TECHNICAL REVIEW AND EVALUATION OF APPLICATION FOR AIR QUALITY SIGNIFICANT PERMIT REVISION NO. 99644 TO OPERATING PERMIT NO. 77414

I. INTRODUCTION

This Class II Significant Permit Revision (SPR) authorizes Freeport-McMoRan Bagdad Inc. (FMBI), the Permittee, to update the design of Alternate Operating Scenario 1 (AOS1) by modernizing the previously permitted primary crushing, overland conveying, milling, and bulk flotation operations as well as incorporating additional molybdenum flotation operations, concentrate handling operations, lime and other reagent operations, prill handling operations, and emergency engines. These changes are described in detail in Section II below.

A. Company Information

Facility Name: Freeport-McMoRan Bagdad Inc

Mailing Address: Terminus of Highway 96

Facility Location: Bagdad, AZ 86321

B. Attainment Classification

FMBI is located in Yavapai County, an area classified as attainment or unclassified for all criteria pollutants.

II. REVISION DESCRIPTION

In Class II Air Quality Permit No. 77414, FMBI was authorized to operate AOS1 called the Two Concentrator Operations. This operating scenario included modified primary crushing and overland conveying operations, additional milling operations, and additional bulk flotation operations. The additional milling and bulk flotation operations are referred to as the Second Concentrator. The AOS1 operations previously authorized were not constructed nor operated due to unfavorable economic conditions. With the current economic conditions, FMBI is planning to move forward with the Two Concentrator Operations under AOS1. However, FMBI is requesting to update the design of Alternate Operating Scenario 1 (AOS1) through this SPR. Therefore, this SPR authorizes FMBI, the Permittee, to make the following changes:

1. PC1 AND OVERLAND CONVEYING

- A new PC1 will be purchased instead of reconstructing/refurbishing the old PC1.
- The overland conveyor transfer apron feeder will be removed.
- All ore processed by PC1 will be transferred to the Second Concentrator.
- Equipment names will be updated.
- Dust collector exhaust flow rates will be updated.

2. PC2 AND OVERLAND CONVEYING

- The overland conveyor transfer apron feeder will be removed.
- Free-Standing Stacker 6 will be retained.
- All ore processed by PC2 will be transferred to the Bagdad Concentrator.
- Fogging systems will be used instead of dust collectors to control emissions from non-fugitive transfer points during overland conveying.

3. SECOND CONCENTRATOR MILLING OPERATIONS

- Autogenous mills (wet processes) will be used instead of secondary crushers.
- An additional ball mill and regrind mill will be used.
- Screening and material handling operations will have a different configuration.
- Equipment names will be updated.
- Dust collector exhaust flow rates will be updated.

4. SECOND CONCENTRATOR FLOTATION OPERATIONS

- Both bulk and molybdenum flotation operations will be included (i.e. the copper/molybdenum concentrate from the Second Concentrator will no longer be combined with the copper/molybdenum concentrate from the Bagdad Concentrator). This will require addition of the Second Concentrator Concentrate Handling Operations and Second Concentrator Lime and Other Reagent Operations.
- Cleaner flotation will be added.
- Thickeners for bulk concentrate, copper concentrate, and molybdenum concentrate will be added
- Equipment names will be updated.

5. SECOND CONCENTRATOR CONCENTRATE HANDLING OPERATIONS

- Filtering and loadout for the copper concentrate from the Second Concentrator will be added.
- Filtering, drying controlled by a scrubber, and packaging of the molybdenum concentrate from the Second Concentrator will be added.

6. SECOND CONCENTRATOR LIME AND OTHER REAGENT OPERATIONS

- Because of the additional Second Concentrator flotation operations, reagent systems for lime, flocculant, xanthate, test reagent, and sodium hydrosulfide will be added.

7. SECOND CONCENTRATOR PRILL HANDLING OPERATIONS

An additional prill bin will be added.

8. SECOND CONCENTRATOR EMERGENCY INTERNAL COMBUSTION ENGINES

- Two diesel emergency generators (609 and 762 horsepower, respectively) and two propane emergency generators (each 84.7 horsepower) will be added to provide backup power to the grinding/flotation line, byproduct separation and handling area, concentrator wastewater treatment plant, and the primary crusher area wastewater treatment plant.

9. MAXIMUM MINING RATES

To achieve the production targets associated with the updated design of AOS1, maximum mining rates and associated operations will be updated, such as blasting rates and mobile equipment usage including haul trucks. The updates will affect emissions from drilling, blasting, haul truck and other vehicle travel, dozer and grader operations, and loading/unloading of mined material.

The upgrades will provide operational flexibility and allow PC1 as well as the accompanying Second Concentrator to operate independently of the Bagdad Concentrator. The changes meet the requirements for a SPR as outlined in Arizona Administrative Code (A.A.C.) R18-2-320.

A. Process Flow Diagrams

Updated Design of AOS1

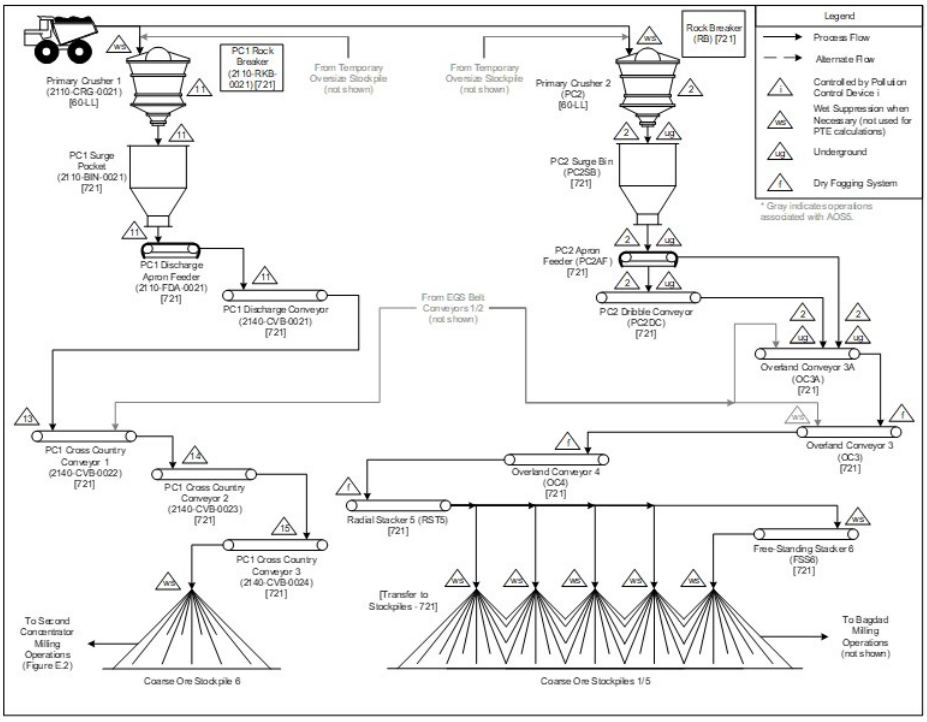


Figure E.1 Primary Crushing and Overland Conveying Operations (AOS1 – Proposed Updated Design)

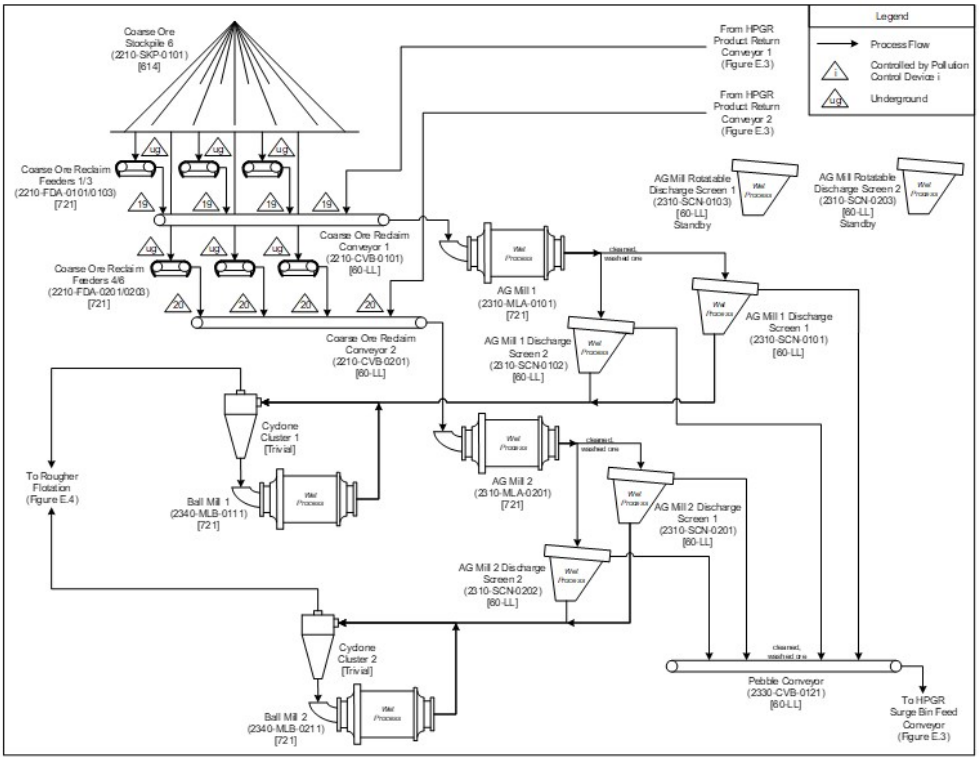


Figure E.2 Second Concentrator Milling Operations 1 (AOS1 – Proposed Updated Design)

