

Aquifer Protection Permit P-100514  
 Place ID # 5683, LTF # 64109  
 Significant Amendment  
 Johnson Camp Mine

The Arizona Department of Environmental Quality (ADEQ) proposes to issue an aquifer protection permit (APP) for the subject facility that covers the life of the facility, including operational, closure, and post closure periods unless suspended or revoked pursuant to Arizona Administrative Code (A.A.C.) R18-9-A213. This document gives pertinent information concerning the issuance of the permit. The requirements contained in this permit will allow the permittee to comply with the two key requirements of the Aquifer Protection Program: 1) meet Aquifer Water Quality Standards (AWQS) at the Point of Compliance (POC); and 2) demonstrate Best Available Demonstrated Control Technology (BADCT). BADCT's purpose is to employ engineering controls, processes, operating methods or other alternatives, including site-specific characteristics (i.e., the local subsurface geology), to reduce discharge of pollutants to the greatest degree achievable before they reach the aquifer or to prevent pollutants from reaching the aquifer.

## I. FACILITY INFORMATION

### Name and Location

Permittee's Name:	Excelsior Mining JCM, Inc.
Mailing Address:	2999 N. 44th Street, Suite 300 Phoenix, AZ 85018
Facility Name and Location:	Johnson Camp Mine 3048 N. Seven Dash Road Dragoon, AZ 85609

### Regulatory Status

A summary of the facility's compliance status with the APP program:

- NOD (Notice of Disposal) filed by Cyprus Mines Corporation in January 1985
- APP application submitted by Arimetco to ADEQ in May 1990
- Consent Order P130-99 issued in June 1999
- Consent Order P-4-01 issued in January 2001 to replace Consent Order P130-99
- Compliance Order #APP-114-02 issued in September 2002
- APP application submitted by NORD Resources to ADEQ in July 2003
- APP P-100514 issued to Nord Resources in October 2010

- Other Amendment Application for Permit Transfer submitted by Excelsior Mining JCM, Inc. (EMJCM) to ADEQ on December 4, 2015, and issued on April 6, 2016.
- Other Amendment Application received on November 9, 2016, which also included an updated closure strategy.
- Other Amendment Application received December 22, 2016.

### **Facility Description**

Johnson Camp Mine (JCM) is an open pit base metal mining/extraction operation located near the town of Dragoon in Cochise County, Arizona, approximately 60 miles east of Tucson. The mine property is located within Township 15 South, Range 22 East, and all or parts of Sections 22, 23, 24, 25, 26, 27, 34, 35, and 36 (Gila and Salt River Base Line and Meridian). The property consists of multiple patented, unpatented, and fee simple mining claims totaling approximately 3,092 acres, or about 4.8 square miles. The mine is located in the southern half of the property. Access to the property is via Exit 322 off of Interstate Highway 10 and approximately one mile north on Johnson Road, which becomes Seven Dash Road near the mine entrance.

The mining history of the property dates to the 1880s, with intermittent underground and later open pit mining activity. Until recently, JCM produced cathode copper through leaching and solvent extraction/electrowinning (SX/EW) methods. Mine facilities include:

- Two inactive open pits (the Burro Pit and the Copper Chief Pit)
- A waste rock stockpile currently being processed for aggregate
- Three heap leach pads
- Four process solution impoundments
- Several stormwater ponds
- A SX/EW plant
- Former crushing, agglomeration, and conveying systems
- Supporting infrastructure, including offices and warehouses, repair and maintenance facilities, tanks, ponds, piping, vehicles, and miscellaneous equipment

The JCM property was acquired by Nord Resources Corporation (Nord) in 1999. Nord expanded and upgraded the mine facilities and actively mined the Burro and Copper Chief pits in 2009 and 2010. Nord ceased mining activities in July 2010 and continued to leach the existing heap leach pads and operate the SX/EW plant until October 2015.

Current activities consist solely of site maintenance and security, and circulating process solution through the heap leach pads to maintain freeboard in the PLS and raffinate ponds, and to allow process solution to evaporate. The property was placed into receivership in November 2014. EMJCM entered into an agreement to purchase the property with the Receiver, Christopher Linscott of Keegan, Linscott & Kenon, P.C., in September 2015. The sale was approved in October 2015 and closed in December 2015.

