

**TECHNICAL REVIEW AND EVALUATION
OF APPLICATION FOR
AIR QUALITY PERMIT No. 99245**

I. INTRODUCTION

This Class I air quality renewal permit is for the continued operation of Freeport-McMoRan Morenci Inc.'s (FMMI) copper ore mining and processing operations. Permit No. 99245 renews and supersedes Permit No. 72683.

A Class I air quality permit is required because the facility's potential to emit (PTE) of particulate matter less than or equal to 10 microns in aerodynamic diameter (PM_{10}), particulate matter less than or equal to 2.5 microns in aerodynamic diameter ($PM_{2.5}$), carbon monoxide (CO), and nitrogen oxides (NO_x) is greater than 100 tons per year pursuant to Arizona Administrative Code (A.A.C.) R18-2-101.75.c.

Permit No. 72683 had an expiration date of December 20, 2023, and the application for this permit renewal was submitted on June 16, 2023. This submission met the permit condition requiring that a complete and timely application be submitted by the facility at least six (6) months, but no earlier than eighteen (18) months, prior to the expiration date of the current permit.

A. Company Information

Facility Name: Freeport-McMoRan – Morenci
Mailing Address/ Facility Location: 4521 U.S. Highway 191
Morenci AZ, 85540

B. Attainment Classification

The facility is located in an area that is in attainment or unclassified for all criteria air pollutants.

II. PROCESS DESCRIPTION

A. Process Equipment

The FMMI facility is a large industrial complex comprised of mining, ore processing, and multiple support operations. The five (5) major operations at the FMMI facility include:

- Mining Operations;
- Morenci Concentrator;
- MFL Fine Crushing Plant;
- Solution Extraction/Electrowinning (SX/EW) Operations; and
- Metcalf Concentrator.

In addition to the five (5) major operations above, the FMMI facility has 14 supporting operation that include:

- Lime Slaking Plants and Lime Transloading;
- Metcalf Power Plant;
- Copper Concentrate Processing Operations;
- Concrete Batch Plant;
- Storage Tanks;
- Grizzly Operations;
- Concentrate Leach Plant;
- Diesel Emergency Engines;
- Combined Molybdenum Flotation and Molybdenum Concentrate Processing Operations;
- Propane and Natural Gas Emergency Engines;
- Prill Bins;
- Tailings Operations;
- Miscellaneous Fuel Burning Equipment; and
- Diesel Non-Emergency Engines.

The five (5) major operations are described in further detail below:

1. Mining Operations

The mining operations begin with drilling and blasting of ore. Following a blast, electric and hydraulic shovels are used to load the blasted material into haul trucks. The haul trucks then transport the ore to either the in-pit crushing and conveying (IPCC) system or the leaching/storage areas. Ore is reclaimed from the feed hoppers by apron feeders which regulate the flow of ore to the in-pit crushers. The ore continues through a series of crushers. The ore is the transported to the Mill IOS and MFL IOS.

2. Morenci Concentrator

The Morenci Concentrator operations begin with the reclaim from the Coarse Ore Storage Bin (COSB). Conveyor belts transfer the ore into the COSB from the Mill IOS. The ore is then transferred to the fine crushing lines where the ore is crushed to reduce its size prior to processing it by the ball mills and bulk flotation plant. The crushed ore is transferred to storage via conveyor belts. The ore is then transferred to the ball mills to pulverize the ore to produce a wet slurry. Oversized material is sent through the ball mills for further pulverization. Over being processed by the ball mill, the ore is transferred to the bulk floatation operations. At the bulk floatation operations, the wet slurry is separated into a combined copper/molybdenum concentrate and tailings.

3. MFL Fine Crushing Plant

The MFL Fine Crushing Plant starts with the reclaim from the Metcalf Track Hopper Storage Bin (MTHSB). Conveyor belts are used to convey and deposit ore into the MTHSB. Apron feeders deposit ore onto conveyor belts which subsequently feed MFL conveyor belts then each feed a scalping screen to split the ore into three (3) separate secondary crushing and screening circuits.

Three (3) secondary crushing and screening circuits are used to reduce the size of ore prior to agglomeration and copper leaching. Each circuit consists of the following operations: size separation using a scalping screen; secondary crushing of the oversize ore from the scalping screen; and size separation of the ore processed by the secondary crusher. Ore is reclaimed from the FOIS using belt feeders. The ore is transferred to agglomerating units, where acid, raffinate, and water are mixed with the ore. The agglomeration causes the fine material in the ore to adhere to the coarser material.

4. Solution Extraction/Electrowinning (SX/EW) Operations

The SX/EW operations begin with copper leaching. The copper leaching takes ore from mining operations or the MFL Crushing Plant. An aqueous solution of weak acid (raffinate) is applied to the stockpiles by sprinkler irrigation methods and drip emitters which dissolve copper and other metals from the ore. The copper containing raffinate, referred to as pregnant leach solution (PLS), flows by gravity to collection ponds (PLS Collection Ponds). The PLS is subsequently pumped from the ponds to the SX facilities.

The PLS solution is pumped to the mixer portion of the extraction mixer-settler units and is vigorously mixed with an equal volume of organic solution. During mixing, the copper in the PLS is transferred to the organic solution. From the mixers, the solution is delivered to the settlers where the copper depleted PLS (now called raffinate) settles to the bottom and is pumped to organic recovery tanks to reclaim any organic before being returned to the leaching stockpiles. The copper containing organic solution (now called loaded organic) floats to the top of the settlers and is pumped to strip mixer-settler units.

At the mixer portion of the strip mixer-settler units, the loaded organic is mixed with a strong solution of sulfuric acid (H_2SO_4 ; lean electrolyte), and the copper selectively moves from the loaded organic to the electrolyte (now called rich electrolyte). From the mixers, the solution is delivered to the settlers where the organic solution stripped of copper (now called barren organic) floats to the top and the rich electrolyte settles to the bottom. The barren organic is sent back to the extraction mixer-settler units and the rich electrolyte is pumped to the EW facilities. The EW facilities process the rich electrolyte from the SX facilities through a series of insoluble lead plates hang in the cells as anodes while stainless steel starter sheets hang in the cells as cathodes. The copper from the rich electrolyte is deposited onto the cathodes to create a copper plate. The cathodes

plated in copper are removed from the cells after approximately seven days. The copper depleted electrolyte (lean electrolyte) is returned to the SX facilities.

5. Metcalf Concentrator

The Metcalf Concentrator operations begin with the reclaim from the Secondary Screen Feed Bin. Conveyor belts transfer the ore into screen to separate oversize ore from the undersize ore. Oversize ore is then transferred to the fine crushing lines where the ore is crushed to reduce the size of the ore prior to processing by the ball mills and bulk floatation plant. The crushed ore is transferred to storage via conveyor belts. The ore is then transferred to the ball mills to pulverize the ore to produce a wet slurry. Oversized material is sent through the ball mills for further pulverization. Over being processed by the ball mill, the ore is transferred to the bulk floatation operations. At the bulk floatation operations, the wet slurry is separated into a combined copper/molybdenum concentrate and tailings.

B. Control Devices

Particulate matter (PM) emissions at the facility are controlled by wet scrubbers, fabric filter dust collectors (FFDC), baghouses, enclosures, and water spray systems at various emission points.

Fugitive dust emissions at the facility are controlled by wet suppression methods including water trucks, water sprays, surfactant use, dust suppression fans, water jets, foggers, and inherent moisture content.

PM and volatile organic compound (VOC) emissions from the Concentrate Leach Plant (CLP) are controlled by wet scrubbers.

C. Process Flow Diagram

An overview of the FMMI facility-wide operations is show in Figure 1 below:

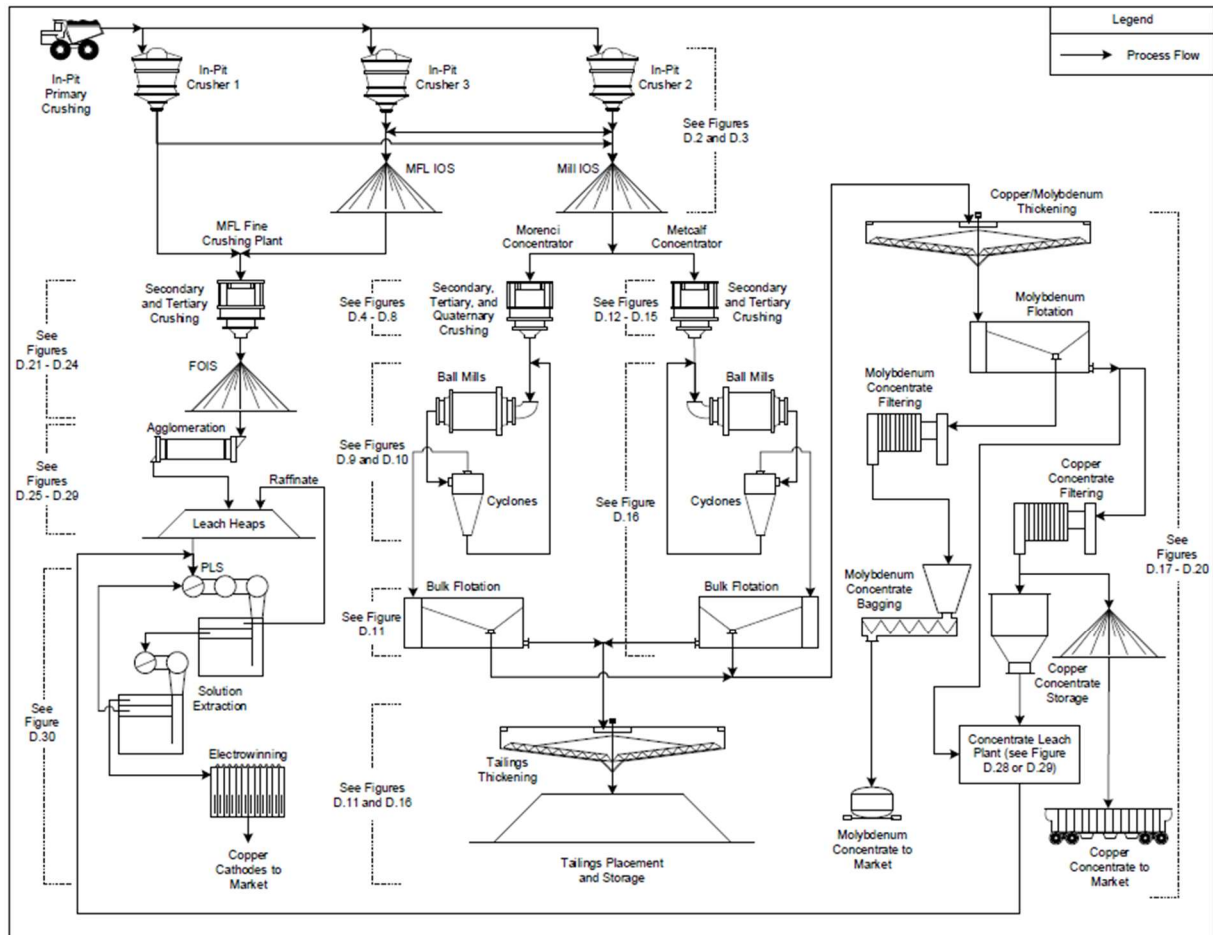


Figure 1: Overview of the FMFI Facility-Wide Operations

III. REVISIONS INCLUDED IN RENEWAL

As part of this renewal application, various changes were incorporated to correct, clarify, and streamline several conditions and the equipment list. These changes include:

- Applicable requirements;
- Sources subject to permitting and correctly identify equipment details;
- Emission calculations based on best available information;
- Regulatory obligations and associated compliance demonstrations; and
- Operations under alternate operating scenarios (AOS).

IV. COMPLIANCE HISTORY

FMFI received four (4) full inspections and two (2) partial inspections during the permit term. Nucor also submitted 12 compliance certifications, five (5) permit deviation reports, and 25 excess emission reports. Two (2) formal enforcement cases were generated in response to these inspections submitted by FMFI. The two (2) cases are detailed below:

A. Case No. 195605

FMMI received a Notice of Violation (NOV), Case ID No. 195605, on February 1, 2021 as a result of exceeding the NO_x emission limits from Natural Gas Turbine 1 and Natural Gas Turbine 2. On December 28, 2020, Freeport-McMoRan Morenci, Inc. (Morenci) conducted performance tests on its Natural Gas Turbines 1 and 2 (Process #'s 005-108 and 005-110, respectively). On January 21, 2021, Morenci was notified by its performance test company that the NO_x emissions measured during those performance tests exceeded its permit limits as stipulated in Appendix "D", Condition I.A.2.a. The performance tests resulted in average NO_x emissions of 0.38 lb/MMBtu for Natural Gas Turbine 1 and 0.44 lb/MMBtu for Natural Gas Turbine 2. The emission limit for these units were 0.32 lb/MMBtu. On January 21, 2021, Morenci notified the Arizona Department of Environmental Quality (ADEQ) of the performance test results by submitting an Excess Emissions report. On January 26, 2021, ADEQ received and reviewed the performance test report and confirmed the violations.

On April 8 and 9, 2021, FMMI performed engineering study performance tests on Natural Gas Turbines 1 and 2 to establish the following:

- NO_x control effectiveness of the inlet water sprays on Natural Gas Turbines 1 and 2 at various load levels;
- Operating power loads that achieve compliance with the current NO_x emissions limits; and
- Compliance with the existing NO_x emissions limits at various load levels and, if needed, determination of an amendment to the NO_x emissions limits for Natural Gas Turbines 1 and 2.

On June 23, 2021, a consent order was finalized between ADEQ and Freeport-McMoRan Morenci Inc. ADEQ established that Freeport-McMoRan Morenci Inc. shall comply with the NO_x emission limits for Natural Gas Turbines 1 and 2 in Permit No. 72683 until a significant permit revision was issued. In addition, FMMI was required to limit the loads from Natural Gas Turbines 1 and 2 to 8.2 MW and 6.6 MW, respectively, on an hourly basis (except as necessary for emergency purposes). Lastly, FMMI was required to operate the water sprays at all times while the turbines were in operation and the consent order was in effect.

On May 27, 2021, Morenci submitted an application for a significant permit revision to amend their permit for operation of Natural Gas Turbines 1 and 2. This significant permit revision increased the NO_x emission limits for each turbine from 0.32 lb/MMBtu to 0.59 lb/MMBtu. This submittal was deemed administratively complete on June 2, 2021. This significant permit revision was issued on October 29, 2021 and the consent order was terminated on November 18, 2021.

B. Case No. 212192

FMMI received an NOV, Case ID No. 212192, on May 10, 2023 as a result of exceeding the cumulative natural gas usage limit five (5) Small Industrial Natural Gas Boilers (Process Numbers 009-123, -184, -185, -222, and -223) in Condition II.B.3.a of Attachment “B”. This 458,148 MMBtu limit restricted the cumulative fuel usage that can be combusted by the five (5) Small Industrial Natural Gas Boilers during any 12-month rolling basis. FMMI exceed this limit in December of 2022. The 12-month rolling totals of fuel combusted in the five (5) Small Industrial Natural Gas Boilers can be seen in Table 1 below.

Table 1: Small Industrial Boilers Natural Gas Usage

Month	Limit (MMBtu)	12-Month Rolling Total (MMBtu)
December 2022	458,148	466,137
January 2023	458,148	480,893
February 2023	458,148	495,428
March 2023	458,148	515,517

The NOV required FMMI to meet the following conditions:

1. By June 10, 2023, FMMI was required to submit a proposed, interim, 12-month rolling total fuel consumption limit (in units of MMBtu) for Small Industrial Natural Gas Boilers 1, 2, 3, 4, and 5 which they complied with until an amended permit was issued. The proposed interim limit was required to be accompanied by data and calculations that demonstrate continued compliance with the total source PTE for NO_x emissions at or below 250 tons per year and an incremental increase of NO_x emissions below 20 tons per year from the proposed increase in fuel consumption.

FMMI submitted Significant Permit Revision (SPR) No. 99132 to fulfill the requirements of this condition. Compliance with this condition was achieved on June 8, 2023. The total source PTE for NO_x is below 250 tons per year and an incremental increase of NO_x emissions is below 20 tons per year from the proposed increase in fuel consumption as provided in Table 3 below.

2. By June 25 2023, FMMI was required to secure an effective consent order with ADEQ containing actions deemed necessary by ADEQ to modify Freeport-McMoRan Morenci Inc.'s permit with a new updated fuel usage limit for Boilers 1 through 5.

ADEQ issued SPR No. 99132 on October 23, 2023 with the updated fuel usage limit.

C. Performance Tests

Two (2) performance tests failed to remain under their corresponding emission limits for Natural Gas Turbines 1 and Turbine 2. These failed performance tests resulted in formal enforcement as

discussed above in Case No. 195605. FFDC (002-036) failed its performance test on July 19, 2023. The facility was issued an NOV and conducted a retest on September 12, 2023. The retest for this performance test failed and an NOV was issued requiring a retest on October 17, 2023. All remaining performance tests passed. The results of the performance tests conducted during the permit term are detailed in Table 2 below.