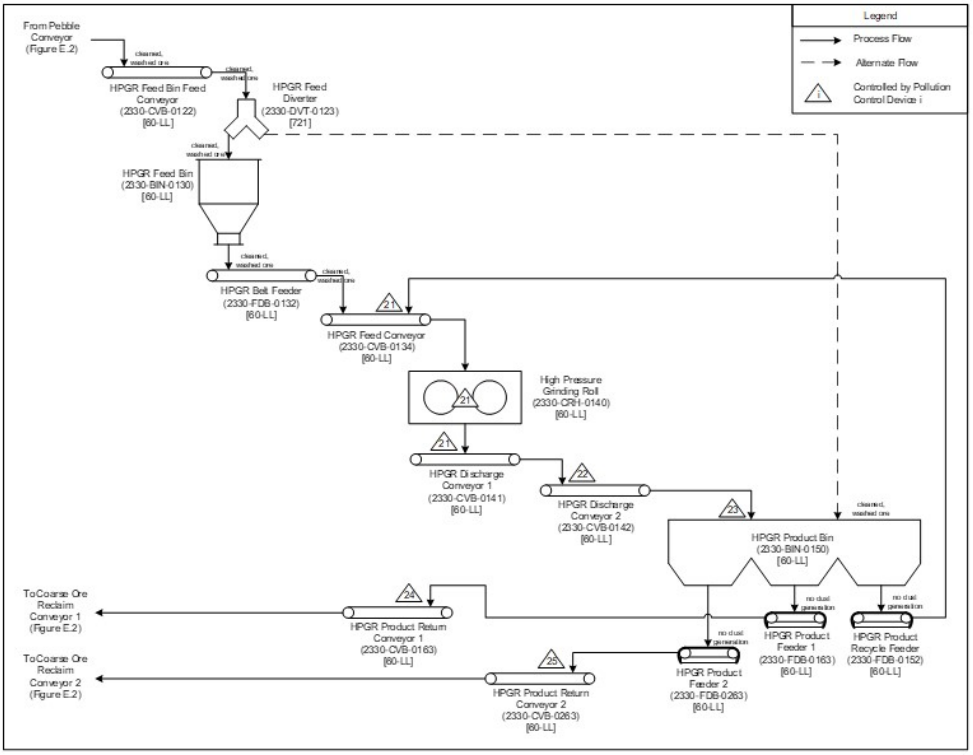


Figure E.3 Second Concentrator Milling Operations 2 (AOS1 – Proposed Updated Design)

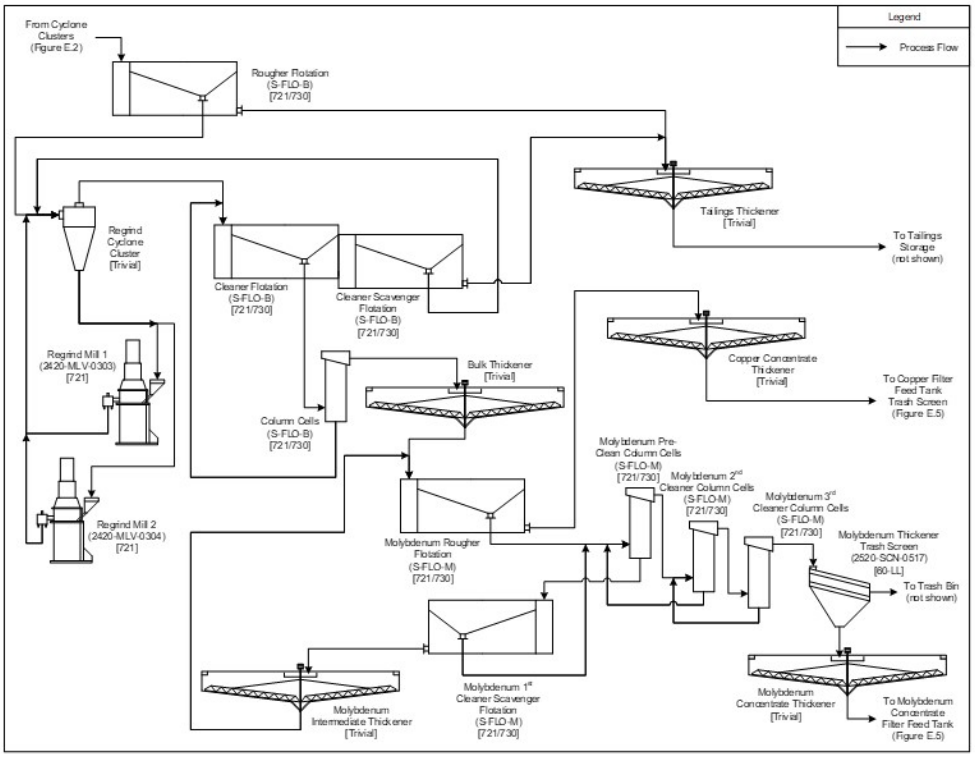


Figure E.4 Second Concentrator Flotation Operations (AOS1 – Proposed Updated Design)

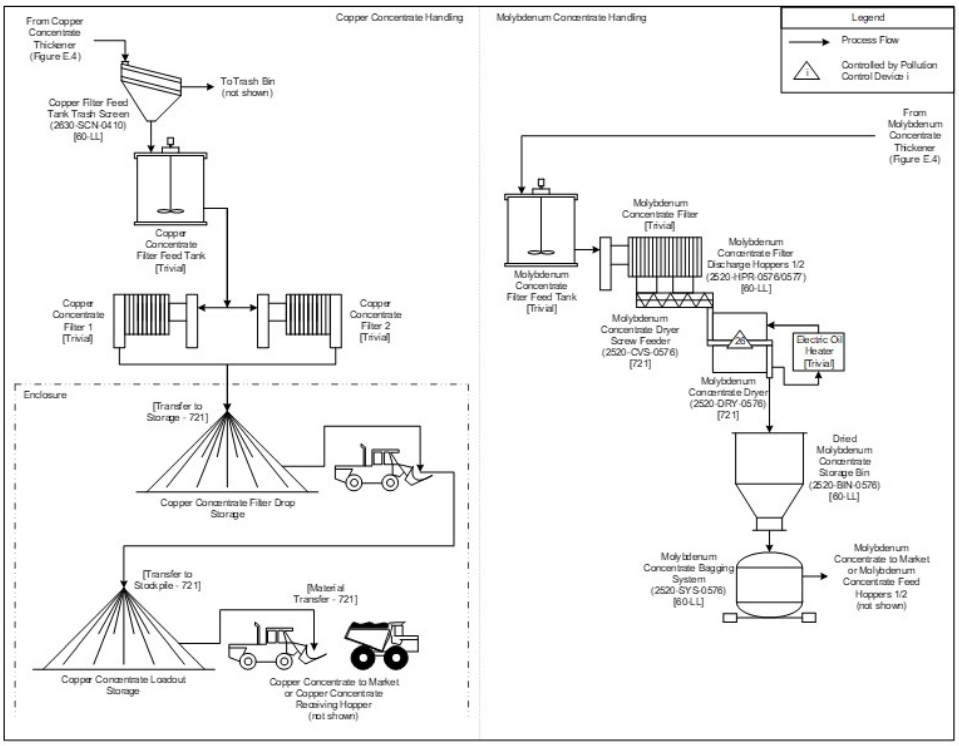


Figure E.5 Second Concentrator Concentrate Handling Operations (AOS1 – Proposed Updated Design)

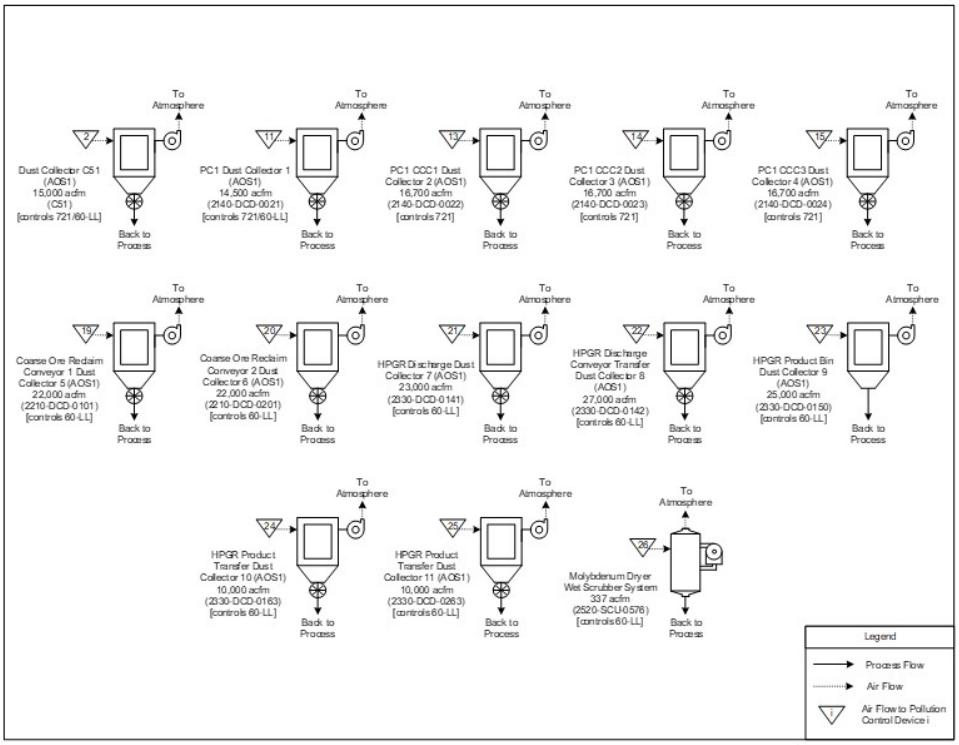


Figure E.6 Pollution Control Devices (AOS1 – Proposed Updated Design)

