

**Copper Queen Branch  
Aquifer Protection Permit No. P-103568  
Place ID 5060, LTF No. 68325**

**I. Introduction:**

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. 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.

**II. Permittee & Facility Location:**

Freeport Minerals Corporation  
Copper Queen Branch  
36 West Highway 92  
Bisbee, AZ 85603

**III. Facility Description:**

The Warren Mining District (WMD), owned by Freeport Minerals Corporation, Copper Queen Branch (CQB), is an historical copper mining district located in the southern part of the Mule Mountains in Cochise County, approximately 90 miles southeast of Tucson, Arizona. The mine includes former underground and open pit mining operations in the vicinity of the City of Bisbee, which includes the original town of Bisbee in the upper part of Mule Gulch and the towns of Lowell, Saginaw, Galena, Bakerville, Briggs, and Warren.

Underground mining began in 1880 at the Copper Queen Mine. Copper ore was processed in a small furnace from 1880 to 1887, at the Copper Queen smelter in Bisbee from 1887 to 1904, and at the Douglas Smelter from 1904 to 1987. Lavender Pit was opened in 1951 and open pit mining of the Lavender Pit ended in 1974. Underground mining ended in 1975, with the last ore extracted from the Campbell Shaft.

Leaching operations began in the mid-1950s with the construction of the Precipitation Plant and continued after underground mining ended in 1975. Active leaching ended before 1986 at several stockpiles but continued until after 1986 at the No. 7, Jones Canyon and Winwood Canyon stockpiles. The Precipitation Plant is inactive and the permitted discharging facilities are now used solely to manage stormwater and draindown from the stockpiles.

**IV. Regulatory Status**

On January 18, 1985, Phelps Dodge Corporation submitted a Notice of Disposal (NOD) to the Arizona Department of Health Services (ADHS) for the CQB, including the WMD. Pursuant to

A.A.C. R18-9-105(A)(2), all of the WMD facilities have been considered to be in compliance with the APP program pending issuance of an individual APP for the WMD.

CQB submitted an area-wide APP application for the WMD to ADEQ in January 2006 (Water Management Consultants, Inc. 2006). At the request of ADEQ, and after substantial review by ADEQ and initiation of a number of studies by CQB for the WMD, including an extensive hydrogeologic field investigation, the development of a numerical groundwater flow model, and several engineering evaluations, CQB formally withdrew the 2006 area-wide application in 2014 and then submitted an application for this Individual APP on December 21, 2017.

#### **V. Best Available Demonstrated Control Technology (BADCT):**

Three formerly leached stockpiles include the Jones Canyon, Winwood Canyon, and No. 7 Stockpiles. These stockpiles were constructed using an end dump method. East Dam and North Dam, formed by concrete headwalls, are used to collect draindown from the No. 7 Stockpile. The East Dam impoundment will be retrofitted with 80-mil double geomembrane liner separated by a geonet, with a leak collection and recovery system (LCRS). Draindown from the Jones and Winwood Canyon Stockpiles is managed by the Jones Canyon Earth Dam Upper Catchment (formed by a 10 foot high earth embankment) and the Winwood Canyon Stockpile Collection System (formed by a concrete wall), respectively.

The Stormwater Containment Pond No. 1 is lined with an 80-mil HDPE liner over 10-ounce geotextile placed on a subgrade layer. Stormwater Ponds 2A and 2B are constructed with a liner system that includes an upper 80-mil HDPE liner and a lower 6-inch thick compacted clay liner on prepared subgrade separated by a leak detection layer (LDL). These impoundments manage flows from upset conditions and stormwater from high intensity storms.

The Precipitation Plant is a concrete structure that is currently used to manage flows from a number of facilities located at the mine site. The Campbell Yard Sump, a non-stormwater impoundment, is constructed with a single HDPE liner over prepared subgrade, and receives overflow from the Precipitation Plant and stormwater flows from the Campbell Yard and access ramp to the No. 7 Stockpile.

#### **VI. Compliance with Aquifer Water Quality Standards (AWQS):**

The regional groundwater flow in the Warren District is generally to the east-southeast, with the exception of the area to the east of the Jones and Winwood canyon area, where groundwater flows to the south towards the center of the property. Localized variations in groundwater flow direction occur due to fracture and fault systems, in addition to historical dewatering that is still recovering from its cessation in 1984. The dewatered zone serves as a hydraulic dewatered zone and redirects local groundwater in a semi-radial pattern towards the center of the zone. Additionally, surface water is actively routed in a radial pattern towards the Lavender Pit, as well as to the No. 7 Stockpile. The depth to groundwater ranges from approximately 70 to 780 feet below ground surface, and is influenced by the local hydrogeological and structural features.

CQB submitted a comprehensive hydrogeologic study as part of the WMD APP Application. The study included a hydrogeologic field investigation and a groundwater model. In addition to planned BADCT upgrades for several of the WMD facilities, the hydrogeologic study, including

the supporting hydrologic field investigation and groundwater modeling reports, supported the demonstration that the WMD facilities will not cause or contribute to a violation of AWQS (or will not further degrade the aquifer for constituents already exceeding AWQS) at the identified POC well locations.