 64302.

A. Company Information

Facility Name: Moss Mine
Mailing Address: 1882 Lakeside Dr. Unit 23277
Bullhead City, AZ 86439
Facility Location: 35° 6' 0.142", -114° 26' 52.13"

B. Attainment Classification

The facility is located in an area designated as attainment/unclassified for all criteria pollutants.

II. PROCESS DESCRIPTION

A. Process Equipment

The Moss Mine Project (MMP) consists of an open-pit mining operation including drilling, blasting and hauling operations, followed by crushing, crushed ore handling and stacking of ore onto a conventional heap leach pad. Gold and silver will be recovered from the pregnant leach solution by a Merrill Crowe process and refined via crucible melt furnace processing to produce doré bars.

B. Control Devices

1. Fabric Filters

Multiple forced air fabric filters ranging from single point bin vents and single point dust collectors to larger scale baghouses which collect emissions from multiple points via ducting are located throughout the ore processing and material handling processes to control particulate emissions.

2. Water Spray Suppression

Water spray suppression of particulate matter is utilized to control emissions from point sources and sources of fugitive emissions where it would be impractical to utilize dust collectors.

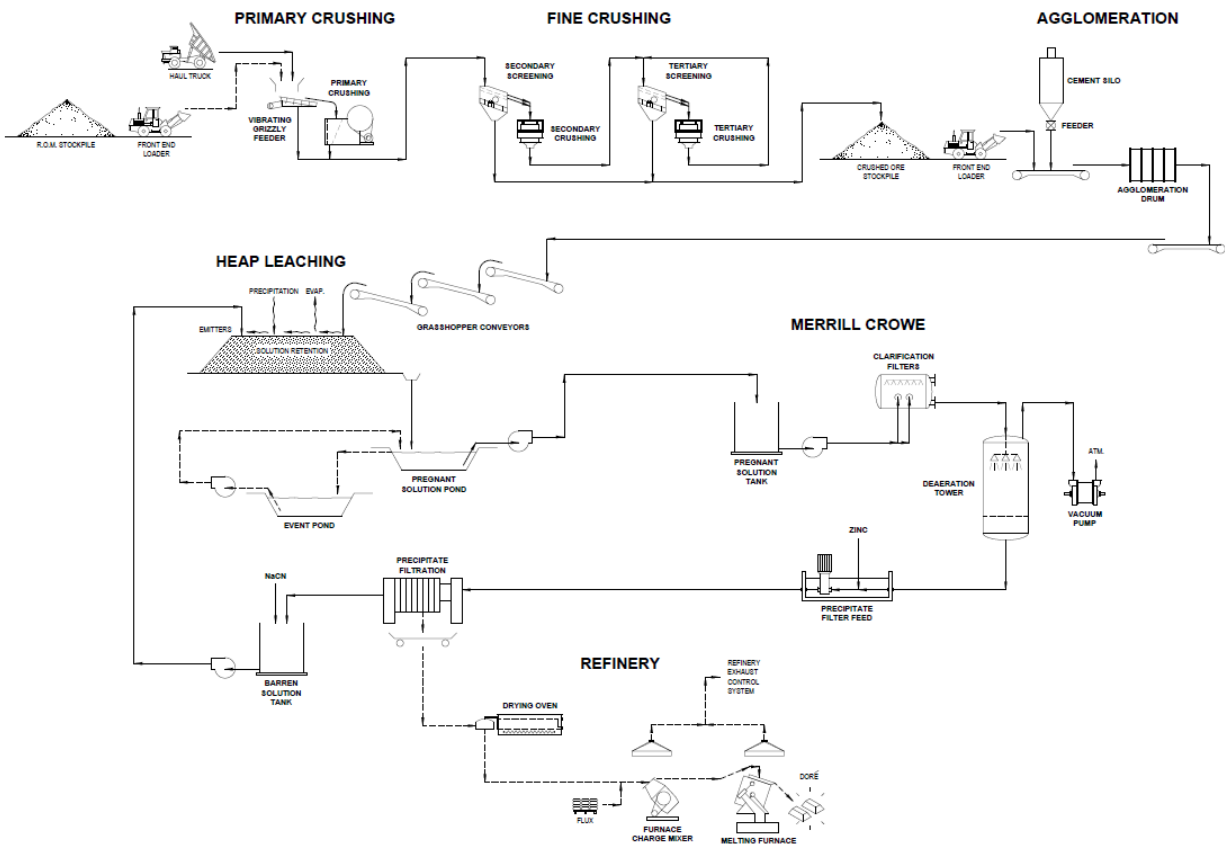
3. Static Measures

Passive protective measures, such as shrouds, partial and full enclosures, to eliminate or minimize particulate emissions are utilized at a number of material transfer operations,

4. Wet Scrubber

A packed bed wet scrubber is utilized to control emissions from the refinery melt furnace.

