

AIR QUALITY PERMIT NO. 66619
FREEPORT MCMORAN MIAMI INC.-MIAMI MINE

I. INTRODUCTION

This Class II renewal permit is issued to Freeport McMoRan Miami Inc. for the continued operation of the Miami Mine, a metallic mineral processing facility in Miami, Arizona. The operation consists of excavation of copper ore from the ground, heap leaching, and solution extraction/electrowinning (SX/EW) plant to produce copper. This permit renews and supersedes Permit No. 56130.

A. Company Information

Facility Name: Freeport McMoRan Miami Inc.

Mailing Address: P.O. Box 4444, Claypool, Arizona 85532

Facility Address: Hwy 60, North of Miami, Claypool, Gila County, Arizona 85532

B. Attainment Classification

Miami area is currently designated as a non-attainment area for particulate matter less than 10 microns (PM₁₀), nonattainment for sulfur dioxide and attainment for all other criteria pollutants.

II. FACILITY DESCRIPTION

The operations at Miami Mine facility consist of six primary activities: Drilling and Blasting, Loading, Ore and overburden hauling, Leaching, Solvent Extraction, and Electrowinning at the Tankhouse. A brief description of these processes are listed below:

A. Drilling and Blasting

Ore and overburden are drilled for placement of ANFO (Ammonium Nitrate and Fuel Oil) explosives. Drilling operations result in fugitive emissions of Particulate Matter (PM) and Particulate Matter less than 10 microns (PM₁₀).

After the holes are drilled, they are filled with explosive and blasting is carried out. Blasting results in fugitive emissions of PM, PM₁₀ and some products of combustion (such as sulfur dioxide (SO₂), Carbon Monoxide (CO), and Nitrogen Oxides (NO_x)).

B. Loading

Ore and overburden generated from blasting activities are loaded into haul trucks for transport. The rock is scooped up by power shovels, loaders or other means and dropped into the beds of off-road haul trucks. Loading operations result in fugitive emissions of PM and PM₁₀.

C. Hauling

Overburden and ore are hauled by off-road trucks from the mine pits to overburden storage areas and to leach pads, respectively. The truck haul activity on unpaved roads is the principal source of fugitive dust.

D. Leaching

The leaching process is the method by which copper is removed from the ore. The haul trucks place their loads of ore onto leach pads. Weak sulfuric acid is applied by irrigation onto the pads. The acid solution trickles through the pads and dissolves copper. The resulting leachate is captured below the leach pads for processing. The ore placement results in fugitive emissions of PM and PM₁₀. Small quantities of fugitive sulfuric acid emissions occur during the irrigation process.

E. Solvent Extraction

The copper rich acid solution that trickles through the leach pads is sent to the solvent extraction (SX) feed tank, and then piped to the extraction circuit of the solvent extraction facility. The extraction process separates the copper from the copper-laden feed using an organic solution. After extraction the remaining solution or raffinate is sent to a lined pond for re-use in leaching. The loaded organic solution is sent to two vented surge tanks prior to the final aqueous extraction step (Stripping). Volatile Organic Compound (VOC) emissions occur at the surge tanks due to breathing and working losses. Other point sources of VOC emission from the solvent extraction system are the “diluent storage tank”, and the “grunge storage tank”. Fugitive VOC emissions also occur during extraction and in subsequent handling of aqueous streams which contacted the organic phase.

6. Tankhouse

The loaded strip solution from the solvent extraction plant is pumped into the electrowinning tanks at the tankhouse for copper recovery. An electric current is applied through the tankhouse solution, which causes copper in the acid solution to plate out in cathode form. When the cathodes reach a specified weight, the cathodes are removed and the acid solution is returned to the SX facility. The solution is required to be heated to ensure proper plating in the tankhouse. The heat is supplied by one or more of three natural-gas fired steam boilers depending on the season. The operations also result in small amounts of fugitive emissions of sulfuric acid emitted during the plating process.

7. Tailings

Tailings stockpiles from milling operations that ceased operation in 1986 have been included in this permit. Formerly it was included within the Miami Smelter permit. The tailings are undergoing reclamation as these are closed facilities (since 1986) and are managed by the Miami Mine operations.