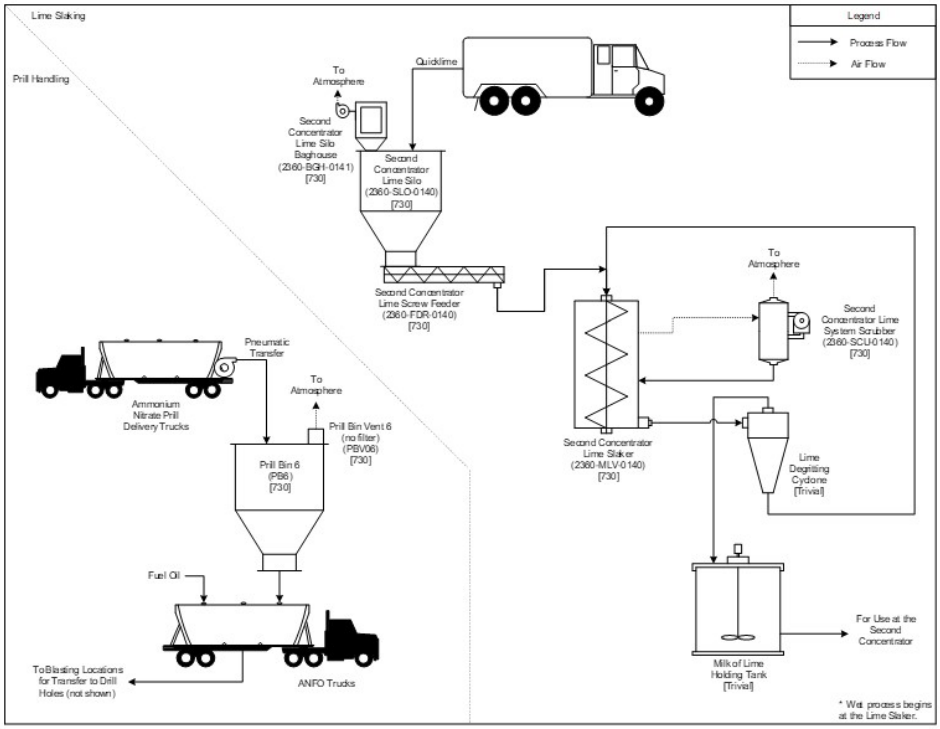


Figure E.7 Second Concentrator Prill Handling and Lime Slaking Operations (AOS1 – Proposed Updated Design)

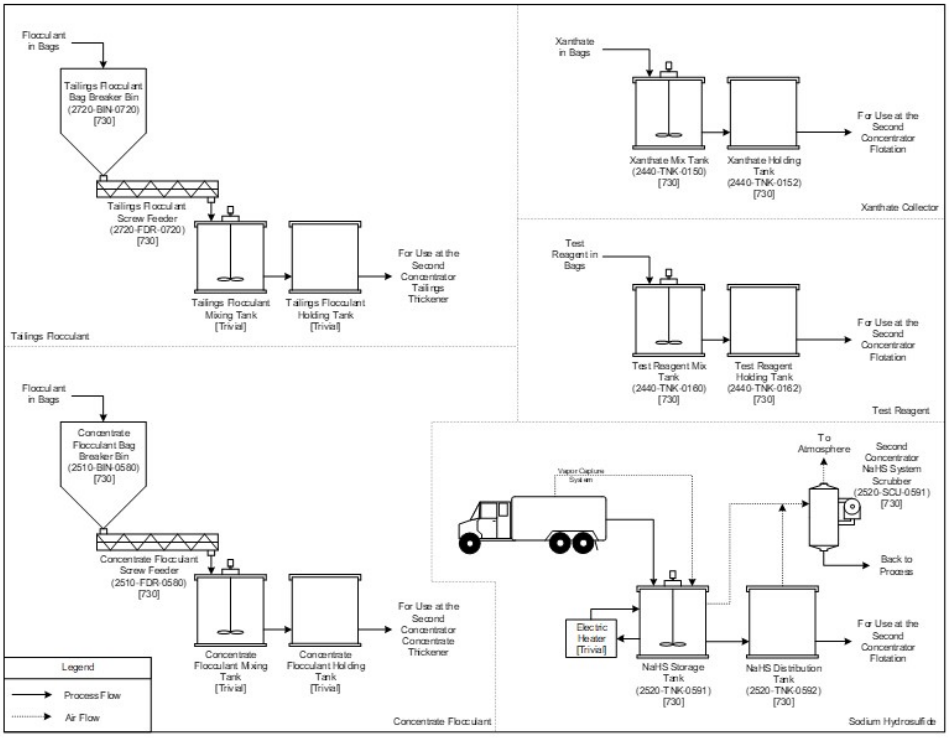


Figure E.8 Second Concentrator Reagent Delivery and Handling Operations (AOS1 – Proposed Updated Design)

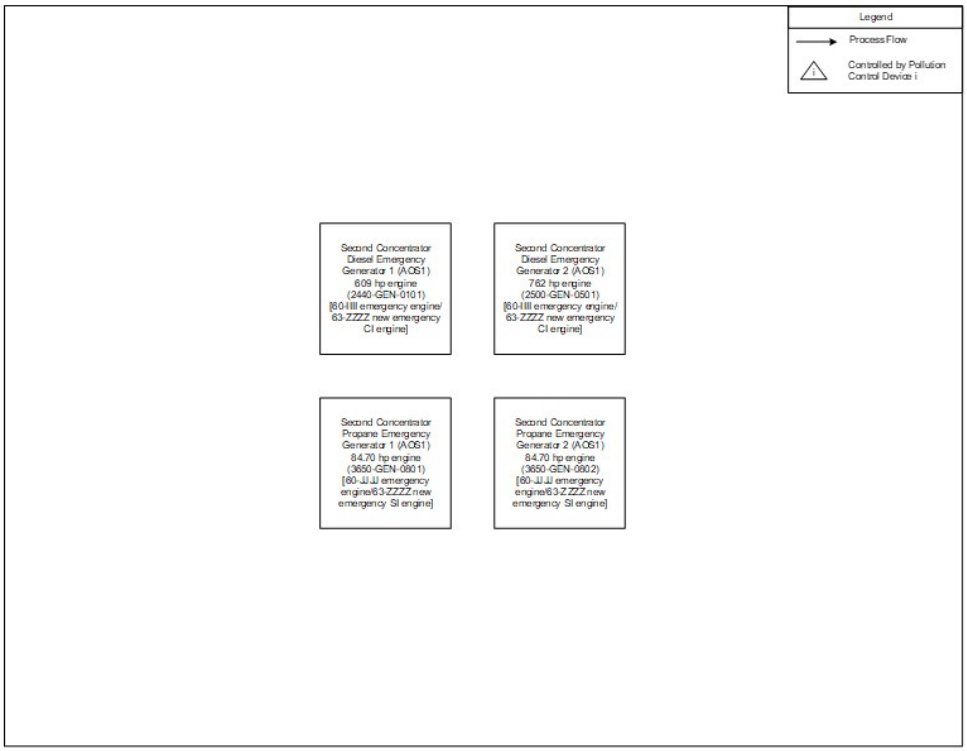


Figure E.9 Second Concentrator Emergency ICE (AOS1 – Proposed Updated Design)

III. DESCRIPTION OF CURRENT OPERATIONS AND THE PRIMARY OPERATING SCENARIO

The six major existing operations at the FMBI facility include: (a) open-pit mining and hauling of ore and overburden; (b) size reduction of the ore using primary crushing and overland conveying followed by grinding/milling and secondary crushing; (c) concentration of the ore using bulk and molybdenum froth flotation; (d) processing and bagging/loading of the copper and molybdenum concentrate; (e) heap leaching of ore to generate a copper-rich pregnant leach solution followed by solution extraction and electrowinning to produce high purity copper cathodes; and (f) pressure leaching of copper and molybdenum concentrate to produce additional copper-rich pregnant leach solution and molybdenum trioxide, respectively.

