



**TECHNICAL REVIEW AND EVALUATION
OF APPLICATION FOR
AIR QUALITY PERMIT No. 87750**

I. INTRODUCTION

This Class II permit is issued to BHP Copper Inc., the Permittee, for the continued operation of a solvent extraction and electrowinning facility. This permit renews and supersedes Permit No. 63722.

A. Company Information

Facility Name: BHP Copper, Inc. – Miami Unit

Mailing Address: PO Box 790
Miami, AZ 85539

Facility Location: 200 E. Line Oak Street
Miami, AZ 85539

B. Attainment Classification

The facility is located in a nonattainment area for PM₁₀ and SO₂, and in an attainment area for all other criteria pollutants.

II. PROCESS DESCRIPTION

A. Process Equipment

The facility operates a solvent extraction and electrowinning (SX/EW) plant. The SX/EW plant recovers acid-soluble copper from pregnant leach solution (PLS). The solvent extraction portion of the process contains a train of mixer-settlers, some of which are extractor cells and some of which are stripper cells. In the extractor cells, the copper is removed from the PLS by mixing it with a kerosene diluent containing an organic extraction reagent. The blended organic loaded with copper is separated from the aqueous portion of the PLS by gravity with the barren aqueous portion, now referred to as raffinate, returning to the leach process or separate waste process, and the copper-laden blended organic moving to the stripper cells.

In the stripper cells, copper is stripped from the loaded organic by mixing it with barren or lean aqueous electrolyte from the electrowinning process. The high acid content of the barren electrolyte causes the stripping action. In the stripper cells, the now copper-laden, or pregnant electrolyte, is routed to the electrowinning process in the tank house while the barren organic is returned to the extractor cells for reuse.

During the electrowinning process, electrical current is passed through the pregnant electrolyte in the tank house cells. Within the cells, the pure copper is plated onto cathodes as the copper gains electrons from the current. In order to balance the electron flow,

hydrogen ions and oxygen gas are freed at the anode. The hydrogen combines with free sulfates forming more acid in the lean electrolyte. The lean electrolyte is then returned to the stripper cells as described previously.

Lastly, the facility utilizes a 10.46 MMBtu/hr natural gas-fired boiler and an emergency combustion diesel engine to support the SX/EW plant.

B. Control Devices

The facility is required to use low vapor pressure solvents, or any other effective means of controlling emissions approved by the Director in the SX plant. In addition, the facility is required to control sulfuric acid emissions by using blankets, surfactants, thermal retention balls or any other effective means of controlling emissions approved by the Director in the EW tank house.

III. LEARNING SITE EVALUATION

ADEQ has established the Learning Site Policy to ensure that children at learning sites are protected from adverse air impacts. Learning sites consist of all existing public schools, charter schools and private schools the K-12 level, and all planned sites for schools approved by the Arizona School Facilities Board.

This permit renewal does not increase emissions and thus, it is exempt from a learning site evaluation.

IV. COMPLIANCE HISTORY

Since the issuance of Permit No. 63722, the facility has had three (3) full physical inspections. In addition, six (6) annual compliance certifications have been reviewed by the Department. On July 25, 2016, a permit deviation report was submitted by the facility. No further violations have been processed since then.

V. EMISSIONS

The facility's potential to emit (PTE) was calculated using AP-42 and facility emission factors:

Table 1: PTE (tpy)

Pollutant	Emissions
PM ₁₀	0.41
PM _{2.5}	0.41
NO _x	5.82
CO	1.26
SO ₂	0.38
VOCs	27.1

Pollutant	Emissions
HAPs	4.22
H ₂ SO ₄	4.22

VI. VOLUNTARILY ACCEPTED EMISSION LIMITATION AND STANDARD

The permit contains the following voluntary emission limitation and standard:

Sulfuric Acid Mist

The facility performed an air quality impact analysis to demonstrate compliance with the Arizona Ambient Air Quality Guideline (AAAQG) for sulfuric acid mist. On August 21, 2006, the facility voluntarily accepted to not operate more than 60 electrowinning cells at any one time. In addition, it also voluntarily accepted to not operate the electrowinning plant with more than 17 amps per square foot (A/ft²).

The facility is not expected to exceed the AAAQG threshold for sulfuric acid mist.

VII. APPLICABLE REGULATIONS

Table 2 identifies applicable regulations along with verifications as to why each standard applies:

Table 2: Applicable Regulations

Unit (Year)	Control Device	Rule	Discussion
SX/EW Circuits (1976/1989)	N/A	A.A.C. R18-2-730	The SX/EW circuits identified in Attachment "C" of the permit are subject to A.A.C. R18-2-730 for Unclassified Sources.
Boiler (1991)	N/A	40 CFR 60.48c(g)(1); 40 CFR 60.48c(i)	The boiler identified in Attachment "C" of the permit is subject to 40 CFR 60 Subpart Dc for Small Industrial-Commercial-Institutional Steam Generating Units.
Emergency ICE (2014)	N/A	40 CFR 60 Subpart IIII	The emergency ICE identified in Attachment "C" of the permit is subject to 40 CFR 60 Subpart IIII for Stationary Compression Ignition Internal Combustion Engines.