Table 2: Performance Test Results

Emission Unit	Pollutant	Date of Test	Emission Limit	Results of Performance Test	Pass/Fail
Turbine 1	NO _x	12/28-31/2021	0.38 lb/MMBtu	0.38 lb/MMBtu	Fail
Turbine 1	CO	12/28-31/2021	0.082 lb/MMBtu	0.010 lb/MMBtu	Pass
Turbine 2	NO _x	12/28-31/2021	0.38 lb/MMBtu	0.44 lb/MMBtu	Fail
Turbine 2	CO	12/28-31/2021	0.082 lb/MMBtu	0.006 lb/MMBtu	Pass
FFDC 1 (017-287)	PM/ PM ₁₀	12/28-31/2021	0.004 gr/dscf	0.001 gr/dscf	Pass
FFDC 2 (017-288)	PM/ PM ₁₀	12/28-31/2021	0.004 gr/dscf	0.001 gr/dscf	Pass
FFDC 3 (017-289)	PM/ PM ₁₀	12/28-31/2021	0.004 gr/dscf	0.000 gr/dscf	Pass
FFDC 4 (017-290)	PM/ PM ₁₀	12/28-31/2021	0.004 gr/dscf	0.001 gr/dscf	Pass
Turbine 1	NO _x	04/08-09/2021	0.38 lb/MMBtu	0.29 lb/MMBtu	Pass
Turbine 2	NO _x	04/08-09/2021	0.38 lb/MMBtu	0.31 lb/MMBtu	Pass
001-006	PM ₁₀	04/14/2021 and 04/16/2021	0.004 gr/dscf	0.0002 gr/dscf	Pass
001-251	PM ₁₀	04/14/2021 and 04/16/2021	0.004 gr/dscf	0.0009 gr/dscf	Pass
001-015	PM ₁₀	04/14/2021 and 04/16/2021	0.004 gr/dscf	0.0001 gr/dscf	Pass
003-201	PM ₁₀	06/09-11/2021	0.007 gr/dscf	0.0004 gr/dscf	Pass
003-202	PM ₁₀	06/09-11/2021	0.007 gr/dscf	0.0004 gr/dscf	Pass
003-203	PM ₁₀	06/09-11/2021	0.007 gr/dscf	0.0009 gr/dscf	Pass
FFDC 1 (017-283)	PM/ PM ₁₀	06/01-03/2021	0.004 gr/dscf	0.003 gr/dscf	Pass
FFDC 2 (017-284)	PM/ PM ₁₀	06/01-03/2021	0.004 gr/dscf	0.003 gr/dscf	Pass
FFDC 3 (017-318)	PM/ PM ₁₀	06/01-03/2021	0.004 gr/dscf	0.003 gr/dscf	Pass
FFDC 4 (017-319)	PM/ PM ₁₀	06/01-03/2021	0.004 gr/dscf	0.001 gr/dscf	Pass
R9/R10	PM/ PM ₁₀	10/26-27/2021	0.001 gr/dscf	0.00057 gr/dscf	Pass

Emission Unit	Pollutant	Date of Test	Emission Limit	Results of Performance Test	Pass/Fail
P9/P10	PM/ PM ₁₀	10/26-27/2021	0.001 gr/dscf	0.0004 gr/dscf	Pass
DC2/P5	PM/ PM ₁₀	10/26-27/2021	0.001 gr/dscf	0.0006 gr/dscf	Pass
Mill IOS/R1B (001-300)	PM/ PM ₁₀	12/14-15/2022	0.004 gr/dscf	0.0028 gr/dscf	Pass
017-280	PM/ PM ₁₀	12/16-17/2021	0.004 gr/dscf	0.001 gr/dscf	Pass
017-281	PM/ PM ₁₀	12/16-17/2021	0.004 gr/dscf	0.001 gr/dscf	Pass
R3/R4 (003-079)	PM/ PM ₁₀	01/11/2022	0.007 gr/dscf	0.0003 gr/dscf	Pass
R10/R3 (003-330)	PM/ PM ₁₀	01/11/2022	0.007 gr/dscf	0.0004 gr/dscf	Pass
017-285	PM/ PM ₁₀	01/06-07/2022	0.004 gr/dscf	0.001 gr/dscf	Pass
017-286	PM/ PM ₁₀	01/06-07/2022	0.004 gr/dscf	0.001 gr/dscf	Pass
Scrubber 3C (003-082)	PM/ PM ₁₀	01/25-26/2022	0.01 gr/dscf	0.0017 gr/dscf	Pass
6A FFDC (003-301)	PM/ PM ₁₀	01/25-26/2022	0.005 gr/dscf	0.0003 gr/dscf	Pass
017-291	PM/ PM ₁₀	02/03-04/2022 and 02/11/2022	0.004 gr/dscf	0.001 gr/dscf	Pass
017-292	PM/ PM ₁₀	02/03-04/2022 and 02/11/2022	0.004 gr/dscf	0.004 gr/dscf	Pass
017-294	PM/ PM ₁₀	02/03-04/2022 and 02/11/2022	0.004 gr/dscf	0.001 gr/dscf	Pass
Turbine 1	NO _x	03/17/2022	0.59 lb/MMBtu	0.38 lb/MMBtu	Pass
Turbine 1	CO	03/17/2022	0.082 lb/MMBtu	0.007 lb/MMBtu	Pass
FFDC 6B (003-302)	PM/ PM ₁₀	04/05/2022	0.005 gr/dscf	0.0002 gr/dscf	Pass
FFDC 1 (003-304)	PM/ PM ₁₀	04/05/2022	0.005 gr/dscf	0.0003 gr/dscf	Pass
FFDC 1 (017-283)	PM/ PM ₁₀	06/06-07/2022	0.004 gr/dscf	0.001 gr/dscf	Pass
FFDC 2 (017-284)	PM/ PM ₁₀	06/06-07/2022	0.004 gr/dscf	0.001 gr/dscf	Pass
FFDC 3 (017-318)	PM/ PM ₁₀	06/06-07/2022	0.004 gr/dscf	0.001 gr/dscf	Pass
FFDC Mill IOS/R1A (001-299)	PM/ PM ₁₀	06/06-08/2022	0.004 gr/dscf	0.0011 gr/dscf	Pass
FFDC R1A & R1B/R7 (001-272)	PM/ PM ₁₀	06/06-08/2022	0.004 gr/dscf	0.0008 gr/dscf	Pass

Emission Unit	Pollutant	Date of Test	Emission Limit	Results of Performance Test	Pass/Fail
Scrubber 4 (003-088)	PM/ PM ₁₀	08/06-08/2022	0.01 gr/dscf	0.0012 gr/dscf	Pass
FFDC 14/15 (003-320)	PM/ PM ₁₀	08/06-08/2022	0.004 gr/dscf	0.0005 gr/dscf	Pass
FFDC 15/16 (003-331)	PM/ PM ₁₀	08/06-08/2022	0.004 gr/dscf	0.0004 gr/dscf	Pass
R1A&R1B/R2 (001-277)	PM/ PM ₁₀	08/06-08/2022	0.004 gr/dscf	0.0055 gr/dscf	Pass
FFDC R2/R11 (001-278)	PM/ PM ₁₀	08/06-08/2022	0.004 gr/dscf	0.0012 gr/dscf	Pass
FFDC 16/S11 (003-309)	PM/ PM ₁₀	09/16-19/2022	0.004 gr/dscf	0.0001 gr/dscf	Pass
FFDC 3A (003-317)	PM/ PM ₁₀	09/16-19/2022	0.004 gr/dscf	0.0001 gr/dscf	Pass
R4/R5/R6 Bag Collector 4 (003-080)	PM/ PM ₁₀	09/16-19/2022	0.007 gr/dscf	0.0006 gr/dscf	Pass
FFDC 8 (003-303)	PM/ PM ₁₀	09/16-19/2022	0.005 gr/dscf	0.0002 gr/dscf	Pass
Scrubber 5 (003-089)	PM/ PM ₁₀	09/16-19/2022	0.01 gr/dscf	0.0015 gr/dscf	Pass
FFDC MFL ISO/R8 (001-228)	PM/ PM ₁₀	09/16-19/2022	0.001 gr/dscf	0.0003 gr/dscf	Pass
FFDC R8/R9 (001-229)	PM/ PM ₁₀	09/16-19/2022	0.001 gr/dscf	0.0004 gr/dscf	Pass
PLV Scrubber (014-239)	PM/ PM ₁₀	12/13/2022	0.75 lb/hr	0.004 lb/hr	Pass
PLV Scrubber (014-239)	VOC (as CH ₄)	12/13/2022	5.82 lb/hr	0.019 lb/hr	Pass
FFDC (002-032)	PM/ PM ₁₀	04/27-28/2023	0.001 gr/dscf	0.001 gr/dscf	Pass
FFDC (017-292)	PM/ PM ₁₀	04/27-28/2023	0.004 gr/dscf	0.001 gr/dscf	Pass
FFDC (002-035)	PM/ PM ₁₀	07/19/2023	0.001 gr/dscf	0.001 gr/dscf	Pass
FFDC (002-036)	PM/ PM ₁₀	07/19/2023	0.001 gr/dscf	0.003 gr/dscf	Fail
R1A/R1B Dust Collector (001-277)	PM/ PM ₁₀	08/03/2023	0.0007 gr/dscf	0.001 gr/dscf	Pass

Emission Unit	Pollutant	Date of Test	Emission Limit	Results of Performance Test	Pass/Fail
FFDC (002-036)	PM/ PM ₁₀	09/11/2023	0.003 gr/dscf	0.001 gr/dscf	Fail

V. EMISSIONS

A. Drilling

PM emissions from drilling are calculated using emission factors from *Compilation of Air Pollutant Emissions Factors from Stationary Sources*, AP-42, Table 11.9-4 (10/98) for total suspended particulates (TSP) from drilling of overburden at western surface coal mines. The TSP emission factor is assumed to be applicable for PM. PM₁₀ and PM_{2.5} emissions from drilling are not listed in AP-42 Table 11.9-4. PM₁₀ and PM_{2.5} emissions are assumed equal to 60% and 11.1%, respectively, of PM emissions based on the ratio determined using the emission factors in AP-42 Table 11.9.2-2 and Figure 11.19-4 (08/04) for tertiary crushing (controlled).