During the Stage 1 operations of the Gunnison Copper Project (Inventory No. 511633), pregnant leach solutions (PLS) will be pumped to the impoundments located at JCM (APP No. P-100514) for processing at the SX/EW plant. Raffinate will be stored, re-acidified, and pumped back to the Gunnison Copper Project wellfield.

A list of permitted facilities is provided in Section 2.1.1 of the permit.

### **Geology**

JCM is located along the east flank of the Little Dragoon Mountains, within the Basin and Range Physiographic Province in southeastern Arizona. The JCM property is underlain by a sequence of sedimentary and meta-sedimentary rocks that include the Precambrian-age Pinal Schist, Pioneer Shale, diabase sills and Dripping Springs Quartzite, the Cambrian Bolsa Quartzite, the Abrigo Formation, the Devonian Martin Formation and the Mississippian Escabrosa Limestone. This sequence was intruded by a large stock (Texas Canyon Granite) of predominantly quartz monzonite composition during the Laramide orogeny near the Cretaceous-Tertiary boundary. Mild folding of the sediments along with extensive fracturing and contact metamorphism of some rock units resulted from intrusion of the stock. Two major sets of faults are recognized on the JCM property. Both fault sets appear to have served as channelways for mineralizing solutions and influenced localization of the manto-type ore deposits and to some extent control of the disseminated mineralization. Displacements on both fault sets are generally less than 100 feet.

Mineral production in the JCM area prior to 1960 came from underground mining of high-grade manto-type replacement deposits hosted by the middle Abrigo Formation. Manto deposits were mined to a depth of 700 feet below surface in the Moore mine and to 1,000 feet below surface in the Republic mine. The workings in both mines are now flooded below an elevation of 4,700 feet amsl. Since 1974, copper deposits mined by open pit in the Burro and Copper Chief pits account for over 160 million tons of copper from disseminated mineralization in the lower Abrigo Formation and in the underlying Bolsa Quartzite and diabase sills. Sulfide minerals dominate below the water table while oxidized copper minerals predominate from surface down to the water table at approximately 4,600 feet amsl. All production to date in the Burro pit has been from the zone of oxide mineralization. EMJCM has no plans to resume mining at JCM for the foreseeable future.

### **Hydrogeology**

Groundwater beneath the JCM property occurs in fractures and permeable layers within Precambrian through Tertiary-age intrusive (basement complex) and consolidated sedimentary rocks (carbonate formations). A thin veneer of alluvium is present locally in the mine area, but is generally unsaturated and discontinuous.

The depth to groundwater ranges from approximately 50 feet to almost 600 feet below ground surface (bgs) in the mine area. The shallowest water levels occur along the southwest fringes of the mine site near the Saddle monitor well and the Smith private stock well. The deepest groundwater levels occur along the eastern edge of the mine site near the Cochise and Twin wells. The Southern well located on the southeastern mine site is currently dry. The groundwater elevations declined approximately 5 to 60 feet over a 5 year period in the active mine area which caused numerous wells to go dry. The greatest water level decline of approximately 61 feet occurred at the Cross monitor well located on the northern edge of the mine area just north of the Burro Pit. The groundwater elevations (using data from 2003 and 2008) range from 5,000 feet amsl in the western (upgradient) part of the mine to 4,300 amsl in the eastern (downgradient) part of the mine. The water level in the Burro Pit rose approximately 33 feet over a 5 year period. The increase in water level in the pit is attributed to the channelization of storm water into the pit during the period of mining inactivity.

The overall direction of groundwater flow in the regional vicinity of the mine is to the east/northeast. The groundwater gradient decreases east of the active mine site as the basin fill sediments are encountered.