The grinding/milling, secondary crushing, and flotation operations described in (b) and (c) above are commonly referred to as the Bagdad Concentrator and are currently fed by a single primary crusher PC2 and overland conveying system. The Bagdad Concentrator produces the copper and molybdenum concentrates described in (d) above. In Class II Air Quality Permit No. 77414, these existing operations are known as the primary operating scenario[1].

The equipment listed under the following headings in the equipment list of Attachment "C" of Class II Air Quality Permit No. 77414 identifies all equipment currently operating at the FMBI facility.

- Primary Crushing and Overland Conveying Operations
- Milling Operations
- Bulk and Molybdenum Flotation Operations
- Copper Concentrate Processing and Loading Operations
- Molybdenum Concentrate Processing and Bagging Operations
- Concentrate Leach Plant
- Solution Extraction/Electrowinning Operations
- Lime Storage and Handling Operations
- Ammonium Nitrate Prill Delivery and Handling Operations

1 The Primary Operating Scenario also includes an additional primary crusher PC1 and overland conveying system, but they are not currently operating

- Portable Aggregate System
- Mill Recycle Operations
- Storage Tanks and Parts Cleaning
- Diesel Emergency ICE
- Propane Emergency ICE
- Natural Gas Emergency ICE
- Diesel Non-Emergency ICE
- Propane Non-Emergency ICE
- Miscellaneous Fuel Burning Equipment

IV. DESCRIPTION OF ALTERNATE OPERATING SCENARIOS

In addition to the current operations described above, FMBI has been authorized to operate five alternate operating scenarios (AOS1 through AOS5). Description of the various AOS are presented below:

The AOS were established to ensure authorization for changes that had been permitted under Class II Air Quality Permit No. 60433, but that had not been implemented by the time Class II Air Quality Permit No. 77414 was issued on November 20, 2019. The AOS strategy preserves authorization for the current operations while also allowing the previously permitted changes to be implemented easily in the future.

AOS1: Two Concentrator Operations

Description

As part of Class II Air Quality Permit No. 60433, FMBI was authorized to operate modified primary crushing and overland conveying operations, additional milling operations, and additional bulk flotation operations. Because FMBI had not yet implemented the changes before issuance of Class II Air Quality Permit No. 77414 on November 20, 2019, AOS1 was established to account for operations following the changes. This SPR No. 99644 updates the design of AOS1 as specified in Section II above. Potential emissions from AOS1 are different than the primary operating scenario. Consequently, facility-wide PTE is presented for both the primary operating scenario and AOS1 in Section III above.

Equipment Subject to Permitting that is Authorized to Operate During AOS1

Equipment ID Number	Type of Equipment	Applicable Attachment "B" Section or Condition
Primary Crushing and Overland Conveying Operations (to Bagdad Concentrator) (AOS1)		
RB	Rock Breaker (AOS1)	Conditions II.A (721) and II.D.1
PC2	Primary Crusher 2 (AOS1)	Conditions II.B (LL) and II.D.1
C51	Dust Collector C51 (AOS1)	Conditions II.C and II.D.1
PC2SB	PC2 Surge Bin (AOS1)	Conditions II.A (721) and II.D.1
PC2AF	PC2 Apron Feeder (AOS1)	Conditions II.A (721) and II.D.1
PC2DC	PC2 Dribble Conveyor (AOS1)	Conditions II.A (721) and II.D.1
OC3A	Overland Conveyor 3A (AOS1)	Conditions II.A (721) and II.D.1
OC3	Overland Conveyor 3 (AOS1)	Conditions II.A (721) and II.D.1
OC4	Overland Conveyor 4 (AOS1)	Conditions II.A (721) and II.D.1
RST5	Radial Stacker 5 (AOS1)	Conditions II.A (721) and II.D.1
FSS6	Free-Standing Stacker 6 (AOS1)	Conditions II.A (721) and II.D.1
Primary Crushing and Overland Conveying Operations (to the Second Concentrator) (AOS1)		
2110-RKB-0021	PC1 Rock Breaker (AOS1)	Conditions II.A (721) and II.D.1
2110-CRG-0021	Primary Crusher 1 (AOS1)	Conditions II.B (LL) and II.D.1
2140-DCD-0021	PC1 Dust Collector 1 (AOS1)	Conditions II.C and II.D.1
2110-BIN-0021	PC1 Surge Pocket (AOS1)	Conditions II.A (721) and II.D.1
2110-FDA-0021	PC1 Discharge Apron Feeder (AOS1)	Conditions II.A (721) and II.D.1
2140-CVB-0021	PC1 Discharge Conveyor (AOS1)	Conditions II.A (721) and II.D.1

Equipment ID Number	Type of Equipment	Applicable Attachment "B" Section or Condition
2140-CVB-0022	PC1 Cross Country Conveyor 1 (AOS1)	Conditions II.A (721) and II.D.1
2140-DCD-0022	PC1 CCC1 Dust Collector 2 (AOS1)	Conditions II.C and II.D.1
2140-CVB-0023	PC1 Cross Country Conveyor 2 (AOS1)	Conditions II.A (721) and II.D.1
2140-DCD-0023	PC1 CCC2 Dust Collector 3 (AOS1)	Conditions II.C and II.D.1
2140-CVB-0024	PC1 Cross Country Conveyor 3 (AOS1)	Conditions II.A (721) and II.D.1
2140-DCD-0024	PC1 CCC3 Dust Collector 4 (AOS1)	Conditions II.C and II.D.1
Second Concentrator Milling Operations (AOS1)		
2210-FDA-0101	Coarse Ore Reclaim Feeder 1 (AOS1)	Conditions II.A (721) and II.D.1
2210-FDA-0102	Coarse Ore Reclaim Feeder 2 (AOS1)	Conditions II.A (721) and II.D.1
2210-FDA-0103	Coarse Ore Reclaim Feeder 3 (AOS1)	Conditions II.A (721) and II.D.1
2210-CVB-0101	Coarse Ore Reclaim Conveyor 1 (AOS1)	Conditions II.B (LL) and II.D.1
2210-DCD-0101	Coarse Ore Reclaim Conveyor 1 Dust Collector 5 (AOS1)	Conditions II.C and II.D.1
2210-FDA-0201	Coarse Ore Reclaim Feeder 4 (AOS1)	Conditions II.A (721) and II.D.1
2210-FDA-0202	Coarse Ore Reclaim Feeder 5 (AOS1)	Conditions II.A (721) and II.D.1
2210-FDA-0203	Coarse Ore Reclaim Feeder 6 (AOS1)	Conditions II.A (721) and II.D.1
2210-CVB-0201	Coarse Ore Reclaim Conveyor 2 (AOS1)	Conditions II.B (LL) and II.D.1
2210-DCD-0201	Coarse Ore Reclaim Conveyor 2 Dust Collector 6 (AOS1)	Conditions II.C and II.D.1
2310-MLA-0101	AG Mill 1 (AOS1)	Conditions II.A (721) and II.D.1
2310-SCN-0101	AG Mill 1 Discharge Screen 1 (AOS1)	Conditions II.B (LL) and II.D.1

Equipment ID Number	Type of Equipment	Applicable Attachment "B" Section or Condition
2310-SCN-0102	AG Mill 1 Discharge Screen 2 (AOS1)	Conditions II.B (LL) and II.D.1
2310-SCN-0103	AG Mill Rotatable Discharge Screen 1 (AOS1)	Conditions II.B (LL) and II.D.1
2340-MLB-0111	Ball Mill 1 (AOS1)	Conditions II.A (721) and II.D.1
2310-MLA-0201	AG Mill 2 (AOS1)	Conditions II.A (721) and II.D.1
2310-SCN-0201	AG Mill 2 Discharge Screen 1 (AOS1)	Conditions II.B (LL) and II.D.1
2310-SCN-0202	AG Mill 2 Discharge Screen 2 (AOS1)	Conditions II.B (LL) and II.D.1
2310-SCN-0203	AG Mill Rotatable Discharge Screen 2 (AOS1)	Conditions II.B (LL) and II.D.1
2340-MLB-0211	Ball Mill 2 (AOS1)	Conditions II.A (721) and II.D.1
2330-CVB-0121	Pebble Conveyor (AOS1)	Conditions II.B (LL) and II.D.1
2330-CVB-0122	HPGR Feed Bin Feed Conveyor (AOS1)	Conditions II.B (LL) and II.D.1
2330-DVT-0123	HPGR Feed Diverter (AOS1)	Conditions II.A (721) and II.D.1
2330-BIN-0130	HPGR Feed Bin (AOS1)	Conditions II.B (LL) and II.D.1
2330-FDB-0132	HPGR Belt Feeder (AOS1)	Conditions II.B (LL) and II.D.1
2330-CVB-0134	HPGR Feed Conveyor (AOS1)	Conditions II.B (LL) and II.D.1
2330-CRH-0140	High Pressure Grinding Roll (AOS1)	Conditions II.B (LL) and II.D.1
2330-DCD-0141	HPGR Discharge Dust Collector 7 (AOS1)	Conditions II.C and II.D.1
2330-CVB-0141	HPGR Discharge Conveyor 1 (AOS1)	Conditions II.B (LL) and II.D.1
2330-CVB-0142	HPGR Discharge Conveyor 2 (AOS1)	Conditions II.B (LL) and II.D.1
2330-DCD-0142	HPGR Discharge Conveyor Transfer Dust Collector 8 (AOS1)	Conditions II.C and II.D.1