Hazardous air pollutant (HAP) emissions from drilling are calculated by multiplying the concentration of HAPs in the associated process material by the PM₁₀ emission factor. It is assumed that the concentration of HAPs in the associated process material is equivalent to the concentration of HAPs in the PM₁₀ emitted.

B. Blasting

PM, PM₁₀, and PM_{2.5} emissions from blasting are calculated using the emission factor expression from AP-42 Table 11.9-1 (10/98) for blasting at western surface coal mines. HAP emissions from blasting are calculated by multiplying the concentration of HAPs in the associated process material by the PM₁₀ emission factor. It is assumed that the concentration of HAPs in the associated process material is equivalent to the concentration of HAPs in the PM₁₀ emitted.

CO emissions from blasting are calculated using an emission factor from *Factors Affecting ANFO Fumes Production* by The National Institute for Occupational Safety and Health (NIOSH) (2001). The emission factor is based on the data points in Figure 2 for ANFO with a 6% fuel oil content. NO_x emissions are calculated using the average emission factor from *NO_x Emissions from Blasting Operations in Open-Cut Coal Mining from Atmospheric Environment 42* (2008) which presents the results of a more successful technique used to measure NO_x emissions from blasting. Sulfur dioxide (SO₂) emissions are calculated assuming all the sulfur in the ANFO is converted to SO₂ emissions. The sulfur content of the diesel fuel is a maximum of 0.0015% while the sulfur content of the animal fat used in the ANFO emulsions is estimated at a worst-case value of 500 parts per million based on a 03/2003 EPA document that states biofuels reduce SO₂ emissions more than No. 2 diesel.

C. Vehicle Travel on Unpaved Roads

The annual and hourly process rates for vehicle travel on unpaved roads are based on the miles traveled by the various vehicles to support the mining and processing operations. PM, PM₁₀, and PM_{2.5} emissions from vehicle travel on unpaved roads are calculated using equations from AP-42 Section 13.2.2 (11/06).

D. Dozer Operations

The annual and hourly process rates for dozer operations are based on the total operating hours of the dozer fleet. The process rates are calculated by multiplying the annual and hourly operating hours for each dozer by the quantity of dozers. PM, PM₁₀, and PM_{2.5} emissions from dozer operations are calculated using the equation from AP-42 Table 11.9-1 (10/98) for bulldozing overburden.

E. Road Grader Operations

The annual and hourly process rates for road grader operations are based on the total vehicle miles traveled by the grader fleet. The annual and hourly miles traveled are determined using the quantity of graders, average speed, and the assumption that all graders operate for 60 minutes/hour and 8,760 hr/yr. PM, PM₁₀, and PM_{2.5} emissions from road grader operations are calculated using the equation from AP-42 Table 11.9-1 (10/98) for grading.

F. Material Transfer Points

The annual and hourly process rates for the material transfer points are based on the amount of material transferred and can be determined using equipment capacities and hours of operations, delivery rates, or maximum expected throughputs. PM, PM₁₀, and PM_{2.5} emissions from the material transfer points associated with mined materials, concentrate, nonmetallic minerals, and aggregate are calculated using the emission factor expression from AP-42 Section 13.2.4.3 (11/06) for aggregate drop processes.

G. Screening Operations

The annual and hourly process rates for screening operations are based on the amount of material screened and are determined using equipment capacities and hours of operations or maximum expected throughputs. PM, PM₁₀, and PM_{2.5} emissions from screening operations are calculated using the emission factors from AP-42 Table 11.19.2-2 (08/04) for screening (controlled).

H. Lime Slaking Operations

PM emissions from lime slaking operations associated with the Morenci Concentrator are calculated using the results from a stack test of a lime slaker at the Western Sugar

Company. PM_{10} and $PM_{2.5}$ emission factors are assumed to equal the PM emission factor as a worst-case emission estimate. The stack test results are used as a best estimate.

PM emissions from lime slaking associated with the Metcalf Concentrator are calculated using manufacturer's information from a stack test performed on a similar slaker (same manufacturer, same ZMI/Portec type lime slaker with wet scrubber, different maximum capacity). The stack test results in units of lb of PM per hour were converted to units of lb of PM per ton of lime to account for the difference in the capacity of the slaker tested versus the lime slaking associated with the Metcalf Concentrator. Additionally, a 20% safety factor was added to account for any differences in the configuration and/or location of the slaker. PM_{10} and $PM_{2.5}$ emission factors are assumed to equal the PM emission factor as a worst-case emission estimate.

I. Wind Erosion of Continuously Active Stockpiles and Storage Piles

PM, PM_{10} , and $PM_{2.5}$ emissions due to wind erosion of continuously active stockpiles and storage piles are calculated using the emission factor expressions derived from the 4th Edition of AP-42 Section 11.2.3 (05/83) for wind erosion of active storage piles.

HAP emissions from the wind erosion of continuously active stockpiles and storage piles are calculated by multiplying the concentration of HAPs in the associated process material by the PM_{10} emission factor. It is assumed that the concentration of HAPs in the stored material is equivalent to the concentration of HAPs in the PM_{10} emitted.

J. Wind Erosion of Tailings

The annual and hourly process rates for wind erosion of tailings are based on the maximum area of the tailings area susceptible to wind erosion. PM, PM_{10} , and $PM_{2.5}$ emissions from the wind erosion of tailings are calculated using the methodology and equations from AP-42 Section 13.2.5 (11/06). HAP emissions from the wind erosion of tailings are calculated by multiplying the concentration of HAPs in the associated process material by the PM_{10} emission factor. It is assumed that the concentration of HAPs in the tailings is equivalent to the concentration of HAPs in the PM_{10} emitted.

K. Cooling Tower

The annual and hourly process rates for the cooling towers and the dust suppression fan are based on the water circulation rate and hours of operation. PM, PM_{10} , and $PM_{2.5}$ emissions from the cooling towers and the dust suppression fan are calculated using the equation adapted from AP-42 Section 13.4 (01/95). HAP emissions from the cooling towers and the dust suppression fan are calculated by multiplying the concentration of HAPs in the TDS by the PM_{10} emission factor. It is assumed that the concentration of HAPs in the TDS is equivalent to the concentration of HAPs in the PM_{10} emitted.

L. Natural Gas External Combustion Equipment and Turbines

The annual and hourly process rates for natural gas external combustion equipment and turbines are based on heat input rates, hours of operation, and/or fuel quantity limitations.

1. General Uncontrolled Natural Gas Combustion $0.3 \leq \text{MMBtu/hr} < 100$

When manufacturer's information is not available, CPM, PM (with CPM), CO, NO_x, SO₂, and VOC emissions from general natural gas external combustion are calculated using the emission factors from AP-42 Tables 1.4-1 and 1.4-2 (07/98) for uncontrolled natural gas combustion.

2. Natural Gas Startup Boiler

CPM, PM (with CPM), CO, SO₂, and VOC emissions from the Natural Gas Startup Boiler are calculated using the emission factors from AP-42 Tables 1.4-1 and 1.4-2 (07/98) for uncontrolled natural gas combustion less than 100 MMBtu/hr but greater than or equal to 0.3 MMBtu/hr.

3. Natural Gas Turbines Associated with the Metcalf Power Plant

CPM, PM (with CPM), SO₂, and VOC emissions from the Natural Gas Turbines Associated with the Metcalf Power Plant are calculated using the emission factors from AP-42 Table 3.1-2a (04/00) for stationary natural gas-fired turbines. CO and NO_x emissions are calculated using voluntarily accepted emission limitations.

M. Diesel External Combustion Equipment

The annual and hourly process rates for propane external combustion equipment are based on heat input rates and hours of operation. CPM, PM (with CPM), CO, NO_x, and SO₂ emissions from propane external combustion equipment are calculated using the emission factors from AP-42 Table 1.5-1 (07/08) for industrial propane boilers. VOC and HAP emissions from propane external combustion equipment are calculated using the emission factor from AP-42 Tables 1.4-2, 1.4-3, and 1.4-4 (07/98) for natural gas combustion.

N. Propane External Combustion Equipment

The annual and hourly process rates for propane emergency engines are based on power ratings (capacity) and hours of operation. Emissions from these units are determined using the emission factors from AP-42 Table 3.2-3 (08/00) for 4-stroke rich burn natural gas engines or EPA engine family certified emissions.