The area to the east of the mine is underlain by Tertiary to Quaternary age unconsolidated to semi-consolidated alluvium that thickens significantly in an easterly direction. These deposits are hundreds of feet thick and are the primary host for groundwater outside of the mine site property. The water supply for JCM is provided from a well referred to as the Section 19 well, located approximately 2 miles northeast of the SX/EW plant. The well is screened within the semi-consolidated alluvium from 706 to 956 feet bgs and reportedly produces 100 to 150 gallons per minute (gpm). Analytical results for a groundwater sample collected from the Section 19 well in 2003 showed no exceedances of drinking water standards.

The groundwater quality varies across the site. Analytical results for groundwater samples collected in 1997, 1998 and 2003-2007 from monitor wells located along the south side of Leach Pad #1, Solution Pond #1 (formerly PLS Pond #1), and the Burro Pit, show high concentrations of fluoride and sulfate. Concentrations of cadmium, beryllium, fluoride and nickel in exceedance of their respective AWQS were also reported in several of these wells. All of the wells in this area are completed in either in the Bolsa Quartzite or in the granitic rocks. Groundwater samples collected from monitor wells along the east and north side of the Burro Pit/waste rock pile show generally good water quality with some AWQS exceedances. These wells are all completed in carbonate units in the upper Abrigo, Martin and Escabrosa formations.

Additional groundwater sampling is required in accordance with the Compliance Schedule (Section 3.0) of this permit.

### **Amendment Description**

ADEQ has reviewed and approved the following changes under this amendment:

1. Amend the permit to allow for the introduction of solutions from the Gunnison Copper Project for storage and processing at the SX/EW plant.
2. Rename three ponds.
3. Review design modification of Solution Pond #1 and Solution Pond #3 (formerly PLS Pond #1 and PLS Pond #3 respectively).
4. Update facility descriptions in Section 2.1.1, and BADCT descriptions in Section 4.1, Table 1.
5. Establish alert levels for the following double-lined ponds: Solution Pond #1, Solution Pond #3, Raffinate Pond #1, and ILS Pond (formerly Raffinate Pond #2).
6. Add discharge monitoring requirement for the PLS pumped from the Gunnison Copper Project at the Solution Pond #3, and for the raffinate from the SX/EW plant at the Raffinate Pond #1.

## **II. BEST AVAILABLE DEMONSTRATED CONTROL TECHNOLOGY**

The BADCT description for each JCM facility is listed in Section 4.1, Table 1 of the APP. The BADCT for the facilities shall be designed and maintained to contain discharges. In addition, POC wells shall be utilized to detect any discharges from the facilities.

## **III. COMPLIANCE WITH AQUIFER WATER QUALITY STANDARDS**

The permittee is required to show that pollutants discharged will not cause or contribute to a violation of aquifer water quality standards, or further degrade the aquifer at the designated POC(s). The location of the points of compliance (POCs) which show compliance with AWQS is determined by an analysis of the pollutant management area (PMA), the discharge impact area (DIA), and locations and uses of groundwater wells in the area.

The PMA is described in A.R.S. §49-244 as the limit projected in the horizontal plane of the area on which pollutants are or will be placed. The PMA includes horizontal space taken up by any liner, dike or other barrier designed to contain pollutants in the facility. If the facility contains more than one discharging activity, the PMA is described by an imaginary line circumscribing the several discharging activities. The PMA at the site will be defined by a line circumscribing the all discharging facilities at the mine site.

The DIA is defined by A.R.S. §49-201.13. The DIA means the potential area extent of pollutant migration, as projected on the land surface, as the result of a discharge from a facility. The DIA was estimated using the approximate 250 mg/L sulfate contour concentration. The estimated DIA extends approximately 1,500 feet to the

south and 800 feet to east, respectively. The DIA may be re-evaluated once the ambient groundwater monitoring is completed at the site.