Equipment ID Number	Type of Equipment	Applicable Attachment "B" Section or Condition
2330-BIN-0150	HPGR Product Bin (AOS1)	Conditions II.B (LL) and II.D.1
2330-DCD-0150	HPGR Product Bin Dust Collector 9 (AOS1)	Conditions II.C and II.D.1
2330-FDB-0152	HPGR Product Recycle Feeder (AOS1)	Conditions II.B (LL) and II.D.1
2330-FDB-0163	HPGR Product Feeder 1 (AOS1)	Conditions II.B (LL) and II.D.1
2330-FDB-0263	HPGR Product Feeder 2 (AOS1)	Conditions II.B (LL) and II.D.1
2330-CVB-0163	HPGR Product Return Conveyor 1 (AOS1)	Conditions II.B (LL) and II.D.1
2330-DCD-0163	HPGR Product Transfer Dust Collector 10 (AOS1)	Conditions II.C and II.D.1
2330-CVB-0263	HPGR Product Return Conveyor 2 (AOS1)	Conditions II.B (LL) and II.D.1
2330-DCD-0263	HPGR Product Transfer Dust Collector 11 (AOS1)	Conditions II.C and II.D.1
Second Concentrator Bulk and Molybdenum Flotation Operations (AOS1)		
S-FLO-B	Second Concentrator Bulk Flotation Equipment (AOS1)	Conditions II.A (721), III.A (730), and II.D.1
2420-MLV-0303	Second Concentrator Regrind Mill 1 (AOS1)	Conditions II.A (721) and II.D.1
2420-MLV-0304	Second Concentrator Regrind Mill 2 (AOS1)	Conditions II.A (721) and II.D.1
S-FLO-M	Second Concentrator Molybdenum Flotation Equipment (AOS1)	Conditions II.A (721), III.A (730), and II.D.1
Second Concentrator Concentrate Handling Operations (AOS1)		
2630-SCN-0410	Copper Filter Feed Tank Trash Screen (AOS1)	Conditions II.B (LL) and II.D.1
2520-SCN-0517	Molybdenum Thickener Trash Screen (AOS1)	Conditions II.B (LL) and II.D.1
2520-HPR-0576	Molybdenum Concentrate Filter Discharge Hopper 1 (AOS1)	Conditions II.B (LL) and II.D.1
2520-HPR-0577	Molybdenum Concentrate Filter Discharge Hopper 2 (AOS1)	Conditions II.B (LL) and II.D.1

Equipment ID Number	Type of Equipment	Applicable Attachment "B" Section or Condition
2520-CVS-0576	Molybdenum Concentrate Dryer Screw Feeder (AOS1)	Conditions II.A (721) and II.D.1
2520-DRY-0576	Molybdenum Concentrate Dryer (AOS1)	Conditions II.A (721) and II.D.1
2520-SCU-0576	Molybdenum Dryer Wet Scrubber System (AOS1)	Conditions II.C and II.D.1
2520-BIN-0576	Dried Molybdenum Concentrate Storage Bin (AOS1)	Conditions II.B (LL) and II.D.1
2520-SYS-0576	Molybdenum Concentrate Bagging System (AOS1)	Conditions II.B (LL) and II.D.1
Second Concentrator Lime and Other Regent Operations (AOS1)		
2360-SLO-0140	Second Concentrator Lime Silo (AOS1)	Conditions III.A (730) and II.D.1
2360-BGH-0141	Second Concentrator Lime Silo Baghouse (AOS1)	Conditions III.A (730) and II.D.1
2360-FDR-0140	Second Concentrator Lime Screw Feeder (AOS1)	Conditions III.A (730) and II.D.1
2360-MLV-0140	Second Concentrator Lime Slaker (AOS1)	Conditions III.A (730) and II.D.1
2360-SCU-0140	Second Concentrator Lime System Scrubber (AOS1)	Conditions III.A (730) and II.D.1
2720-BIN-0720	Tailings Flocculant Bag Breaker Bin (AOS1)	Conditions III.A (730) and II.D.1
2720-FDR-0720	Tailings Flocculant Screw Feeder (AOS1)	Conditions III.A (730) and II.D.1
2510-BIN-0580	Concentrate Flocculant Bag Breaker Bin (AOS1)	Conditions III.A (730) and II.D.1
2510-FDR-0580	Concentrate Flocculant Screw Feeder (AOS1)	Conditions III.A (730) and II.D.1
2440-TNK-0150	Xanthate Mix Tank (AOS1)	Conditions III.A (730) and II.D.1
2440-TNK-0152	Xanthate Holding Tank (AOS1)	Conditions III.A (730) and II.D.1
2440-TNK-0160	Test Reagent Mix Tank (AOS1)	Conditions III.A (730) and II.D.1
2440-TNK-0162	Test Reagent Holding Tank (AOS1)	Conditions III.A (730) and II.D.1

Equipment ID Number	Type of Equipment	Applicable Attachment "B" Section or Condition
2520-TNK-0591	NaHS Storage Tank (AOS1)	Conditions III.A (730) and II.D.1
2520-TNK-0592	NaHS Distribution Tank (AOS1)	Conditions III.A (730) and II.D.1
2520-SCU-0591	Second Concentrator NaHS System Scrubber (AOS1)	Conditions III.A (730) and II.D.1
Second Concentrator Prill Handling Operations (AOS1)		
PB6	Prill Bin 6 (AOS1)	Conditions III.A (730) and II.D.1
Second Concentrator Emergency ICE (AOS1)		
2440-GEN-0101	Second Concentrator Diesel Emergency Generator 1 (AOS1)	Conditions VI.B (IIII), VI.E (ZZZZ), and II.D.1
2500-GEN-0501	Second Concentrator Diesel Emergency Generator 2 (AOS1)	Conditions VI.B (IIII), VI.E (ZZZZ), and II.D.1
3650-GEN-0801	Second Concentrator Propane Emergency Generator 1 (AOS1)	Conditions VI.C (JJJJ), VI.E (ZZZZ), and II.D.1
3650-GEN-0802	Second Concentrator Propane Emergency Generator 2 (AOS1)	Conditions VI.C (JJJJ), VI.E (ZZZZ), and II.D.1

Equipment That is Not Authorized to Operate During AOS1

Equipment ID Number	Type of Equipment	Applicable Attachment "B" Section or
Primary Crushing and Overland Conveying Operations		
C18	Scrubber C18	Conditions II.A, II.B, and II.C
PC1SB	PC1 Surge Bin	Condition II.A (721)
PC1AF	PC1 Apron Feeder	Condition II.A (721)
OC1	Overland Conveyor 1	Condition II.A (721)

Equipment ID Number	Type of Equipment	Applicable Attachment "B" Section or
OC2	Overland Conveyor 2	Condition II.A (721)

Equipment Authorized to Operate During Both Current Operations and AOS1

Equipment ID Number	Type of Equipment	Applicable Attachment "B" Section or Condition
PC1 (under current operations), 2110-CRG-0021 (under AOS1)	Primary Crusher 1	Condition II.A (721, under current operations), Condition II.B (LL, under AOS1)
RB	Rock Breaker	Condition II.A (721, under current operations and AOS1), Condition II.D.1 (under AOS1)
PC2	Primary Crusher 2	Condition II.B (LL, under current operations and AOS1), Condition II.D.1 (under AOS1)
C51	Dust Collector C51	Condition II.B (under current operations), Condition II.D.1 (under AOS1), and Condition II.C (under current operations and AOS1)
PC2SB	PC2 Surge Bin	Condition II.A (721, under current operations and AOS1), Condition II.D.1 (under AOS1)
PC2AF	PC2 Apron Feeder	Condition II.A (721, under current operations and AOS1), Condition II.D.1 (under AOS1)
PC2DC	PC2 Dribble Conveyor	Condition II.A (721, under current operations and AOS1), Condition II.D.1 (under AOS1)
OC3A	Overland Conveyor 3A	Condition II.A (721, under current operations and AOS1), Condition II.D.1 (under AOS1)
OC3	Overland Conveyor 3	Condition II.A (721, under current operations and AOS1), Condition II.D.1 (under AOS1)
OC4	Overland Conveyor 4	Condition II.A (721, under current operations and AOS1), Condition II.D.1 (under AOS1)
RST5	Radial Stacker 5	Condition II.A (721, under current operations and AOS1), Condition II.D.1 (under AOS1)

Equipment ID Number	Type of Equipment	Applicable Attachment "B" Section or Condition
FSS6	Free-Standing Stacker 6	Condition II.A (721, under current operations and AOS1), Condition II.D.1 (under AOS1)

AOS2: Upgrades to Mining, Primary Crushing, and Overland Conveying Operations

Description

As part of MPR No. 76822 under Class II Air Quality Permit No. 60433, FMBI was authorized to replace Primary Crusher 2. Because FMBI had not yet made the replacement before issuance of Class II Air Quality Permit No. 77414 on November 20, 2019, AOS2 was established to account for operations following the replacement. The replacement of Primary Crusher 2 has since occurred in 2021. Consequently, FMBI utilized MPR No. 93110 to incorporate the requirements of AOS2 into the requirements for the Primary Operating Scenario and AOS1.