O. Emergency and Non-Emergency Engines

PM (with CPM), CO, NO_x, and VOC emissions from these emission units are based on tier standards for diesel engines using the applicable exhaust emission standards from Table 3 of Appendix I of 40 Code of Federal Regulations (CFR) 1039, EPA engine family certified emissions, and emission factors in AP-42 Table 3.4-2 (10/96) as applicable.

P. SX, Organic Tanks, And Raffinate Ponds

The annual and hourly process rates for SX, organic tanks, and raffinate ponds are based on hours of operation. VOC and HAP emissions from SX, organic tanks, and raffinate ponds are calculated using the methodology and equations from the Hydrometallurgy of Copper.

Q. Electrowinning

PM and H₂SO₄ emissions from Central EW, Southside EW and Stargo EW are calculated using the concentration of H₂SO₄ inside the EW tankhouse buildings and the flow rate of air out of the buildings. The equations used to calculate the wind and thermal effects of the natural ventilation are from the 1985 American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRE) Fundamentals Handbook.

PM, PM₁₀, PM_{2.5}, and H₂SO₄ emissions from the Modoc Test Facility EW are calculated using the emission factor of 0.000157 pounds per square foot-hour (lb/ft²-hr), from a report entitled *Measurement of Sulfuric Acid Mist Emissions from the Cyprus Twin Buttes Copper Company Electrowinning Tankhouse* (12/92) produced by Applied Environmental Consultants, Inc. The emission factor includes the control efficiency from dispersion balls used during EW at Copper Twin Buttes. The Modoc Test Facility EW uses similar methods to control H₂SO₄ emissions (e.g., heat retention balls and surfactants) such that the measurements found at the Cyprus Twin Buttes Copper Company Electrowinning Tankhouse are applicable to the Modoc Test Facility EW.

R. Storage Tanks

The annual and hourly process rates for the storage tanks are based on hours of operation. VOC and HAP emissions from the storage tanks are calculated using the EPA TANKS program.

S. Bulk Flotation Operation

The annual and hourly process rates for the bulk flotation operations are based on the quantity of organic reagent (frother and molybdenum collector) used in the bulk flotation operations. VOC emissions from the bulk flotation operations are calculated using an emission factor based on testing conducted at the Freeport-McMoRan Henderson Mill in 2009. HAP emissions are calculated by applying diesel vapor mass fractions to the VOC emission factor. Diesel is representative of the organic used in the flotation operations.

T. Agglomerating Units

The annual and hourly process rates for the agglomerating units are based on the quantity of ore processed in the units. CO, NO_x, SO₂, and CO₂ emissions from the agglomerating units are calculated based on the results of performance testing completed on similar units.

The facility's PTE is provided in Table 3 below.

Table 3: Potential to Emit (tpy)

Pollutant	Previous PTE	Change in PTE	Current PTE	Permitting Exemption Threshold	Significant Thresholds	Minor NSR Triggered?
PM	232.97	-36.78	196.19	N/A	25	No
PM ₁₀	188.00	-18.70	169.30	7.5	15	No
PM _{2.5}	165.61	-7.89	157.72	5	10	No
NO _x	246.78	-14.70	232.08	20	40	No
CO	149.73	-27.10	122.63	50	100	No
SO ₂	2.13	-0.20	1.93	20	40	No
VOCs	52.34	+11.37	63.71	20	40	No
Pb	0.35	+0.00	0.35	0.3	0.6	No
H ₂ S	2.06	+0.00	2.06	N/A	10	No
Greatest Single HAP (Xylenes)	5.77	+0.00	5.77	N/A	10	No
HAPs (combined)	15.35	+0.09	15.44	N/A	25	No
GHG (CO ₂ e)	110,828	-16,290	94,538	--	75,000	No

VI. MINOR NEW SOURCE REVIEW (NSR)

Minor new source review (NSR) is required if the emissions of any physical change, or change in the method of an operation of an emission unit or stationary source increases the facility's PTE of any regulated minor NSR pollutant by an amount greater than the permitting exemption threshold (PET) shown in Table 3 above. This renewal does not increase the PTE of any regulated minor NSR pollutant and thus, minor NSR does not apply.

VII. VOLUNTARILY ACCEPTED EMISSION LIMITATIONS AND STANDARDS

The permit contains the following voluntarily emission limitations and standards:

- A. Dust Collectors

FMMI has multiple dust collectors with voluntarily accepted emission limitations and standards throughout the facility. These emission units required performance testing to demonstrate compliance with the applicable limits.

B. Metcalf Power Plant

1. Natural Gas Usage

FMMI voluntarily accepted a limitation for the cumulative natural gas usage in Natural Gas Turbine 1 (Process #005-108) and Natural Gas Turbine 2 (Process #005-110) in Condition I.A of Attachment “D”. This voluntarily accepted fuel usage limitation is 537,140 MMBtu per year. FMMI is required to keep monthly records of the total fuel consumed in Natural Gas Turbine 1 (Process #005-108) and Natural Gas Turbine 2 (Process #005-110) in units of MMBtu and compute and record the 12-month rolling total of fuel consumed (in units of MMBtu) at the end of each month.

2. CO

FMMI voluntarily accepted a limitation for CO emissions in Natural Gas Turbine 1 (Process #005-108) and Natural Gas Turbine 2 (Process #005-110) in Condition I.2 of Attachment “D”. This voluntarily CO emission limit is 0.082 lb/MMbtu. FMMI is required to keep conduct performance testing for Natural Gas Turbine 1 (Process #005-108) and Natural Gas Turbine 2 (Process #005-110).

3. NO_x

FMMI voluntarily accepted a limitation for NO_x emissions in Natural Gas Turbine 1 (Process #005-108) and Natural Gas Turbine 2 (Process #005-110) in Condition I.2 of Attachment “D”. This voluntarily NO_x emission limit is 0.59 lb/MMbtu. FMMI is required to keep conduct performance testing for Natural Gas Turbine 1 (Process #005-108) and Natural Gas Turbine 2 (Process #005-110).

C. Small Industrial Natural Gas Boilers 1-5

FMMI voluntarily accepted a limitation for the cumulative natural gas usage in five (5) Small Industrial Natural Gas Boilers (Process Numbers 009-123, -184, -185, -222, and -223) in Condition II.B.3.a of Attachment “B” in SPR No. 99132. This voluntarily accepted fuel usage limitation will be increased to a limit of 625,000 MMBtu per 12-month rolling basis. This limit continues to ensure FMMI's facility-wide PTE remains below the Prevention of Significant Deterioration (PSD) major source thresholds.

D. Natural Gas Startup Boiler

FMMI voluntarily accepted a limitation for the cumulative natural gas usage in the Natural Gas Startup Boiler (Process #014-242) in Condition II.B.3.b of Attachment “B”. This

voluntarily accepted fuel usage limitation is 61,320 MMBtu per year. FMMI is required to keep monthly records of the total fuel consumed in the Natural Gas Startup Boiler (Process #014-242) in units of MMBtu and compute and record the 12-month rolling total of fuel consumed (in units of MMBtu) at the end of each month.

E. Pressure Leach Vessel 1 and Pressure Leach Vessel 2

1. PM/PM₁₀

FMMI voluntarily accepted a limitation for PM and PM₁₀ emissions in Pressure Leach Vessel (PLV) 2-Stage Scrubber exhaust (Process #014-239) in Condition X.1.e and d of Attachment “C”. This voluntarily PM and PM₁₀ emission limit is 0.75 lb/hr. FMMI is required to keep conduct performance testing for PLV 2-Stage Scrubber exhaust (Process #014-239).

FMMI voluntarily accepted a limitation for PM and PM₁₀ emissions in PLV Scrubber 1 exhaust (Process #014-458 AOS2) and PLV Scrubber 1 exhaust (Process #014-459 AOS2) in Condition X.1.c and d of Attachment “C” while operating under AOS2. This voluntarily PM and PM₁₀ emission limit is 0.525 lb/hr. FMMI is required to keep conduct performance testing for PLV Scrubber 1 exhaust (Process #014-458 AOS2) and PLV Scrubber 1 exhaust (Process #014-459 AOS2).

2. VOCs

FMMI voluntarily accepted a limitation for VOC emissions in PLV 2-Stage Scrubber exhaust (Process #014-239) in Condition X.1.e and d of Attachment “C”. This voluntarily PM and PM₁₀ emission limit is 5.82 lb/hr. FMMI is required to keep conduct performance testing for PLV 2-Stage Scrubber exhaust (Process #014-239).

FMMI voluntarily accepted a limitation for PM and PM₁₀ emissions in PLV Scrubber 1 exhaust (Process #014-458 AOS2) and PLV Scrubber 1 exhaust (Process #014-459 AOS2) in Condition X.1.c and d of Attachment “C” while operating under AOS2. This voluntarily PM and PM₁₀ emission limit is 4.074 lb/hr. FMMI is required to keep conduct performance testing for PLV Scrubber 1 exhaust (Process #014-458 AOS2) and PLV Scrubber 1 exhaust (Process #014-459 AOS2).