8. Reclamation

Plans for reclamation activities are under way at the Miami Mine. Reclamation activities are very similar to mining. Miami is implementing reclamation of mining facilities which involves regrading of some slopes, requiring earthmoving activities including

loading, hauling and other earthwork.

III. COMPLIANCE HISTORY

There have been 14 air quality inspections and compliance report reviews during the permit term. No air quality violations for this facility have resulted from these inspections/ reviews.

IV. FACILITY-WIDE EMISSIONS

All emissions from the facility are computed using AP-42 emission factors. Following tables provide summary of the facility-wide potential to emit (PTE).

TABLE 1: FACILITY-WIDE NON-FUGITIVE EMISSIONS

Pollutant	Generators	SX/EW	Boilers/heaters	Total
	Tons per year			
PM ₁₀	1.58	0.0	2.19	3.78
PM _{2.5}	1.58	0.0	2.19	3.78
NO _x	31.2	0.0	40.42	71.62
CO	29.4	0.0	24.23	53.73
SO ₂	0.03	0.0	0.18	0.21
VOCs	3.24	2.81	1.61	7.66

TABLE 2: FACILITY-WIDE FUGITIVE EMISSIONS

Pollutant	Emissions
	tpy
PM ₁₀	5440
PM _{2.5}	566
CO	229
NO _x	68
SO ₂	6.79
VOCs	18

V. APPLICABLE REGULATIONS

Table 3 identifies the applicable regulations corresponding to every process unit and also provides verification as to why that standard applies.

TABLE 3: VERIFICATION OF APPLICABLE REGULATIONS

Unit	Control Device	Rule	Verification
<p>Boilers nos. 1, 2, and 3, other miscellaneous space heaters and propane water heaters</p>	<p>N/A</p>	<p>A.A.C. R18-2-724</p> <p>40 CFR 60 Part Dc</p> <p>40 CFR 63 Subpart DDDDD</p>	<p>Boilers #1 and 2 (>10.0 MMBtu/hr) were constructed prior to June 9, 1989, and, therefore, are not subject to New Source Performance Standards (NSPS) 40 CFR 60 Part Dc. Thus, these boilers and other heaters are subject to Existing Stationary Source Performance Standards under A.A.C. R18-2-724.</p> <p>Boiler #3 (>10.0 MMBtu/hr) was constructed after June 9, 1989, and, therefore, is subject to NSPS 40 CFR 60 Part Dc.</p> <p>Boilers 1, 2, and 3 are subject to National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements under 40 CFR 63 Subpart DDDDD. Propane Water Heater is exempt from requirements of NESHAP Subpart DDDDD since it is below the capacity threshold of 1.6 MMBtu per hour.</p> <p>The propane water heater is not subject to NESHAP Subpart DDDDD because it has a capacity less than 120 U.S. gallons</p>
<p>Internal Combustion Engines</p> <p>765 KW (1993) 750 KW (2000) 750 KW (2001) 56 KW (2004) 56 KW (2006)</p> <p>25 KW (2011) 35 KW (2011) 56 KW (2012)-3 100 KW (2011)</p>	<p>N/A</p>	<p>A.A.C. R18-2-719</p> <p>40 CFR Part 60 Subpart III</p> <p>40 CFR Part 60 Subpart JJJJ</p>	<p>The engines are not new sources subject to NSPS and therefore are subject to Existing Stationary Source Performance Standards under A.A.C. R18-2-719.</p> <p>The engines manufactured on or after April 1, 2006 and for which construction commenced after July 11, 2005 are subject to New Source performance Standards under 40 CFR Part 60, Subpart III.</p> <p>For purposes of the National</p>

Unit	Control Device	Rule	Verification
		40 CFR Part 63 Subpart ZZZZ	Emissions Standards for Hazardous Air Pollutants (NESHAP) program, the Miami Mine and Miami Smelter are collectively a “major source.” Engines for which construction commenced before June 12, 2006 are considered existing engines subject to NESHAP Subpart ZZZZ. Engines for which construction commenced on or after June 12, 2006 are considered new engines subject to NESHAP Subpart ZZZZ.
Electrowinning/ Solvent extraction operations, miscellaneous storage tanks, waste water treatment, and degreasing operations	Cell Blankets, thermal retention balls, or other methods as approved by the Director	A.A.C. R18-2-730 A.A.C R18-2-614	This standard is applicable to unclassified sources. This standard is applicable to nonpoint sources
Fugitive dust sources	Water Trucks Dust Suppressants	A.A.C. R18-2 Article 6	These standards are applicable to all nonpoint sources of fugitive dust at the facility.
Mobile sources	None	A.A.C. R18-2, Article 8	These are applicable to off-road mobile sources, which either move while emitting air pollutants or are frequently moved during the course of their utilization.
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.
Spray Painting	Enclosures	A.A.C. R18-2-702 A.A.C. R-18-2-727	This standard is 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.