C. Process Flow Diagram



III. LEARNING SITE EVALUATION

The emissions increase for this Class I Renewal permitting action is less than the permitting exemption thresholds for all pollutants. There are no learning sites within two miles as of October 4, 2021. Based on the emissions increase and the distance to the nearest learning sites, the facility is exempt from the learning sites evaluations.

IV. COMPLIANCE HISTORY

During the permit term, Golden Vertex Corp. submitted six (6) compliance certifications associated with Permit number 64302 to ADEQ certifying compliance with the permit. The compliance certifications resulted in one (1) notice of violation (NOV) and no notices of opportunity to correct (NOC).

ADEQ inspected the facility two (2) times during the permit term. The inspections resulted in no NOV or NOC. There were no excess emission reports during the permit term.

The Permittee conducted five (5) performance tests during the permit term. All of the performance tests were emission compliance tests. The performance tests resulted in no NOV or NOC. Table 1 shows the results of the performance tests.

Table 1: Performance Test Results

Emission Unit	Date of test	Pollutant	Permitted emission rate	Tested Emission Rate	Pass/Fail
Wet Scrubber 500-DC-010	May 4, 2021	PM	0.02 gr/dscf	0.001 gr/dscf	Pass
		Opacity	7%	0%	Pass
		Hg	0.1 lb/ton concentrate	0.0382 lb/ton concentrate	Pass
Dust collector 1938850	April 14, 2020	PM	0.02 gr/dscf	0.000339 gr/dscf	Pass
Opacity		7%	0%	Pass	
Wet Scrubber 500-DC-010		PM	0.02 gr/dscf	0.000655 gr/dscf	Pass
		Opacity	7%	0%	Pass
		Hg	0.1 lb/ton concentrate	0.023 lb/ton concentrate	Pass
Dust collector 1938850	July 23, 2019	PM	0.02 gr/dscf	0.00038 gr/dscf	Pass
Opacity		7%	0%	Pass	
Wet Scrubber 500-DC-010	January 10, 2019	PM	0.05 g/dscm	0.00064 g/dscm	Pass
		Opacity	7%	0%	Pass
		Hg	0.1 lb/ton concentrate	0.066 lb/ton concentrate	Pass
200-DC-001	December 13, 2018	PM	0.05 g/dscm	0.0009 g/dscm	Pass
Opacity		7%	0%	Pass	
200-DC-002		PM	0.05 g/dscm	0.0019 g/dscm	Pass
		Opacity	7%	0%	Pass
200-DC-005		PM	0.05 g/dscm	0.0021 g/dscm	Pass
		Opacity	7%	0%	Pass
200-DC-006		PM	0.05 g/dscm	0.0079 g/dscm	Pass
		Opacity	7%	0%	Pass
200-DC-007		PM	0.05 g/dscm	0.0018 g/dscm	Pass
		Opacity	7%	0%	Pass

A. Case Number 187050

1. A Notice of Violation was issued to Golden Vertex Corp on December 11, 2019 for exceeding the 1,040 hours of operation permitted for the melt furnace. This was discovered during the November 15, 2019 compliance certification when the Permittee stated that records indicate the total number of furnace run hours for the refinery from October 1, 2018 to September 30, 2019 was 1,599 hours. Golden Vertex stated in the compliance certification report, the facility had difficulties in achieving sustained quality of gold and silver separation from the slag. This was a violation of Condition IV.B.1 of Attachment “B” of Permit 64302.
2. The same compliance certification noted that the opacity certification lapsed during the reporting period and that it was being rectified. This was a violation of Condition II.A.3 of Attachment “B” of Permit 64302. This violation led to subsequent violations that required the certified observer to perform visible emission surveys during the reporting periods. The other conditions that were violated were Condition III.B.3.a and VI.E.3 of Attachment “B”.
3. Documentation to fulfill Question 11.1 of the compliance certification was not submitted verifying fuel usage in the melt furnace to less than 100,000 gallons per year. This was a violation of Condition VI.B and VI.E.2 of Attachment “B”.

Compliance was documented and the NOV was closed March 13, 2020 and ADEQ took no further action.

V. EMISSIONS

The emissions for Moss Mine were calculated using individual engine certifications, and non-road CI engine certified emissions database for all generators, and Compilation of Air Pollutant Emission Factors (AP-42) for all other emissions. The emission calculations for MPR 86732 have been updated since the previous permitting action to reflect the engines power rating and not the generator power rating.