AOS3: Upgrades to Milling Operations

Description

As part of MPR No. 76822 under Class II Air Quality Permit No. 60433, FMBI was authorized to replace the Secondary Crushers and increase the belt width of Belt Conveyors B. Because FMBI had not yet implemented the changes before issuance of Class II Air Quality Permit No. 77414 on November 20, 2019, AOS3 was established to account for operations following the changes.

Emissions from operation of AOS3 are equal to emissions from the existing Secondary Crushers and Belt Conveyors B on both an annual and hourly basis. Consequently, emissions from AOS3 are not included in FMBI's facility-wide emission totals.

Equipment Subject to Permitting that is Authorized to Operate During AOS3

Equipment ID Number	Type of Equipment	Maximum Rated Capacity	Model	Applicable Attachment "B" Section or Condition
Grinding Line 1				
GL1-BCB	GL1 Belt Conveyor B (AOS3)	1,300 tph	48"	Conditions II.A (721) and II.D.2
GL1-SC1	GL1 Secondary Crusher (AOS3)	1,450 tph	MP1250	Conditions II.B (LL) and II.D.2
Grinding Line 2				
GL2-BCB	GL2 Belt Conveyor B (AOS3)	1,300 tph	48"	Conditions II.A (721) and II.D.2

Equipment ID Number	Type of Equipment	Maximum Rated Capacity	Model	Applicable Attachment "B" Section or Condition
GL2-SC2	GL2 Secondary Crusher (AOS3)	1,450 tph	MP1250	Conditions II.B (LL) and II.D.2
Grinding Line 3				
GL3-BCB	GL3 Belt Conveyor B (AOS3)	1,300 tph	48"	Conditions II.A (721) and II.D.2
GL3-SC3	GL3 Secondary Crusher (AOS3)	1,450 tph	MP1250	Conditions II.B (LL) and II.D.2
Grinding Line 4				
GL4-BCB	GL4 Belt Conveyor B (AOS3)	1,300 tph	48"	Conditions II.A (721) and II.D.2
GL4-SC4	GL4 Secondary Crusher (AOS3)	1,450 tph	MP1250	Conditions II.B (LL) and II.D.2
Grinding Line 5				
GL5-BCB	GL5 Belt Conveyor B (AOS3)	1,300 tph	48"	Conditions II.B (LL) and II.D.2
GL5-SC5	GL5 Secondary Crusher (AOS3)	1,450 tph	MP1250	Conditions II.B (LL) and II.D.2

Equipment That is Not Authorized to Operate During AOS3

Equipment ID Number	Type of Equipment	Maximum Rated Capacity	Model	Applicable Attachment "B" Section or
Grinding Line 1				
GL1-BCB	GL1 Belt Conveyor B	1,300 tph	40"	Condition II.A (721)
GL1-SC1	GL1 Secondary Crusher	650 tph	MP800	Condition II.B (LL)
Grinding Line 2				
GL2-BCB	GL2 Belt Conveyor B	1,300 tph	40"	Condition II.A (721)

Equipment ID Number	Type of Equipment	Maximum Rated Capacity	Model	Applicable Attachment "B" Section or
GL2-SC2	GL2 Secondary Crusher	650 tph	MP800	Condition II.B (LL)
Grinding Line 3				
GL3-BCB	GL3 Belt Conveyor B	1,300 tph	40"	Condition II.A (721)
GL3-SC3	GL3 Secondary Crusher	650 tph	MP800	Condition II.B (LL)
Grinding Line 4				
GL4-BCB	GL4 Belt Conveyor B	1,300 tph	40"	Condition II.A (721)
GL4-SC4	GL4 Secondary Crusher	650 tph	MP800	Condition II.B (LL)
Grinding Line 5				
GL5-BCB	GL5 Belt Conveyor B	1,300 tph	40"	Condition II.B (LL)
GL5-SC5	GL5 Secondary Crusher	650 tph	MP800	Condition II.B (LL)

AOS4: GL5 Pollution Control Device Replacement

Description

As part of MPR No. 76354 under Class II Air Quality Permit No. 60433, FMBI was authorized to replace GL5 Scrubber C5 with GL5 Dust Collector DC5. Because FMBI had not yet made the replacement before issuance of Class II Air Quality Permit No. 77414 on November 20, 2019, AOS4 was established to account for operations following the replacement.

The replacement of GL5 Scrubber C5 with GL5 Dust Collector DC5 has since occurred in 2022. Consequently, FMBI utilized MPR No. 96299 to incorporate the requirements of AOS4 into the requirements for the current operations.

AOS5: Emergency Grizzly Systems

Description

AOS5 involves operation of the Emergency Grizzly Systems to process ore when a primary crusher malfunctions or is otherwise inoperative. FMBI can avoid depletion of the Coarse Ore Stockpiles and potential shutdown or curtailment of the Milling Operations by using AOS5 when a primary

crusher is down. A single line of the Emergency Grizzly Systems is authorized to operate for each primary crusher that is inoperative.

Emissions from operations of the Emergency Grizzly Systems are less than emissions from operation of the primary crushers. Consequently, emissions from the Emergency Grizzly Systems are not included in FMBI's facility-wide emission totals.

Equipment associated with the Emergency Grizzly Systems will be rented or brought in from another Freeport-McMoRan Copper & Gold facility, as necessary. Consequently, detailed information regarding the exact equipment to be used is not available. Generic equipment details are included in FMBI's equipment list under AOS5.

Equipment Subject to Permitting that is Authorized to Operate During AOS5[2]

Equipment ID Number	Type of Equipment	Applicable Attachment "B" Section or
EG1	EGS Bar Grizzly 1 (AOS5)	Conditions II.B (LL) and II.D.4
EG2	EGS Bar Grizzly 2 (AOS5)	Conditions II.B (LL) and II.D.4
EGAF1	EGS Apron Feeder 1 (AOS5)	Conditions II.A (721) and II.D.4
EGAF2	EGS Apron Feeder 2 (AOS5)	Conditions II.A (721) and II.D.4
EGBC1	EGS Belt Conveyor 1 (AOS5)	Conditions II.A (721) and II.D.4
EGBC2	EGS Belt Conveyor 2 (AOS5)	Conditions II.A (721) and II.D.4

[2] When operating under AOS5, the Permittee may operate only one Bar Grizzly (EG1 or EG2), one Apron Feeder (EGAF1 or EGAF2), and one Belt Conveyor (EGBC1 or EGBC2) of the Emergency Grizzly System for each primary crusher that is inoperative.

Equipment That is Not Authorized to Operate During AOS5[3]

Equipment ID Number	Type of Equipment	Applicable Attachment "B" Section or
When operating under the Primary Operating Scenario:		
PC1	Primary Crusher 1	Conditions II.A (721, prior to reconstruction) and II.B (LL, following reconstruction)

Equipment ID Number	Type of Equipment	Applicable Attachment "B" Section or
PC2	Primary Crusher 2	Condition II.B (LL)
When operating under AOS1:		
2110-CRG-0021	Primary Crusher 1 (AOS1)	Conditions II.B (LL) and II.D.1
PC2	Primary Crusher 2 (AOS1)	Conditions II.B (LL) and II.D.1

[3]f only one primary crusher is inoperative, the other primary crusher can continue to operate as long as only one Bar Grizzly (EG1 or EG2), one Apron Feeder (EGAF1 or EGAF2), and one Belt Conveyor (EGBC1 or EGBC2) of the Emergency Grizzly System operates.

V. EMISSIONS

The FMBI facility is currently a synthetic minor source of regulated air pollutants for permitting purposes under A.A.C. Title 18, Chapter 2, Articles 3 and 4. The primary activity of the FMBI facility is mining and ore processing operations, which is not a "categorical source" or a "Section 302(j) category" source as defined in A.A.C. R18-2-101.23 and A.A.C. R18-2-101.129, respectively. Therefore, only non-fugitive emissions are included in the determination of the facility-wide potential to emit (PTE) of regulated air pollutants (except HAPs) for purposes of determining "major source" status under A.A.C. R18-2, Articles 3 and 4. All HAP emissions are included in the determination of the facility-wide PTE regardless of their fugitive or non-fugitive classification. The updated design of AOS1 will not affect the source status of the FMBI facility. FMBI's PTE prior to and following the updates are presented in Tables 1 and 2. Tables presents the PTE for Primary Operating Scenario (current operations) while Table 2 presents the PTE for Alternate Operating Scenario 1 (AOS1 – two concentrator operations)

Pollutant	PTE (tons per year)			Permitting Exemption Threshold (tons per year)	Minor NSR Triggered?
	Previous PTE	PTE Following Updates	Difference		
PM	117.41	117.41	0.00	N/A	N/A
PM_{10}	85.57	85.57	0.00	7.5	No
$PM_{2.5}$	65.02	65.02	0.00	5	No
NO_x	62.01	62.01	0.00	20	No
SO_2	1.38	1.38	0.00	20	No
VOCs	30.12	30.12	0.00	20	No
CO	65.85	65.85	0.00	50	No

HAPs	10.92	10.92	0.00	N/A	No

Table 1: Change in PTE for the Primary Operating Scenario

Table 2: Change in PTE for Alternate Operating Scenario 1*

Pollutant	PTE (tons per year)			Permitting Exemption Threshold (tons per year)	Minor NSR Triggered?
	Previous PTE	PTE Following the Updates	Difference		
PM	107. 83	105.26	-2.57	N/A	N/A
PM_{10}	91.06	86.29	-4.77	7.5	No
$PM_{2.5}$	82.00	75.71	-6.29	5	No
NO_x	62.01	65.40	+3.38	20	No
SO_2	1.38	1.39	+0.009	20	No
VOCs	30.12	39.77	+9.65	20	No
CO	65.85	76.20	+10.35	50	No
HAPs	10.92	14.60	+3.68	N/A	No

*Emissions from Alternate Operating Scenarios 3 and 5 are either equal to or are less than these two operating scenarios such that they are not included in the PTE totals.