**Point of Compliance**

The hazardous POCs are located as follows:

Well #	Descriptive Location	ADWR #	Latitude	Longitude
CW-1	East of the Waste Rock Stockpile	TBD <sup>1</sup>	32° 05' 44" N	110° 03' 41" W
CW-2	East of the Waste Rock Stockpile	TBD	32° 06' 02" N	110° 03' 39" W
CW-5	East of Secondary Containment Pond #1	TBD	33° 05' 34" N	110° 03' 40" W
CW-6	East of the Waste Rock Stockpile	TBD	32° 06' 19" N	110° 03' 50" W
Durham	South of Heap Leach Pad #1	55-595927	32° 05' 37" N	110° 04' 08" W
Hill	South of Heap Leach Pad #2	55-563955	32° 05' 44" N	110° 04' 18" W
Saddle	South of Heap Leach Pad #2	55-561563	32° 05' 51" N	110° 04' 35" W

1. TBD= Wells to be installed per the Compliance Schedule (Section 3.0). The coordinates given are estimated locations given in degrees, minutes and seconds.

The Director may designate additional POCs if information on groundwater gradients or groundwater usage indicates the need.

**Monitoring Requirements**

Groundwater monitoring is required by the permit.

**IV. STORM WATER AND SURFACE WATER CONSIDERATIONS**

There are no perennial or intermittent surface water bodies located within a 5 mile radius of JCM. The area is drained by several ephemeral tributaries of Walnut Wash which flows to the east into the Sulphur Springs Valley. The Walnut Wash eventually drains into the Wilcox Playa, approximately 15 miles from the mine site. Surface water run-on in the mine area is entirely from direct precipitation. The mine plan includes control of surface water run-on by constructing small impoundments and diversion structures both upstream of the operations and within the mine areas. The mine area is not included within a Federal Emergency Management Administration (FEMA) regulatory floodplain.

**V. COMPLIANCE SCHEDULE**

The Compliance Schedule is provided in Section 3.0 of the permit.

## **VI. OTHER REQUIREMENTS FOR ISSUING THIS PERMIT**

### **Technical Capability**

EMJCM has demonstrated the technical competence necessary to carry out the terms and conditions of the permit in accordance with A.R.S. § 49-243(N) and A.A.C. R18-9-A202(B).

ADEQ requires that appropriate documents be sealed by an Arizona-Registered Geologist or Professional Engineer. This requirement is a part of an ongoing demonstration of technical capability. The permittee is expected to maintain technical capability throughout the life of the facility.

### **Financial Capability**

The permittee has demonstrated financial capability under A.R.S. § 49-243(N) and A.A.C. R18-9-A203. The permittee shall maintain financial capability throughout the life of the facility. The estimated closure and post-closure cost is \$432,476. The financial assurance mechanism was demonstrated through a performance surety bond per A.A.C. R18-9-A203(C)(2).

### **Zoning Requirements**

Mining activity of greater than five contiguous acres is exempt from zoning requirements pursuant to A.R.S. § 11-830.

## **VII. ADMINISTRATIVE INFORMATION**

### **Public Notice (A.A.C. R18-9-108(A))**

The public notice is the vehicle for informing all interested parties and members of the general public of the contents of a draft permit or other significant action with respect to a permit or application. The aquifer protection program rules require that permits be public noticed in a newspaper of general circulation within the area affected by the facility or activity and provide a minimum of 30 calendar days for interested parties to respond in writing to ADEQ. The basic intent of this requirement is to ensure that all interested parties have an opportunity to comment on significant actions of the permitting agency with respect to a permit application or permit.

### **Public Comment Period (A.A.C. R18-9-109(A))**

The Department shall accept written comments from the public prior to granting the significant amendment. The written public comment period begins on the publication date of the public notice and extends for 30 calendar days. After the closing of the public comment period, ADEQ is required to respond to all significant comments at the time a final permit decision is reached or at the same time a final permit is actually issued.

### **Public Hearing (A.A.C R18-9-109(B))**

A public hearing may be requested in writing by any interested party. The request should state the nature of the issues proposed to be raised during the hearing. A public hearing will be held if the Director determines there is a significant amount of

interest expressed during the 30-day public comment period, or if significant new issues arise that were not considered during the permitting process.

#### **VIII. ADDITIONAL INFORMATION**

Additional information relating to this proposed permit may be obtained from:

Arizona Department of Environmental Quality  
Water Quality Division – Water Permits Section  
Attn: Vimal Chauhan  
1110 West Washington Street, Mail Code 5415B-3  
Phoenix, Arizona 85007  
Phone: (602) 771-4362

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