The facility has a potential-to-emit (PTE) more than the major source threshold for CO and more than the significant threshold for PM₁₀ and PM_{2.5}. The increase in emissions for all pollutants is below the permitting exemption thresholds. The change in emissions is due to removing the two 200 kW generators and the 47.5-kW generators, adding a 75-kW generator, and making all of the Tier 4 528-kw generators non-emergency use. Most of the emissions increase is due to the change of the emergency engines to non-emergency engines. The facility’s PTE is provided in Table 2 below:

Table 2: Potential to Emit (tpy)

Pollutant	Emissions (tpy)		
	MPR 86732	Renewal 90574	Difference
PM ₁₀	47.18	49.40	2.20
PM _{2.5}	12.7	13.75	1.05

Pollutant	Emissions (tpy)		
	MPR 86732	Renewal 90574	Difference
NO _x	24.07	26.48	2.41
SO ₂	0.46	4.00	3.54
VOC	6.71	8.22	1.51
CO	99.33	147.78	48.23

VI. MINOR NEW SOURCE REVIEW (NSR)

Minor new source review was not required for this permitting action since the increase in emissions for all pollutants are below the permitting exemption thresholds.

The Permittee chose to apply reasonably available control technology (RACT) to meet the requirements of mNSR in association with Permit No. 64302. Per A.A.C R18-2-334.C.1.a, In the case of a new source, the owner or operator shall implement RACT for each emissions unit that has the potential to emit a regulated minor NSR pollutant in an amount equal to or greater than 20% of the permitting exemption threshold. The eight 528 kW engines are Tier 4 engines which meets the RACT requirements established in Permit No. 64302. The other engines are all below 20% of the permitting exemption thresholds and therefore, are not subject to RACT requirements.

VII. VOLUNTARILY ACCEPTED EMISSION LIMITATIONS AND STANDARDS

The permit contains the following voluntary emission limitations and standards:

A. Condition I.C.1 of Attachment "B"

The Permittee shall not exceed 4.1 million tons annual throughput, measured as output from the primary crushing circuit on a rolling 12-month total.

B. Condition VI.D.3 of Attachment "B"

The Permittee shall not install an engine that is not Tier-4 certified and that has the potential to emit more than 20% of the permitting exemption threshold of any regulated air pollutant.

VIII. APPLICABLE REGULATIONS

Table 3 identifies applicable regulations and verification as to why that standard applies. The table also contains a discussion of any regulations the emission unit is exempt from.

Table 3: Applicable Regulations

Unit & year	Control Device	Rule	Discussion
Metallic Mineral Processing Equipment	Dust collectors, wet scrubber, water sprays, partial and full enclosures	40 CFR 60 Subpart LL	Post -1982 affected facilities listed in 40 CFR 60.380 are subject to New Source Performance Standards (NSPS) 40 CFR 60 Subpart LL

Unit & year	Control Device	Rule	Discussion
Refinery Processes: (Precipitate Filters to Slag Pots)	Baghouse and scrubber	40 CFR 63 Subpart EEEEEEE	These standards are applicable to any gold mine ore processing and production facility that is an area source of hazardous air pollutants and uses a melt furnace but does not use carbon or resins to recover gold from the cyanide leach solution.
Melt Furnace Oil Burner	Fuel Restrictions	A.A.C. R18-2- 724	These standards apply to industrial fossil-fuel fired equipment rated between 0.5 MMBtu/hr and 250 MMBtu/hr. 40 CFR 60 Subpart Dc is not applicable because the oil burner does not meet the definition of a steam generating unit. 40 CFR 63 Subpart JJJJJ is not applicable because the oil burner is not a boiler.
Cement Silo, Stackers, Agglomeration Equipment, Merrill Crowe chemical feed equipment.	Dust collectors and water sprays	A.A.C. R18-2- 730	These standards are applicable to otherwise unclassified sources.
Compression Ignition Engines	Fuel restrictions, additional pollution control devices (TBD) may be included by manufacturer as a component of the certified engine	40 CFR Subpart III	These standards are applicable to combustion ignition reciprocating internal combustion engines (CI-RICE) manufactured after July 11, 2005, or July 1, 2006 for certified National Fire Protection Association (NFPA) fire pump engines.
Fugitive dust sources	Water Trucks, Dust Suppressants	A.A.C. R18-2 Article 6 A.A.C. R18-2- 702	These standards are applicable to all fugitive dust sources at the facility.
Abrasive Blasting	Wet blasting; Dust collecting equipment; Other approved methods	A.A.C. R-18-2- 702 A.A.C. R-18-2- 726	These standards are applicable to any abrasive blasting operation.

Unit & year	Control Device	Rule	Discussion
Spray Painting	Enclosures	A.A.C. R18-2-702 A.A.C. R-18-2-727	These standards are applicable to any spray-painting operation.
Demolition/renovation Operations	N/A	A.A.C. R18-2-1101.A.8	This standard is applicable to any asbestos related demolition or renovation operations.