VI. MINOR NEW SOURCE REVIEW (NSR)

Minor new source review is required for any physical change or change in the method of an operation of an emission unit or stationary source that increases the PTE of any regulated minor

NSR pollutant by an amount greater than or equal to the permitting exemption threshold (PET) as shown in Table 1 and Table 2**Error! Reference source not found.** above. This SPR does not increase the PTE of any regulated minor NSR pollutant above the corresponding PET as demonstrated in Table 1 and 2 above. Thus, minor NSR does not apply.

VII. VOLUNTARILY ACCEPTED EMISSION LIMITATIONS AND STANDARDS

As part of the design of AOS1 in Class II Air Quality Permit No.77414, FMBI previously accepted voluntary emission limitations for the processes controlled by new dust collectors. FMBI accepted voluntary emission limitations of 0.0026 gr/dscf to provide a buffer for compliance demonstrations during performance testing. After many years of experience with the specific dust collectors chosen for AOS1 (i.e., FARR cartridge filter dust collectors), FMBI will accept limitations of 0.0023 gr/dscf for both PM and PM_{10} for the processes controlled by new dust collectors in the updated design of AOS1. FMBI also will accept a voluntary limitation for the operation of fogging systems on the transfer points associated with existing overland conveying operations. For the processes controlled by existing Dust Collector C51, FMBI will retain the previously established voluntary emission limitation of 0.0135 gr/dscf for both PM and PM_{10}.

VIII. APPLICABLE REGULATIONS

All applicable regulatory requirements related to this permit revision are currently included in FMBI's Class II Air Quality Permit No. 77414.

A. Ore Processing Equipment

Ore Processing Equipment are subject to A.A.C. R18-2-306.01 (Voluntarily Accepted Emission Limitations and Standards), A.A.C. R18-2-702. B.3 (Opacity Standard), A.A.C. R18-2-721 (Standards of Performance for Existing Nonferrous Metals Industry Sources) and/or A.A.C. R18-2-901.46 and 40 CFR 60 Subpart LL (Standards of Performance for Metallic Mineral Processing Plants). These regulatory requirements are currently included in FMBI's Class II Air Quality Permit No.77414, so no new conditions were added to the permit for these changes.

B. Lime and Other Reagent Operations and Prill Handling Operations

Lime and Other Reagent Operations and Prill Handling Operations are subject to, A.A.C. R18-2-702. B.3 (Opacity Standard) and A.A.C. R18-2-730 (Standards of Performance for Unclassified Sources). These regulatory requirements are currently included in FMBI's Class II Air Quality Permit No.77414, so no new conditions were added to the permit for these changes.

C. Diesel Emergency Engines

Diesel Emergency Engines are subject to A.A.C. R18-2-901.84, 40 CFR 60 Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines), A.A.C. R18-2-1101. B.81 and 40 CFR 63 Subpart ZZZZ (National Emissions

Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines). These regulatory requirements are currently included in FMBI's Class II Air Quality Permit No. 77414, so no new conditions were added to the permit for these changes.

D. Propane Emergency Engines

Propane Emergency Engines are subject to A.A.C. R18-2-901.85, 40 CFR 60 Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines), and A.A.C. R18-2-1101. B.81 and 40 CFR 63 Subpart ZZZZ (National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines). These regulatory requirements are currently included in FMBI's Class II Air Quality Permit No. 77414, so no new conditions were added to the permit for these changes.

IX. PERMIT CONDITIONS

A. Changes to Current Permit

Table 3 addresses the changes made to the sections and conditions from Permit No. 77414 as updated by Significant Permit Revision (SPR) No. 99644:

Table 3: 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 II		X		Metallic Mineral Processing Operations: Conditions II.A.4.b, II.C.2.f, II.C.3.a, II.C.3.c, II.C.3.d, and II.D.1 was revised to incorporate the AOS1 SPR changes.
Att. "B" Section III		X		Unclassified Sources Subject to A.A.C. R18-2-730: Conditions III.A.1 and III.A.5.d was revised to incorporate the AOS1 SPR changes.
Att. "C"		X		Equipment List (AOS1: Two Concentrator Operations): The equipment under AOS1: Two Concentrator Operations in Attachment "C" was revised to reflect the most recent equipment included as provided in the AOS1 SPR changes.

Section No.	Determination			Comments
	Added	Revised	Deleted	
Att.” D”		X		Processes with Voluntary Emission Limitations: The entry for Dust Collector C51 (AOS1) under Section A and the entire Section F of the table in Attachment “D” was revised to reflect the changes in the SPR.

X. MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS

The voluntary limitations for the updated design of AOS1 and associated monitoring, recordkeeping, and reporting requirements necessary to demonstrate that the voluntary limitations are permanent, quantifiable, and otherwise enforceable as a practical matter are presented in Table 4, which is 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. Records are required to be kept for a minimum of 5 years as outlined in Section XII of Attachment "A" of the permit.

Table 4: Permit No. 77414 as Amended by SPR No. 99644

Emission Unit	Pollutant	Emission Limit	Monitoring, Recordkeeping, and Reporting Requirements
Primary Crushing and Overland Conveying Operations (to Bagdad Concentrator) (AOS1)			
Dust Collector C51 (AOS1)	PM, PM_{10}, $PM_{2.5}$	PM ≤ 0.0135 gr/dscf PM10 ≤ 0.0135 gr/dscf	Three Method 5 Test Runs, Perform periodic opacity monitoring and complete performance testing
Primary Crushing and Overland Conveying Operations (to the Second Concentrator) (AOS1)			
PC1 Dust Collector 1 (AOS1)	PM, PM_{10}, $PM_{2.5}$	PM ≤ 0.0023 gr/dscf PM10 ≤ 0.0023 gr/dscf	Three Method 5 Test Runs, Perform periodic opacity monitoring and complete performance testing
PC1 CCC1 Dust Collector 2 (AOS1)	PM, PM_{10}, $PM_{2.5}$	PM ≤ 0.0023 gr/dscf PM10 ≤ 0.0023 gr/dscf	Three Method 5 Test Runs, Perform periodic opacity monitoring and complete performance testing
PC1 CCC2 Dust Collector 3 (AOS1)	PM, PM_{10}, $PM_{2.5}$	PM ≤ 0.0023 gr/dscf PM10 ≤ 0.0023 gr/dscf	Three Method 5 Test Runs, Perform periodic opacity monitoring and complete performance testing