VI. PREVIOUS PERMIT CONDITIONS

A. Previous Permits

The table below lists previous permits held by this facility.

TABLE 4: PREVIOUS PERMITS

Permit Number	Date Issued	Application Basis
56130	January 2, 2013	Class II Operating
61820	April 3, 2015	Minor Permit Revision

B. Previous Permit Conditions

This Renewal Permit No. 66619 is for the continued operation of this facility. Table 5 below illustrates if a section in Permit No. 56130 and revision thereof was revised or deleted.

TABLE-5: OPERATING PERMIT’S CONDITIONS THAT HAVE CHANGED

Condition #, Permit No. 56130 as amended by MPR #61820	Determination		Comments
	Deleted	Revised	
Attachment “A”		x	This Attachment has been revised and the most recent Attachment “A” is used for this permit.
Attachment “B”			
II		x	Title changed to Boilers and Other Fuel Burning Equipment.
II.A, B, and C		x	These Conditions are covered under Condition II.A.
II.D		x	This Condition renumbered as Condition II.C and revised since some of the requirements have been met.
III		x	This Condition for Boilers subject to New Source Performance Standards is renumbered as Condition II.B.
IV		x	This Condition for SX/EW, Misc. Storage Tanks and other unclassified Operations is renumbered as Condition III.
V		x	Title changed to Internal Combustion Engines-Emergency and renumbered as Condition IV.
VI		x	Title changed to Internal Combustion Engines- Non Emergency and renumbered as Condition V.

Condition #, Permit No. 56130 as amended by MPR #61820	Determination		Comments
	Deleted	Revised	
VII		x	This Condition for Fugitive Dust Requirement renumbered as Condition VI.
VIII		x	This Condition for Mobile Source Requirement renumbered as Condition VII.
IX		x	This Condition for Other Periodic Activities renumbered as Condition VIII.

VII. MONITORING, RECORDKEEPING AND REPORTING REQUIREMENTS

A. Fuel Burning Equipment

1. The Permittee is required to burn only natural gas in the boilers and miscellaneous heaters.
2. The Permittee must report all 6-minute periods during which the visible emissions exceed 15 percent opacity, as required under Condition XII of Attachment "A."

B. SX/EW Process

The Permittee must conduct a quarterly survey of the visible emissions from SX/EW process. If any observation appears to exceed the opacity standard, the Permittee is required to conduct a Method 9 observation. If this observation is in excess of the opacity standard, the Permittee is required to take corrective action, and also report to ADEQ as an "excess emission". The Permittee is required to log all control measures used to limit emissions from the SX/EW process

C. Internal Combustion Engines

1. The Permittee must install a non-resettable hours meter to record the operation hours for NSPS/NESHAP applicable emergency engines.
2. The Permittee must maintain records of hours of operations for emergency operations.
3. The Permittee must maintain records of fuel supplier certifications that contain information regarding the name of fuel supplier, sulfur content, and heating value of the fuel. These records shall be made available to ADEQ upon request.
4. The Permittee must conduct monthly survey of visible emissions from the stacks of non-NSPS generators, when in operation. The Permittee is required to keep records of the initial survey and any EPA Reference Method 9 observations performed.

D. Fugitive Dust Sources

The Permittee must conduct a bi-weekly (every other week) visual survey of the fugitive emissions from in the facility as per the approved visual observation plan. If any observation appears to exceed the opacity standard, the Permittee shall conduct and record a proper Method 9 observation. If this observation is in excess of the opacity standard, suitable corrective action shall be taken and also reported to ADEQ as an “excess emission”.

VIII. INSIGNIFICANT ACTIVITIES

The applicant has provided a list of activities to be deemed as “insignificant”. This list was evaluated in accordance with A.A.C. R18-2-101.68, and following activities are not deemed “insignificant”.