VIII. APPLICABLE REGULATIONS

Table 4 identifies applicable regulations and explains why each standard applies. It also contains a discussion of any regulations the emission unit is exempt from.

Table 4: Applicable Regulations

Unit	Control Device	Rule	Discussion
Crushing Operations, Material Transfers and Ore Processing Operations at the Morenci Concentrator, Metcalf Concentrator, Metcalf MFL Plant, and Copper and Molybdenum Concentrate Processing Operations	Wet Scrubbers, FFDCs, Bag Collectors, Wet Suppression Methods	40 CFR 60 Subpart LL A.A.C. R18-2-721	<p>New Source Performance Standards (NSPS) 40 CFR 60 Subpart LL are applicable to 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 that commences construction or modification after August 24, 1982. Three conveyor belt transfer points, previously regulated by ADEQ under A.A.C. R18-2-721, will be subject to NSPS Subpart LL as part of this permitting action.</p> <p>Standards of Performance for Existing Nonferrous Metals Industry Sources under A.A.C. R18-2-721 are applicable to the above equipment constructed on or before to August 24, 1982, or any other equipment not covered above.</p>
Natural Gas Turbines 1 and 2	None	A.A.C R18-2-719	As these turbines were manufactured prior to the October 3, 1977, they are not subject to the requirements under 40 CFR 60 Subpart GG. Therefore, Standards of Performance for Existing Stationary Rotating Machinery under A.A.C. R18-2-719 are applicable to these gas turbines.

Unit	Control Device	Rule	Discussion
Natural Gas Boilers 1 and 2	None	A.A.C. R18-2-703	As these steam generating units were manufactured prior to August 17, 1971, they are not subject to NSPS requirements under 40 CFR 60 Subpart D or Da. Therefore, Standards of Performance for Existing Fossil-fuel Fired Steam Generators under A.A.C. R18-2-703 is applicable to these boilers as they are over 73 megawatts capacity.
Cooling Towers 1 and 2	Drift Eliminators	A.A.C. R18-2-730 A.A.C. R18-2-702	Requirements for unclassified sources under A.A.C. R 18-2-730 are applicable to the cooling towers.
Grizzly operations	Wet Suppression System	A.A.C. R18-2-721 A.A.C. R18-2-722	Grizzly operations for metallic mineral material are subject to the Standards of Performance for Existing Nonferrous Metals Industry Sources Under A.A.C. R18-2-721. Grizzly operations for non-metallic minerals are subject to Existing Gravel or Crushed Stone Processing Plant Sources requirements under A.A.C. R18-2-722.
Prill Bins	None	A.A.C. R18-2-730 A.A.C. R18-2-702	Requirements for unclassified sources under A.A.C. R 18-2-730 are applicable to the prill bins.

Unit	Control Device	Rule	Discussion
Emergency and Non-Emergency Compression Ignition Internal Combustion Engines	None	A.A.C. R18-2-719 NSPS 40 CFR 60 Subpart IIII NESHAP 40 CFR 63 Subpart ZZZZ	<p>Engines not subject to 40 CFR 60 Subpart IIII are subject to Existing Stationary Rotating Machinery standards under A.A.C. R18-2-719.</p> <p>The engines that commenced construction after July 11, 2005 and are either manufactured after April 1, 2006 (and are not fire pump engines) or are manufactured after July 1, 2006 and are fire pumps are subject to NSPS 40 CFR 60 Subpart IIII.</p> <p>The National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR 63 Subpart ZZZZ are applicable to reciprocating internal combustion engines (RICE) located area sources of HAPs.</p>
Emergency Spark Ignition Internal Combustion Engines	None	A.A.C. R18-2-719 NSPS 40 CFR 60 Subpart JJJJ NESHAP 40 CFR 63 Subpart ZZZZ	<p>Emergency SI engines not subject to 40 CFR 60 Subpart JJJJ are subject to Existing Stationary Rotating Machinery standards under A.A.C. R18-2-719.</p> <p>The emergency SI engines that commenced construction after June 12, 2006 and are manufactured on or after January 1, 2009 for emergency engines greater than 25 hp and on or after July 1, 2008 for all other engines less than 500 hp are subject to NSPS 40 CFR 60 Subpart JJJJ.</p> <p>NESHAP 40 CFR 63 Subpart ZZZZ is applicable to spark ignition internal combustion engines located area sources of HAPs.</p>

Unit	Control Device	Rule	Discussion
Small Industrial External Combustion Equipment	None	NSPS 40 CFR 60 Subpart Dc A.A.C R18-2-724	<p>Small Industrial Boilers 1, 2, 3, 4, and 5, and Natural Gas Startup Boiler are subject to NSPS 40 CFR 60 Subpart Dc as these were constructed after June 9, 1989 and have maximum design heat input greater than or equal to 10 MMBtu/hr but less than 100 MMBtu/hr.</p> <p>Other small industrial external combustion equipment are subject to Standards of Performance for Fossil-fuel Fired Industrial and Commercial Equipment under A.A.C R18-2-724.</p>
Diesel Storage Tanks	None	A.A.C. R18-2-730	Requirements for unclassified sources under A.A.C. R 18-2-730 are applicable to diesel storage tanks.
Gasoline Storage and Dispensing facilities	None	A.A.C. R18-2-710 NESHAP 40 CFR 63 Subpart CCCCC	<p>Gasoline Storage tanks are less than 20,000 gallons and hence, they are not subject to NSPS 40 CFR 60 Subpart K, Ka or Kb. Thus, these tanks are subject to requirements under A.A.C. R18-2-710.</p> <p>NESHAP 40 CFR 63 Subpart CCCCC is applicable to gasoline storage tanks and gasoline dispensing facilities.</p>
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 Collectors, 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	These standards are applicable to any spray painting operation.

Unit	Control Device	Rule	Discussion
Demolition/Renovation Operations	N/A	A.A.C. R18-2-1101.A.12	This standard is applicable to any asbestos related demolition or renovation operations.

IX. PREVIOUS PERMIT REVISIONS AND CONDITIONS

A. Previous Permit Revisions

Table 5 provides a description of the permit revisions made to Permit No. 72683 during the previous permit term.

Table 5: Permit Revisions to Permit No. 72683

Permit Revision No.	Permit Revision Type	Brief Description
74878	MPR	This MPR authorized FMMI to install and operate new lime transloading operations. This MPR also removed an existing diesel pressure washer from Permit No. 72683.
78567	MPR	This MPR authorize FMMI to install and operate a new 79-hp propane-fired emergency generator. The revision also updated the equipment list and incorporates some typographical corrections in the Permit No. 72683.
85342	MPR	This MPR authorized FMMI to replace the emergency generator for the Central SX (solution extraction) facility.
89540	SPR	This SPR reset NO _x emission limits and the fuel limitation for Natural Gas Turbine 1 and Natural Gas Turbine 2. In addition, it removed the following pieces of equipment: Natural Gas Boiler 1, Natural Gas Boiler 2, Cooling Tower 1, Cooling Tower 2, Emergency Diesel Pump Engine LS-234 and Non-Emergency Diesel Pump Engine LS-136.
94603	MPR	This MPR authorized FMMI to make upgrades to the Metcalf MFL Plant and to add a diesel engine.
96391	SPR	This SPR authorized FMMI to make the following changes to the Concentrate Leach Plant: (a) increase the maximum capacity of PLV to 20 tons per hour (tph); (b) add an additional cooling tower at the Oxygen Plant; and (c) replace the existing pollution control equipment with a two-train control system (one for each PLV).

Permit Revision No.	Permit Revision Type	Brief Description
98655	MPR	This MPR authorized FMMI to install a diesel emergency engine and update the language in Condition III.D of Attachment "B."
99132	SPR	This SPR authorized FMMI to increase the cumulative amount of natural gas permitted to be combusted in five (5) small industrial natural gas boilers from 458,148 MMBtu to 625,000 MMBtu per 12-month rolling basis.

B. Changes to Current Renewal

Table 6 addresses the changes made to the sections and conditions from Permit No. 72683:

Table 6: 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		Facility-Wide Requirements: Revised to represent the most recent template language
Att. "C" Section I		X		Mining Operations: <ul style="list-style-type: none"> Renamed AOS5 to AOS3 Updated applicable equipment requirements based on equipment additions, removals, or renaming
Att. "C" Section II		X		Morenci Concentrator: <ul style="list-style-type: none"> Removed AOS2 Updated equipment names
Att. "C" Section III		X		Metcalf MFL Plant: <ul style="list-style-type: none"> Renamed Metcalf MFL Plant to MLF Fine Crushing
Att. "C" Section IV		X		Metcalf Concentrator: <ul style="list-style-type: none"> Removed AOS3 Updated equipment names
Att. "C" Section IV		X		Combined Molybdenum Flotation, Copper and Molybdenum Concentrate Processing Operations: Removed AOS4.

