



**TECHNICAL REVIEW AND EVALUATION  
OF APPLICATION FOR  
AIR QUALITY SIGNIFICANT PERMIT REVISION NO. 87668  
TO OPERATING PERMIT NO. 64471**

**I. INTRODUCTION**

This Significant Permit Revision (SPR) No. 87668 to Class II Air Quality Permit No. 64471 amends the voluntarily established nitrogen oxide (NO<sub>x</sub>) emission limit for the acid plant from 10 pounds per hour to an equivalent 43.8 tons per year for operational flexibility purposes. To ensure compliance with the National Ambient Air Quality Standards (NAAQS), a higher hourly emission limit of 14 pounds per hour is included as a permit condition.

**A. Company Information**

Facility Name: Freeport-McMoRan – Safford Operations

Mailing Address: P.O. Box 1019, Safford AZ, 85548

Facility Location: 8500 North Freeport-McMoRan Road, Safford, Graham, AZ 85548 (32° 56' N/109° 42' W, 3,600 ft)

**B. Attainment Classification**

This area is attainment or unclassified for all criteria pollutants

**II. PROCESS DESCRIPTION**

**A. Process Description**

FMSI operates a copper ore mining, heap leaching, and processing facility in Safford, Arizona. The Freeport-McMoRan Safford Inc. site contains two types of stationary sources:

- The primary activity, mining operations, that is not on the list of 28 categorical sources contained in the Title V and Prevention of Significant Deterioration programs and is subject to a source-wide 250 tons per year major source threshold; and
- The sulfuric acid plant, which is on the list of 28 categorical sources and is separately subject to a 100 tons per year major source threshold.

The acid plant that produces sulphuric acid (H<sub>2</sub>SO<sub>4</sub>) from sulphur burning. The H<sub>2</sub>SO<sub>4</sub> is used in FMSI's leaching and electrowinning operations. The acid plant uses molten sulphur for the production of the sulphuric acid. Molten sulphur deliveries are by truck. The sulphur unloading process by truck does not produce emissions of regulated pollutants. Truck unloading occurs into a 500-ton nominal capacity, sulphur pit. The truck unloads sulphur by gravity directly into the pit through a short steam-traced trench. Two sulphur storage

tanks (each with 4,000 tons sulphur capacity) are steam traced. sulphur from the storage tank flows through a level-controlled control valve into a pump pit. Furnace sulphur feed pumps are installed in this pit.

Molten sulfur is combusted in a sulfur burner furnace along with dried atmospheric air. The sulfur reacts with oxygen in the presence of cesium-vanadium catalyst to produce sulfur trioxide gas. The sulfur trioxide is combined with water to form sulfuric acid. Heat released by the burning of the sulfur and the exothermic reactions is captured where possible but is ultimately removed by the cooling tower. A propane pre-heater and startup boiler are used to startup the cold acid plant up to operating temperature whenever it has been shut down for an extended period.

### III. REVISION DESCRIPTION

This SPR No. 87668 to Class II Air Quality Permit No. 64471 amends the voluntarily established NO<sub>x</sub> emission limit for the acid plant from 10 pounds per hour to an equivalent 43.8 tons per year for operational flexibility purposes. As illustrated in Table 2, the change from pounds per hour to tons per year does not affect the facility's annual potential-to-emit (PTE). To ensure compliance with the National Ambient Air Quality Standards (NAAQS), an additional emission limit of 14 pounds per hour is included as a permit requirement. Additionally, FMSI installed a Continuous Emission Monitoring System (CEMS) to monitor NO<sub>x</sub> emissions from the acid plant. The CEMS requirement replaced the annual performance testing for NO<sub>x</sub> at the acid plant.

### IV. COMPLIANCE HISTORY

ADEQ has reviewed six (6) compliance certifications and performed 1 field inspection since Permit No. 64471 has been issued. No permit deviations or excess emissions have been noted during any report review or inspection for Permit No. 64471.

FMSI has conducted four (4) performance tests for the acid plant stack for Permit No. 64471. All of these performance tests demonstrated that the stack was in compliance with FMSI's established emission limits. The results of the NO<sub>x</sub> emission rates from these test can be seen in Table 1.