TABLE 6: LIST OF INSIGNIFICANT ACTIVITIES

<i>S. No.</i>	<i>Activity</i>	<i>Determination</i>	<i>Justification</i>
1	CSM and Lab Equipment used for chemical and physical analysis.	Yes	A.A.C. R 18-2-101.68
2	Storage of butane, propane, or liquefied petroleum and piping and storage systems for natural gas, propane, and liquefied petroleum gas.	Yes	A.A.C. R 18-2-101.68.a.iii
3	Petroleum product storage tanks containing diesel and fuel oil (capacity <40,000 gallons), transformer oil, used oil, gasoline storage equipment (capacity<10,000 gallons).	Yes	A.A.C. R 18-2-101.68.a.i and ii
4	Piping of fuel oils, used oil, and transformer oil. Line from diesel storage tanks to delivery hoses to fuel island.	Yes	A.A.C. R 18-2-101.68.a.iv
5	Storage and Handling of drums or other transportable containers where the containers are sealed during storage (includes containers of RCRA waste and used oil) and covered during loading and unloading. These drums include 55 gallon hazardous waste satellite accumulation.	Yes	A.A.C. R 18-2-101.68.a.v
6	Storage tanks of any sizer containing exclusively soaps, detergents, waxes, grease, aqueous salt solutions, aqueous acid solutions, or caustic solutions, drums and boiler water treatment chemicals in 120 gallon totes..	Yes	A.A.C. R 18-2-101.68.a.vi

<i>S. No.</i>	<i>Activity</i>	<i>Determination</i>	<i>Justification</i>
7	Servicing oil filled transformers	Yes	A.A.C. R 18-2-101.68.a.vii
8	IC Engine driven gen sets and pumps used less than 500 hours for emergency replacement or standby provided the permittee keeps records documenting the hours of operation.	Yes	A.A.C. R 18-2-101.68.b
9	Equipment using water, water and soap detergent, or a suspension of abrasives in water for purposes of cleaning and finishing	Yes	A.A.C. R 18-2-101.68.c.iv
10	Blast cleaning equipment using a suspension of abrasive in water and any exhaust system or collector serving them exclusively.	Yes	A.A.C. R 18-2-101.68.c.v
11	Plastic pipe welding	Yes	A.A.C. R 18-2-101.68.c.vi
12	Vacuum cleaning of spilled and accumulated items in buildings and vehicles	Yes	A.A.C. R 18-2-101.68.d.i
13	Sanding of streets and roads to abate traffic hazards caused by ice and snow	Yes	A.A.C. R 18-2-101.68.d.ii
14	Street and Parking lot striping	Yes	A.A.C. R 18-2-101.68.d.iii
15	Architectural painting and associated surface preparation for maintenance purposes	Yes	A.A.C. R 18-2-101.68.d.iv
16	Sampling points, analyzers and process instrumentation use in conjunction with SX/EW processes	Yes	A.A.C. R 18-2-101.68.e.i
17	General office activities, such as paper shredding, copying, photographic activities, pencil sharpening and blueprinting, but not including incineration;	Yes	A.A.C. R 18-2-101.68.f.i
18	Consumer products used in same manner as normal consumer use	Yes	A.A.C. R 18-2-101.68.f.ii
19	Activity related to potable water sources at Barney and Other locations	Yes	A.A.C. R 18-2-101.68.g.i
20	Transformer vents	Yes	A.A.C. R 18-2-101.68.g.ii

IX. LIST OF ABBREVIATIONS

A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
AQD	Air Quality Division
CO	Carbon Monoxide
EPA	United States Environmental Protection Agency
HAP	Hazardous Air Pollutant
hr	Hour
IC	Internal Combustion
MMBtu	Million British Thermal Units
NESHAP	National Emission standards for Hazardous Air Pollutants
NO _x	Nitrogen Oxide
NSPS	New Source Performance Standards
PM	Particulate Matter
PM ₁₀	Particulate Matter Nominally less than 10 Micrometers
PM _{2.5}	Particulate Matter Nominally less than 2.5 Micrometers
PTE	Potential-to-Emit
SO ₂	Sulfur Dioxide
SX/EW	Solvent Extraction and Electrowinning
TPY	Tons per Year
VOC	Volatile Organic Compound
Yr.	Year

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