Unit (Year)	Control Device	Rule	Discussion
Mobile Sources	N/A	A.A.C. R18-2-801	These standards are applicable to all mobile sources at the facility.
Fugitive Dust	Water Trucks, Dust Suppressants	A.A.C. R18-2-Article 6 A.A.C. R18-2-702	These standards are applicable to all fugitive dust sources at the facility.
Abrasive Blasting	Wet Blasting; Dust Collecting Equipment; Other Approved Methods	A.A.C. R-18-2-702 A.A.C. R-18-2-726	These standards are applicable to any abrasive blasting operations.
Spray Painting	Enclosures	A.A.C. R18-2-702 A.A.C. R-18-2-727	These standards are applicable to any spray painting operation.
Demolition/Renovation	N/A	A.A.C.R18-2-1101.A.12	This standard is applicable to any asbestos related demolitions or renovations.

VIII. PREVIOUS PERMIT REVISIONS AND CONDITIONS

A. Previous Permit Revisions

No permit revisions were made to Permit No. 63722 during the permit term.

B. Changes to Current Renewal

Table 3 addresses the changes that were made to the sections and conditions from Permit No. 63722:

Table 3: Previous Permit Conditions

Section No.	Determination			Comments
	Added	Revised	Deleted	
Att. "A"		X		General Provisions – Revised to reflect the most recent template language.
Att. "B", Section I		X		Facility-Wide Requirements – Updated recordkeeping requirements for maintenance activities. Added additional information regarding opacity requirements. Added reporting requirement for permit deviations.
Att. "B", Section II		X		Solvent Extraction/Electrowinning Process (SX/EW) – Revised section heading and added an applicability statement. Updated operating limitations as needed.

Section No.	Determination			Comments
	Added	Revised	Deleted	
Att. "B", Section III		X		Boiler – Revised section heading and added an applicability statement.
Att. "B", Section IV			X	Emergency Internal Combustion Engine (ICE) Not Subject to New Source Performance Standards - Deleted section given the emergency ICE was removed from the facility.
Att. "B", Section V		X		Emergency Internal Combustion Engine (ICE) Subject to New Source Performance Standards - Revised section heading and added an applicability statement. Embedded additional information regarding nonroad diesel fuel. Included performance testing requirements as applicable.
Att. "C"		X		Equipment List – Added new columns to the equipment list. Removed emergency ICE not subject to New Source Performance Standards.

IX. MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS

Table 4 contains an inclusive but not an exhaustive list of the monitoring, recordkeeping and reporting requirements prescribed by the air quality permit. The table below is intended to provide insight to the public for how the Permittee is required to demonstrate compliance with Permit No. 87750.

Table 4: Permit No. 87750

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
SX/EW Circuits		105 electrowinning cells; 17 amps per square foot (A/ft ²)		Maintain records on a daily basis of electrowinning cells in operation and the electric current density.	
				Maintain records of the control measures used to limit emissions from the SX/EW process.	
Boiler		Natural gas only		Record and maintain records of the amount of fuel combusted during each operating day for a period of two (2) years following the date of such record.	
Emergency ICE		Maximum sulfur content of 15 ppm; Minimum cetane index of 40 or maximum		Keep records of diesel supplier certification: name of supplier, sulfur content, method used to determine the sulfur	

		aromatic content of 35 volume percent		content and the cetane index or aromatic content.	
				<p>Keep records of the operation of the emergency ICE in emergency and non-emergency service that are recorded through the non-resettable hour meter.</p> <p>Record the time of operation of the engine and the reason the engine was in operation during that time.</p>	<p>Submit an annual report.</p> <p>Annual reports for each calendar year must be submitted no later than March 31 of the following calendar year.</p>
Mobile Sources	PM	40% Opacity		Keep a record of all emissions related maintenance activities performed on mobile sources as per manufacturer's specifications.	
Fugitive Dust	PM	40% Opacity	Conduct a monthly survey of visible emissions.	<p>Record the dates and types of dust control measures employed.</p> <p>Maintain records of the monthly survey of visible emissions.</p>	
Abrasive Blasting	PM	20% Opacity		Record the date, duration and pollution control	

				measures of any abrasive blasting project.	
Spray Painting	VOCs	20% Opacity; Control 96% of Overspray		Maintain records of the date, duration, quantity of paint used, any applicable SDS, and pollution control measures of any spray painting project.	
Demolition/ Renovation	Asbestos			Maintain records of all asbestos related demolitions or renovations including the "NESHAP Notification for Renovation and Demolition Activities" form and all supporting documents.	

X. LIST OF ABBREVIATIONS

A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
A.R.S.	Arizona Revised Statutes
CFR	Code of Federal Regulations
CO	Carbon Monoxide
EPA	Environmental Protection Agency
HAPs	Hazardous Air Pollutants
ICE	Internal Combustion Engine
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO _x	Nitrogen Oxides
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
PTE	Potential to Emit
SO ₂	Sulfur Dioxide
tpy	Tons per Year
VOCs	Volatile Organic Compounds
yr	Year