IX. PREVIOUS PERMIT REVISIONS AND CONDITIONS

A. Previous Permit Revisions

Table 4 provides a description of the permit revisions made to Permit No. 64302 during the previous permit term.

Table 4: Permit Revisions to Permit No. 64302

Permit Revision No.	Permit Revision Type	Brief Description
86732	MPR	Update Attachment "C", Equipment List and the associated Attachment "B" permit conditions with equipment detail to reflect current operations. The changes include adding emergency and non-emergency generators, continuous use operation of the melt furnace and a throughput increase from 3.1 to 4.1 million tons per year.

B. Changes to Current Renewal

Table 5 addresses the changes made to the sections and conditions from Permit No. 64302:

Table 5: Previous Permit Conditions

Section No.	Determination			Comments
	Added	Revised	Deleted	
Att. "A"		X		General Provisions: Revised to represent the most recent template language.
Att. "B" Section I			X	Relationship of Permit to Applicable State Implementation Plan: Removed, all other sections renumbered appropriately.
Att. "B" Section II		X		Facility wide requirements: Revised to represent the most recent template language.
Att. "B" Section III		X		Process Operations Subject to NSPS Subpart LL: Revised to reflect the most recent equipment operating at the facility.

Section No.	Determination			Comments
	Added	Revised	Deleted	
Att. "B" Section VII		X		Requirements for CI-RICE: Revised to reflect the most recent equipment operating at the facility. Added the engine RACT requirement to the compliance requirements.
Att. "C"		X		Equipment List: Revised to reflect the most recent equipment operating at the facility and to include equipment information provided.

X. MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS

Table 6 contains an inclusive but not an exhaustive list of the monitoring, recordkeeping and reporting requirements prescribed by the air quality permit. The table below is intended to provide insight to the public for how the Permittee is required to demonstrate compliance with the emission limits in the permit.

Table 6: Permit No. 90574

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
All emission points subject to NSPS Subpart LL	PM	7% Opacity	Conduct monthly visible emissions observations Conduct emission compliance performance test once per permit term		Submit emission compliance performance test results.
Wet Scrubber	PM	7% Opacity	Conduct monthly visible emissions observations Conduct emission compliance performance test once per permit term.		Submit emission compliance performance test results.
		0.05 g/dscm	Conduct emission compliance performance test once per permit term		
	Hg	0.1 lb/ton concentrate	Conduct annual emission compliance performance test		

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Melt Furnace	PM	15% Opacity	Conduct monthly visible emissions survey of melt furnace		
Tier 3 73 kW and 117 kW engines	NMHC+ NO _x	4.7 and 4 g/kW-hr respectively		Engine Certifications or compliance documentation demonstrating compliance with emission limits	
	CO	5 g/kW-hr			
	PM	0.4 and 0.3 g/kW-hr respectively 20% opacity acceleration mode. 15% opacity lugging mode. 50% opacity peaks in either the acceleration or lugging modes.		Quarterly visible emission observation	

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Tier 4 528-kW engines	NO _x	0.4 g/kW-hr		Engine Certifications or compliance documentation demonstrating compliance with emission limits	
	NMHC	0.19 g/kW-hr			
	CO	3.5 g/kW-hr			
	PM	0.02 g/kW-hr			
Fugitive Dust	PM	40% Opacity	A Method 9 observer is required to conduct a monthly survey of visible emissions.	Record of the dates and types of dust control measures employed, and if applicable, the results of any Method 9 observations, and any corrective action taken to lower the opacity of any excess emissions.	
Abrasive Blasting	PM	20% Opacity		Record the date, duration and pollution control measures of any abrasive blasting project.	
Spray Painting	VOC	20% Opacity Control 96% of the overspray		Maintain records of the date, duration, quantity of paint used, any applicable MSDS, and pollution control measures of any spray-painting project.	
Demolition/ Renovation	Asbestos			Maintain records of all asbestos related demolition or renovation projects including the "NESHAP Notification for Renovation and Demolition Activities" form and all supporting documents	

XI. LIST OF ABBREVIATIONS

A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
Btu	British Thermal Units
CFR	Code of Federal Regulations
CO	Carbon Monoxide
EPA	Environmental Protection Agency
g	Gram
HAP	Hazardous Air Pollutant
hr	hour
IC	Internal Combustion
lb	Pound
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO _x	Nitrogen Oxides
NO ₂	Nitrogen Dioxide
NSPS	New Source Performance Standards
NSR	New Source Review
PM	Particulate Matter
PM ₁₀	Particulate Matter less than 10 µm nominal aerodynamic diameter
PM _{2.5}	Particulate Matter less than 2.5 µm nominal aerodynamic diameter
PTE	Potential to Emit
SO ₂	Sulfur Dioxide
TPY	Tons per Year
VOC	Volatile Organic Compound
yr	Year