Section No.	Determination			Comments
	Added	Revised	Deleted	
Att. "C" Section IV		X		Concentrate Leach Plant: Added AOS2 to authorize FMMI to operate the current CLP operations while the CLP upgrades are under construction.
Att. "C" Section IV			X	Concentrate Leach Plant: Removed Crushing and Screening Plant from the permit. FMMI removed this equipment from the facility.
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 7 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 facility is required to demonstrate compliance with the emission limits in the permit. Records are required be kept for a minimum of 5 years as outlined in Section XII of Attachment “A” of the permit.

Table 7: Permit No. 99245

Emission Unit or Associated Operations	Pollutant/ Process	Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Boilers (Subject to State Regulations)	PM	15% opacity	Conduct periodic opacity monitoring on a quarterly basis of the stacks of all boilers.	Records of the fuel used in all the boilers.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
Small Industrial Natural Gas Boilers 1-5	Natural Gas Combustion	625,000 MMBtu per year 12-month rolling basis	Compute and record the 12-month rolling total of fuel consumed.	Maintain records of the natural gas combusted in Small Industrial Natural Gas Boilers 1-5 during each calendar month.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
Engines (Subject to State Regulations)	PM	40% opacity – for any period greater than 10 seconds	Conduct periodic opacity monitoring on a quarterly basis.	N/A	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.

Emission Unit or Associated Operations	Pollutant/ Process	Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
	SO ₂	1.0 lb/MMBtu	N/A	Record the daily sulfur content of the fuel used in the engines.	Report any daily period where sulfur content exceeds 0.8%.
Emergency Diesel Engine (Process #015-262)	Hours	300 hours per 12-month rolling total	Compute and record the 12-month rolling total of hours operated.	Maintain records of the hours operated during each calendar month.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
Gasoline Storage Tanks	Throughput	N/A	N/A	Record the monthly throughput of the total volume of gasoline that is loaded into, or dispensed from, all gasoline storage tanks at each GDF during a month.	N/A
Fugitive Dust	PM	40% Opacity	Conduct periodic opacity monitoring on a biweekly basis.	Record of the dates and types of dust control measures employed, and if applicable, the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.

Emission Unit or Associated Operations	Pollutant/ Process	Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Abrasive Blasting	PM	20% Opacity	N/A	Record the date, duration and pollution control measures of any abrasive blasting project.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
Spray Painting	VOC	20% Opacity Control 96% of the overspray	N/A	Maintain records of the date, duration, quantity of paint used, any applicable MSDS, and pollution control measures of any spray painting project.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
Demolition/ Renovation	Asbestos	N/A	N/A	Maintain records of all asbestos related demolition or renovation projects including the “NESHAP Notification for Renovation and Demolition Activities” form and all supporting documents.	N/A
Mining, Ore Processing and Supporting Operations	PM	20% Opacity	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.

Emission Unit or Associated Operations	Pollutant/ Process	Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
(Subject to State Regulations)	Throughput and hours of operation	N/A	N/A	Record the daily process rates and hours of operation of all material handling facilities.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
Mining, Ore Processing and Supporting Operations (Subject to NSPS Subpart LL)	PM	Opacity 7% or 10%	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
	PM	0.05 g/dscm	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
	PM	0.002-0.007 gr/dscf	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
	PM ₁₀	0.001-0.007 gr/dscf	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
Morenci Concentrator	PM	20% Opacity	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.

Emission Unit or Associated Operations	Pollutant/ Process	Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
(Subject to State Regulations)	Throughput and hours of operation	N/A	N/A	Record the daily process rates and hours of operation of all material handling facilities.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
Morenci Concentrator (Subject to NSPS Subpart LL)	PM	Opacity 7% or 10%	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
	PM	0.05 g/dscm	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
	PM	0.002-0.004 gr/dscf	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
	PM ₁₀	0.001-0.004 gr/dscf	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
MFL Fine Crushing Plant	PM	20% Opacity	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.

Emission Unit or Associated Operations	Pollutant/ Process	Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
(Subject to State Regulations)	Throughput and hours of operation	N/A	N/A	Record the daily process rates and hours of operation of all material handling facilities.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
MFL Fine Crushing Plant (Subject to NSPS Subpart LL)	PM	0.05 g/dscm	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
	PM	Opacity 7% or 10%	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
	PM	0.002-0.007 gr/dscf	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
	PM ₁₀	0.001-0.007 gr/dscf	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
Metcalf Concentrator	PM	20% Opacity	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.

Emission Unit or Associated Operations	Pollutant/ Process	Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
(Subject to State Regulations)	Throughput and hours of operation	N/A	N/A	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
Metcalf Concentrator (Subject to NSPS Subpart LL)	PM	Opacity 7% or 10%	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
	PM	0.05 g/dscm	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
	PM	0.004 gr/dscf	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
	PM ₁₀	0.004 gr/dscf	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
Combined Molybdenum Flotation, Copper and Molybdenum	PM	20% Opacity	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.

Emission Unit or Associated Operations	Pollutant/ Process	Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Concentrate Processing Operations (Subject to State Regulations)	Throughput and hours of operation	N/A	N/A	Record the daily process rates and hours of operation of all material handling facilities.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
Combined Molybdenum Flotation, Copper and Molybdenum Concentrate Processing Operations (Subject to State Regulations)	PM	10% Opacity	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
Lime Slaking Plants and Lime Transloading	PM	20% Opacity	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
Solution Extraction/ Electrowinning Operations	PM	20% Opacity	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.

Emission Unit or Associated Operations	Pollutant/ Process	Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Concrete Batch Plant	PM	20% Opacity	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
Grizzly Operations	PM	20% Opacity	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
	Throughput and hours of operation	N/A	N/A	Record the daily process rates and hours of operation of all material handling facilities.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
Concentrate Leach Plant	PM	20% Opacity	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
PLV Scrubber 1 and PLV Scrubber 2	PM/PM ₁₀	0.525 lb/hr	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
PLV Scrubber 1 and PLV Scrubber 2	VOC	4.074 lb/hr	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.

Emission Unit or Associated Operations	Pollutant/ Process	Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
PLV 2-Stage Scrubber	PM/PM ₁₀	0.75 lb/hr	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
PLV 2-Stage Scrubber	VOC	5.82 lb/hr	Conduct performance testing once per permit term.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
Prill Bins	PM	20% Opacity	Conduct periodic opacity monitoring on a biweekly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
Natural Gas Turbine 1 and Natural Gas Turbine 2	Natural Gas Combustion	537,140 MMBtu per year 12-month rolling basis	Compute and record the 12-month rolling total of fuel consumed.	Maintain records of the natural gas combusted in Small Industrial Natural Gas Boilers 1-5 during each calendar month.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
	NO _x	0.59 lb/MMBtu	Conduct performance testing within reaching 1,440 hours of operation of the previous performance tests.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.

Emission Unit or Associated Operations	Pollutant/ Process	Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
	CO	0.082 lb/MMBtu	Conduct performance testing within reaching 1,440 hours of operation of the previous performance tests.	Keep data and test reports for monitoring.	Report test results. Submit excess emissions and deviations reports if applicable.
Black Start Engines	PM	40% opacity – for any period greater than 10 seconds	Conduct periodic opacity monitoring on a quarterly basis.	Record the results of any observations, and any corrective action taken.	Submit semiannual compliance certifications including excess emissions and deviations reports if applicable.
	SO ₂	1.0 lb/MMBtu	N/A	Record the daily sulfur content of the fuel used in the engines.	Report to any daily period where the sulfur content exceeds 0.8%.

XI. COMPLIANCE ASSURANCE MONITORING (CAM)

The CAM rule applies to pollutant-specific emission units (PSEU) at a major Title V source if the unit meets all of the following criteria:

- A. The unit is subject to an emission limit or standard for the applicable regulated air pollutant;
- B. The unit uses a control device to achieve compliance with the emission limit or standard; and
- C. The unit has "potential pre-control device emissions" of the applicable regulated air pollutant equal to or greater than 100% of the amount (tons/year) required for a source to be classified as a major source. "Potential pre-control device emissions" means potential to emit (PTE, as defined in Title V) except emissions reductions achieved by the applicable control device are not taken into account.

The general purpose of monitoring required by the CAM rule is to assure compliance with emission standards by ensuring that control devices meet and maintain the assumed control efficiencies. Compliance is ensured through requiring monitoring of the operation and maintenance of the control equipment and, if applicable, operating conditions of the pollutant-specific emissions unit. For the PSEUs that have post control potential to emit equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source, for each parameter monitored, the facility shall collect four or more data values equally spaced over each hour. Such units are defined as "large" PSEUs. For all other PSEUs ("small" PSEUs), the monitoring shall include some data collection at least once per 24-hour period.