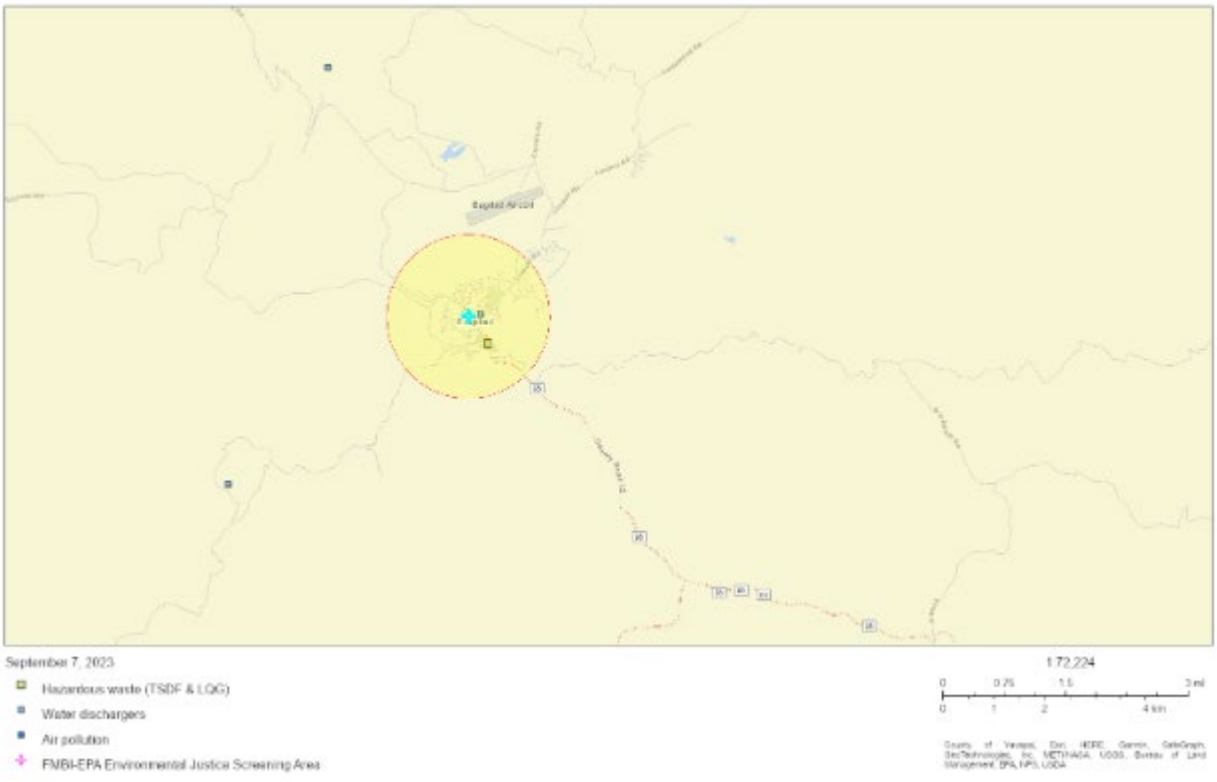
PC1 CCC3 Dust Collector 4 (AOS1)	PM, PM_{10}, $PM_{2.5}$	PM ≤ 0.0023 gr/dscf PM10 ≤ 0.0023 gr/dscf	Three Method 5 Test Runs, Perform periodic opacity monitoring and complete performance testing
Second Concentrator Milling Operations (AOS1)			
Coarse Ore Reclaim Conveyor 1 Dust Collector 5 (AOS1)	PM, PM_{10}, $PM_{2.5}$	PM ≤ 0.0023 gr/dscf PM10 ≤ 0.0023 gr/dscf	Three Method 5 Test Runs, Perform periodic opacity monitoring and complete performance testing
Coarse Ore Reclaim Conveyor 2 Dust Collector 6 (AOS1)	PM, PM_{10}, $PM_{2.5}$	PM ≤ 0.0023 gr/dscf PM10 ≤ 0.0023 gr/dscf	Three Method 5 Test Runs, Perform periodic opacity monitoring and complete performance testing
HPGR Discharge Dust Collector 7 (AOS1)	PM, PM_{10}, $PM_{2.5}$	PM ≤ 0.0023 gr/dscf PM10 ≤ 0.0023 gr/dscf	Three Method 5 Test Runs, Perform periodic opacity monitoring and complete performance testing
HPGR Discharge Conveyor Transfer Dust Collector 8 (AOS1)	PM, PM_{10}, $PM_{2.5}$	PM ≤ 0.0023 gr/dscf PM10 ≤ 0.0023 gr/dscf	Three Method 5 Test Runs, Perform periodic opacity monitoring and complete performance testing
HPGR Product Bin Dust Collector 9 (AOS1)	PM, PM_{10}, $PM_{2.5}$	PM ≤ 0.0023 gr/dscf PM10 ≤ 0.0023 gr/dscf	Three Method 5 Test Runs, Perform periodic opacity monitoring and complete performance testing
HPGR Product Transfer Dust Collector 10 (AOS1)	PM, PM_{10}, $PM_{2.5}$	PM ≤ 0.0023 gr/dscf PM10 ≤ 0.0023 gr/dscf	Three Method 5 Test Runs, Perform periodic opacity monitoring and complete performance testing

HPGR Product Transfer Dust Collector 11 (AOS1)	PM, PM_{10}, $PM_{2.5}$	PM ≤ 0.0023 gr/dscf PM10 ≤ 0.0023 gr/dscf	Three Method 5 Test Runs, Perform periodic opacity monitoring and complete performance testing

XI. ENVIRONMENTAL JUSTICE ANALYSIS

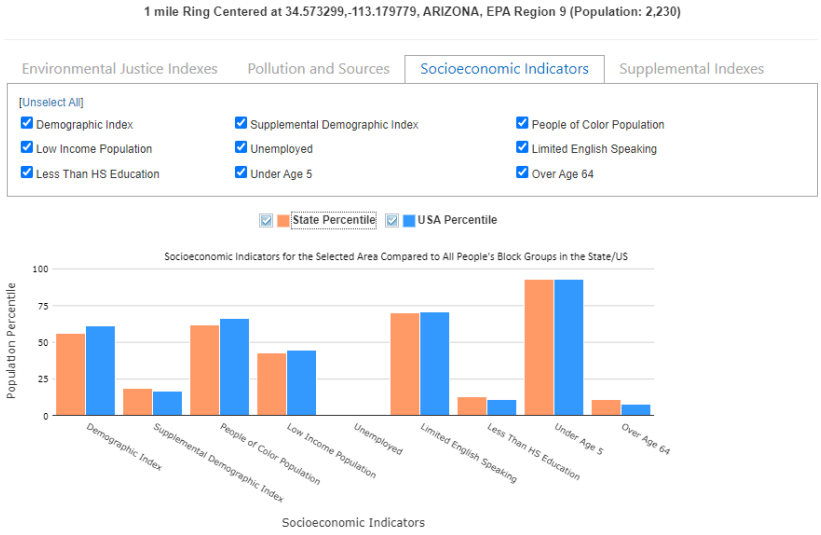
The Environmental Protection Agency (EPA) defines Environmental Justice (EJ) to include the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and polices. 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 an 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. The ADEQ mapped the location of FMBI and reviewed a five-mile radius around the facility for potential environmental justice concerns (see Figure below).



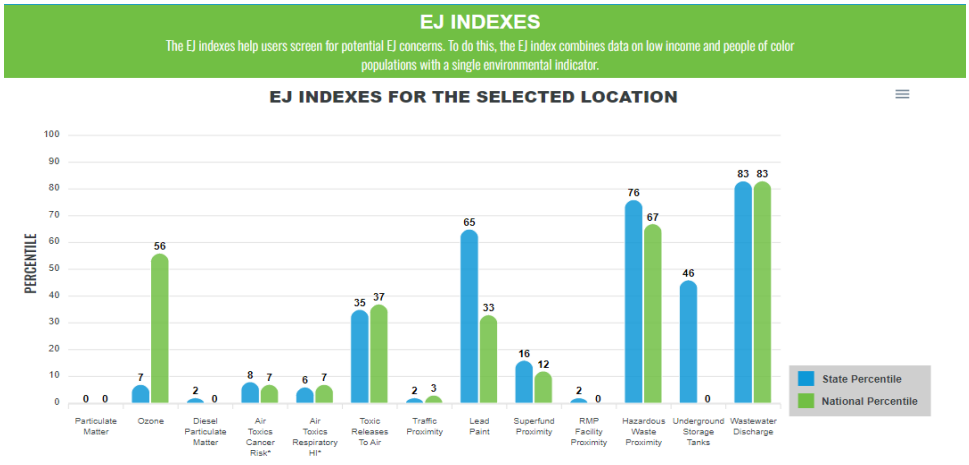
A. Demographics

The ADEQ relied on data from the EPA EJ Screen tool to assess the demographics of the communities near the location of the FMBI facility. The EJSCREEN report shows that the Demographic Indicators; Minority Population, Low Income Population, Linguistically Isolated Population, and Population over 64 years of age, are all below the 80th percentile threshold. The Demographic Indicator for Population with Less Than High School Education was in the 13th percentile compared to the USA average and Population under Age 5 was 93th percentile for Arizona and the USA.



B. Summary of Air Quality

Air quality related environmental indicators within a 1-miles radius of the facility were below the 80th percentile for both Arizona and the USA averages except Population under Age 5. ADEQ has determined that this SPR will not have an adverse impact on the community.



C. Conclusion

The ADEQ concludes that the protections afforded by Arizona Revised Statutes (A.R.S.) § 49-426, which is imposed through the permit, ensure that the public health and environment in Arizona are protected and that the public notice and comment opportunities afforded to the community on this significant permit revision application satisfy the public participation component of the 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.

XII. LEARNING SITE EVALUATION

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 SPR will not result in an increase in emissions above permitting exemption thresholds and thus, this permit application is exempt from a learning sites evaluation.

XIII. LIST OF ABBREVIATIONS

A.A.C. ..... Arizona Administrative Code
ADEQ ..... Arizona Department of Environmental Quality
AOS ..... Alternate Operating Scenario
AQD ..... Air Quality Division
A.R.S. ..... Arizona Revised Statutes
Btu/ft^3 ..... British Thermal Units per Cubic Foot
CFR ..... Code of Federal Regulations
CH_4 ..... Methane
CO ..... Carbon Monoxide
CO_2 ..... Carbon Dioxide
CO_2e ..... CO_2 equivalent basis
EPA ..... Environmental Protection Agency
EJ ..... Environmental Justice
°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
kW ..... Kilowatt

MW ..... Megawatts
MPR ..... Minor Permit Revision
NAAQS ..... National Ambient Air Quality Standard
NESHAP ..... National Emission Standards for Hazardous Air Pollutants
NO_X ..... Nitrogen Oxides
NO_2 ..... Nitrogen Dioxide
N_2O ..... 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
SPR ..... Significant Permit Revision
TPY ..... Tons per Year
VOCs ..... Volatile Organic Compounds
yr ..... Year