**Table 1: Acid Plant NO<sub>x</sub> Performance Test Results**

Emission Unit	Pollutant	Date of Test	Results of Performance Test
Acid Plant	NO <sub>x</sub>	March 9, 2017	5.38 lbs/hr
Acid Plant	NO <sub>x</sub>	March 27, 2018	4.80 lbs/hr
Acid Plant	NO <sub>x</sub>	May 30, 2019	8.56 lbs/hr
Acid Plant	NO <sub>x</sub>	March 18, 2020	9.10 lbs/hr

### V. EMISSIONS

The PTE for NO<sub>x</sub> at the acid plant was calculated using voluntarily accepted emission limits. Only NO<sub>x</sub> emissions from the acid plant were evaluated as part of this SPR. The change in facility-wide PTE is provided in Table 2 below:

**Table 2: Potential to Emit (tpy)**

<b>Pollutant</b>	<b>Emissions Prior to SPR No. 87668</b>	<b>Change in Emissions</b>	<b>Permitting Exemption Threshold</b>	<b>Minor NSR Triggered?</b>
NO <sub>x</sub>	93.91	0.00	20	No
PM <sub>10</sub>	81.14	0.00	7.5	No
PM <sub>2.5</sub>	81.14	0.00	5	No
CO	47.93	0.00	50	No
SO <sub>2</sub>	97.17	0.00	20	No
VOC	1.07	0.00	20	No
HAPs	2.64E-04	0.00	N/A	N/A

**VI. MINOR NEW SOURCE REVIEW (NSR)**

Minor new source review as a “minor NSR modification” is required if the emissions of 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 the permitting exemption threshold (PET) in Table 2 above. No emissions triggered minor NSR review; thus, the facility is not subject to minor NSR requirements.

**VII. VOLUNTARILY ACCEPTED EMISSION LIMITATIONS AND STANDARDS**

The following describes the voluntary emission limitations and standards relevant to the SPR:

**A. Acid Plant**

The facility has accepted a voluntary emission limit of 43.8 tpy of NO<sub>x</sub> to avoid classification as a “major source” that requires a Class I permit. The limit was previously an equivalent 10 lb/hr that was voluntarily established in Significant Permit Revision No. 46747, issued in 2008, to avoid classification as a “major source.”

**VIII. MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS**

Table 3 contains an inclusive but not an exhaustive list of the monitoring, recordkeeping and reporting requirements relevant to the revision made in SPR No. 87668. The table below is intended to provide insight to the public for how the Permittee is required to demonstrate compliance with the emission limits in the permit.

**Table 3: Permit No. 87668**

<b>Emission Unit</b>	<b>Pollutant</b>	<b>Emission Limit</b>	<b>Monitoring Requirements</b>	<b>Recordkeeping Requirements</b>	<b>Reporting Requirements</b>
Acid Plant	NO <sub>x</sub>	14.0 lb/hr 43.8 TPY	Operate a NO <sub>x</sub> CEMS and a flow measurement sensor at the acid plant stack	Record the hourly emission rate in lb/hr Calculate and record the 12-month rolling total at the end of each month	

**IX. AMBIENT AIR IMPACT ANALYSIS**

With the amendment of the NO<sub>x</sub> emission limit from a lb/hr value to a TPY value, ADEQ required an additional hourly emission limit to ensure compliance with the NAAQS. FMSI performed an Aerscreen model for NO<sub>x</sub> emissions from the main stack of the acid plant. Modeling at 14 lbs/hr of NO<sub>x</sub> emitted from the acid plant demonstrated compliance with the NAAQS. The modeling results are presented in **Table 4**.

**Table 4: Aerscreen Model Results**

Maximum NO <sub>x</sub> Emission Rate (lb/hr)	Background Concentration (µg/m <sup>3</sup> )	Maximum Facility Impact (µg/m <sup>3</sup> )	Maximum Impact (µg/m <sup>3</sup> )	1 Hour NO <sub>2</sub> NAAQS (µg/m <sup>3</sup> )
14.0	61.75	120.6	182.4	188

**X. LIST OF ABBREVIATIONS**

- A.A.C. .... Arizona Administrative Code
- ADEQ ..... Arizona Department of Environmental Quality
- AERMOD ..... AMS/EPA Regulatory Model
- AQD..... Air Quality Division
- A.R.S..... Arizona Revised Statutes
- CEMS.....Continuous Emissions Monitoring System
- CFR..... Code of Federal Regulations
- CO..... Carbon Monoxide
- HAP ..... Hazardous Air Pollutant
- NAAQS..... National Ambient Air Quality Standard
- NO<sub>x</sub> ..... Nitrogen Oxides
- NO<sub>2</sub> ..... Nitrogen Dioxide
- O<sub>3</sub> ..... Ozone
- Pb ..... Lead
- PM..... Particulate Matter
- PM<sub>10</sub>..... Particulate Matter less than 10 µm nominal aerodynamic diameter
- PM<sub>2.5</sub> ..... Particulate Matter less than 2.5 µm nominal aerodynamic diameter
- PTE ..... Potential to Emit
- sec ..... Seconds
- SO<sub>2</sub>..... Sulfur Dioxide Significant Impact Levels
- TPY ..... Tons per Year
- VOC..... Volatile Organic Compound
- yr ..... Year