The PSEUs at the FMMI facility that meet the requirements of 40 CFR 64.2(a)(1) and (2) have potential pre-control device emissions less than the amount required for a source to be classified as a major source. In addition, the control methods used do not meet the general applicability requirements of 40 CFR 64.2(a)(1) and (2). Consequently, CAM requirements do not apply, and CAM plans are not necessary.

XII. LEARNING SITE EVALUTATION

In accordance with ADEQ's Environmental Permits and Approvals near Learning Sites Policy, the Department is required to conduct 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 in 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.

This renewal will not result in an increase in emissions above permitting exemption thresholds and thus, it is exempt from a learning sites evaluation.

XIII. ENVIRONMENTAL JUSTICE ANALYSIS

The EPA (Environmental Protection Agency) defines Environmental Justice (EJ) to include the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The goal of completing an EJ assessment in permitting is to provide an opportunity for overburdened populations or communities to allow for meaningful participation in the permitting process. Overburdened is used to describe the minority, low-income, tribal and indigenous populations or communities that potentially experience disproportionate environmental harms and risks due to exposures or cumulative impacts or greater vulnerability to environmental hazards. The significant permit revision does not allow or permit any significant increases in emissions.

The EPA developed EJScreen, a publicly available tool that uses nationally consistent data, to produce maps and reports detailing environmental and demographic indicators that can be used to evaluate EJ concerns. The EPA selected a 90th percentile threshold for this action to evaluate the potential for EJ concerns in a community, meaning that if the area of interest exceeds the 90th percentile for one or more of the EJ indexes, the EPA considers that area to have a high potential for EJ concerns. ADEQ mapped the location of the FMMI facility and reviewed a 2-mile radius around it for potential environmental justice concerns (see Figure 2 below).

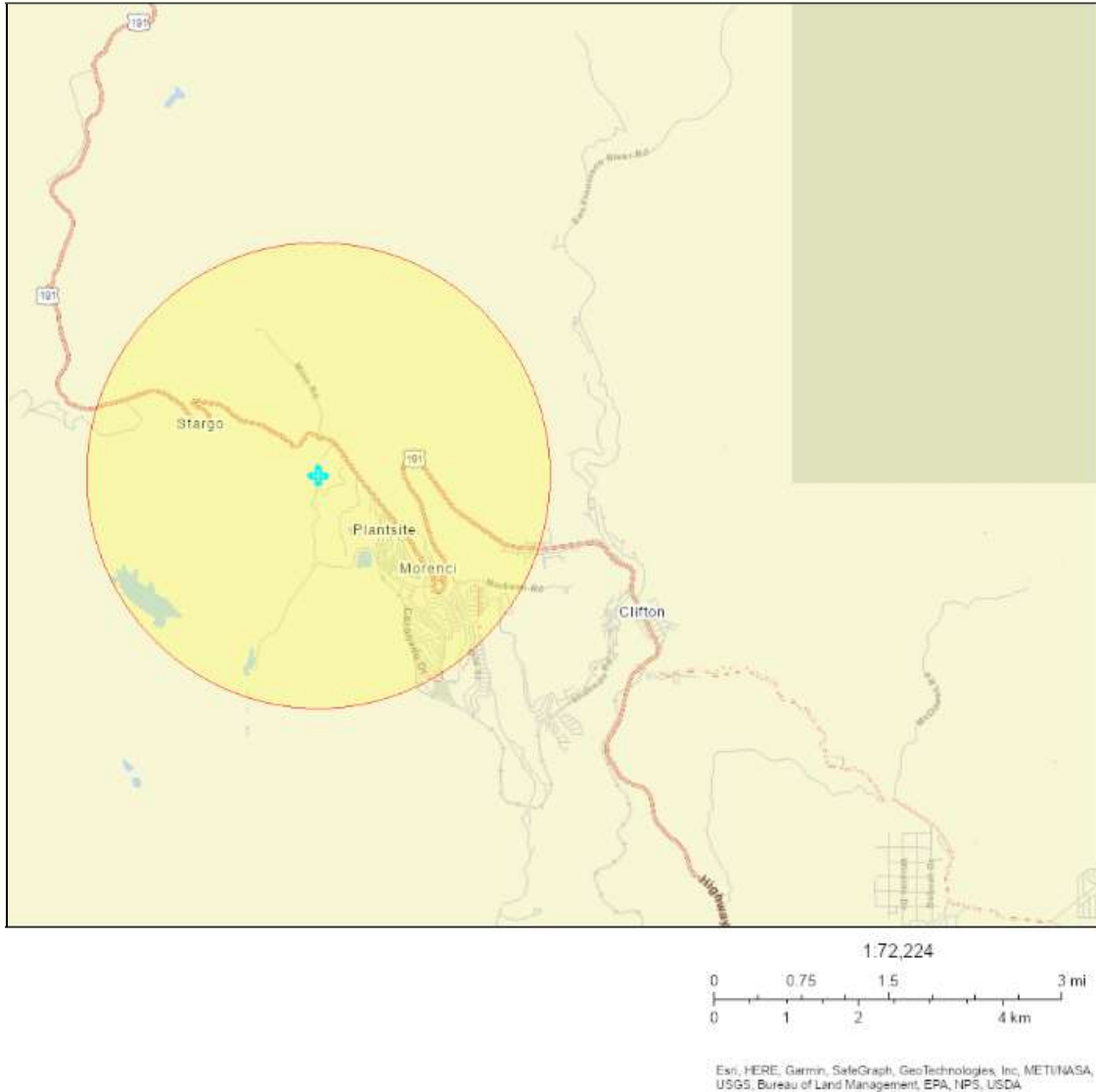


Figure 2: EPA EJ Screening Area for FMMI Facility

A. Demographics

ADEQ relied on data from the EPA EJScreen tool to assess the demographics of the communities near the location of the FMMI facility. The EJScreen report shows that the Demographic Indicators: People of Color, Limited English Speaking Population, and Population Under Age 5 and Population Over Age 64, are all below the 80th percentile threshold. The Demographic Indicator for Population with Less Than High School Education was in the 4th percentile compared to the U.S. average, Population Over Age 64 was in the 6th percentile compared to Arizona and was in the 60th percentile compared the U.S. average, and People of Color was in the 72nd percentile compare to the U.S. average.

B. Summary of Air Quality

All air quality related environmental indicators within a 2-miles radius of the facility were below the 90th percentile for both Arizona and the U.S. averages. ADEQ has determined that the issuance of this renewal will not have an adverse impact on the community.

C. Conclusion

ADEQ concludes that the protections afforded by Arizona Revised Statutes (A.R.S.) § 49-426, which are imposed throughout the permit, ensure that public health and the environment are protected within the surrounding community. In addition, that public notice and comment period opportunities are afforded to the community on this renewal satisfy EPA EJ Guidance. Additionally, ADEQ posts a notice in two newspapers of general circulation within the surrounding community, as well as publishes the notice electronically to ensure that the community has ample opportunity to provide comments on the draft documents prior to a final permitting decision.

XIV. LIST OF ABBREVIATIONS

A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
AERMOD	AMS/EPA Regulatory Model
AERMET	AERMOD Meteorological Preprocessor
AMS	American Meteorological Society
AQD	Air Quality Division
AQRV	Air Quality Related Values
ARM	Ambient Ratio Method
A.R.S.	Arizona Revised Statutes
BACT	Best Available Control Technology
Btu/ft ³	British Thermal Units per Cubic Foot
CAM	Compliance Assurance Monitoring
CEMS	Continuous Emissions Monitoring System
CFR	Code of Federal Regulations
CH ₄	Methane
COSB	Coarse Ore Storage Bin
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CO ₂ e	CO ₂ equivalent basis
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
FOIS	Fine Ore Intermediate Stockpile
FLM	Federal Land Manager
°F	degrees Fahrenheit
ft	Feet
g	Gram
GHG	Greenhouse Gases
HAPs	Hazardous Air Pollutants

HHV.....	Higher Heating Value
hp.....	Horsepower
hr.....	Hour
IC.....	Internal Combustion
IOS.....	Intermediate Ore Stockpile
IPCC.....	In-Pit Crushing and Conveying
kW.....	Kilowatt
MTHSB.....	Metcalf Track Hopper Storage Bin
MW.....	Megawatts
NAAQS.....	National Ambient Air Quality Standard
NO _x	Nitrogen Oxides
NO ₂	Nitrogen Dioxide
N ₂ O.....	Nitrous Oxide
NSPS.....	New Source Performance Standards
O ₃	Ozone
Pb.....	Lead
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
PSD.....	Prevention of Significant Deterioration
psia.....	Pounds per square Inch (absolute)
PTE.....	Potential to Emit
sec.....	Seconds
SF ₆	Sulfur Hexafluoride
SIA.....	Significant Impact Area
SIL.....	Significant Impact Level
SO ₂	Sulfur Dioxide Significant Impact Levels
SW/EX.....	Solution Extraction/Electrowinning
TPY.....	Tons per Year
TSP.....	Total Suspended Particulates
VOCs.....	Volatile Organic Compounds
yr.....	Year