

**Freeport-McMoRan Bagdad Mine**  
Aquifer Protection Permit No. 105258  
Place ID No. 1390, LTF No. 86902  
**SIGNIFICANT AMENDMENT**

## **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. Facility Location:**

The Bagdad Mine is located near Bagdad, Arizona, Yavapai County.

## **III. Facility Description:**

Mining of copper from the Bagdad porphyry copper deposit began in 1928. The deposit is currently mined using open pit methods, with truck and conveyor haulage. The operations produce a combined total of 200,000 tons per day of sulfide ore, leach rock, and waste rock. Sulfide ores are processed in the flotation concentrator, and sent to off-site smelters. Oxide ore is processed through the leach dump and solution extraction/electrowinning (SX/EW) method. The mine includes an open pit, a concentrator, ore and concentrate stockpiles, an SX/EW plant, active and inactive leach dumps, waste rock dumps, active and inactive tailings impoundments, pregnant leach solution impoundments, raffinate impoundments, and stormwater diversion ditches and detention basins.

## **IV. Amendment Description:**

The purpose of this amendment is to make the following changes (more info can be found in the BADCT section below):

1. Extend a portion of the Butte Stockpile and to change the Butte Stockpile BADCT. The extension will add additional storage capacity to the stockpile and will provide a platform for future construction of an overland conveyance corridor and will also cover two upgradient stormwater control features (UG-1 and UG-2) that are part of the existing Butte Stockpile BADCT.
  - a. UG-1 and UG-2 will be covered by the extension of the stockpile, and construction of an adjoining equipment laydown yard. Stormwater from undeveloped and developed surrounding areas around the Northeast Extension will be conveyed and discharged to the proposed Sub-basin 35 and 36 ponding locations to contain their corresponding runoff volumes.

The required ponded water extents for both sub-basins are maintained within the property limits.

2. Remove three non-point of compliance (non-POC) monitor wells from the permit.
  - a. This change is being made because both WMF-481 and WMF-482 have a long history of being dry. Bagdad Waste Management Facility (WMF) is scheduled to be closed by burial under the Butte Stockpile as early as 2023, and by that time these wells (including WMF-483) will need to be abandoned in accordance with Arizona Department of Water Resources requirements.
3. Allow no-purge sampling techniques as an alternative to the traditional purge and sample techniques currently required by the permit.
4. Redefine the function of Last Chance Pond in the permit to clarify the function of the facility and how discharges of storm water and non-stormwater from the mill and concentrator area managed. Last Chance Pond will be defined as a collection point in the overall mine water and solution management system.
5. Change the name of Mulholland Tailings Pond to Mulholland Tailings Impoundment.

**Rationale for Amendment Category:**

The request relating to removal of monitoring on the non-POC wells WMF-481, WMF-482 and WMF-483 from the permit is considered a reduction in monitoring (less stringent monitoring). This change qualifies for a “Significant Amendment” as per the following rule:

*R18-9-A211(B)(4): The permittee requests and the Department agrees to less stringent monitoring that reduces the frequency in monitoring or reporting or reduces the number of pollutants monitored, and the permittee demonstrates that the changes will not affect the permittee's ability to remain in compliance with Articles 1 and 2 of this Chapter.*

**V. Regulatory Status**

No violations were found in the most recent inspection that was conducted on March 13, 2019.

**VI. Best Available Demonstrated Control Technology (BADCT):**

The following subsections describe the changes made to this permit under this amendment.

**Butte Stockpile Extension**

The Butte Stockpile extension will add additional storage capacity to the stockpile and will provide a platform that will support future construction of an overland conveyor and pipeline corridor for transporting tailings slurry to the Sycamore Tailings Storage Facility (TSF). The extension would add approximately 35 acres to the Butte Stockpile, increasing the total permitted area by approximately 3 percent to 1,337 acres with a maximum permitted capacity of 785,600,000 cubic yards. Constructing the stockpile extension and laydown yard will cover two existing elements of the Butte Stockpile BADCT: upgradient stormwater retention impoundments UG-1 and UG-2. The original primary function of UG-1 and UG-2 was discharge control by preventing stormwater from pooling against the stockpile and inundating the waste rock. However, because the stockpile is entirely located within the Bagdad Mine Passive Containment Capture Zone (PCCZ) and within a surface drainage that also leads to the pit, any discharges from the stockpile resulting from infiltrating stormwater runoff will report to the pit. Therefore, the upgradient stormwater structures

are not required if it can be demonstrated that the infiltration of stormwater will not destabilize the stockpile.

The application also contained an adequate demonstration of slope stability and stormwater controls.

### **Modified Facility Description**

The facility descriptions for Last Chance Pond was modified to provide operational flexibility and clarification regarding sources of available solutions used in the mine reclaim water system.

“Facility is located within the passive containment capture zone of the open pit. The facility is a concrete-lined impoundment, located within the Mulholland Tailings Impoundment, which is located over predominantly Precambrian crystalline rocks which provide a low-permeability base to the tailings pond. The pond receives and contains excess discharge from the mill, washdown from the concentrate loadout pad, and stormwater runoff from these facilities. The pond solution is strongly alkaline (pH 11.1 SU), with trace metal concentrations and elevated sulfate. Stored solutions are allowed to evaporate or return to the mine water reclaim system via pumped or overflow discharge to the Mulholland Tailings reclaim pond.”

### **Groundwater Monitoring and Sampling Protocols**

The following paragraph was added to the end of the section on sampling protocols:

“As a third alternative method for sampling within POC wells with very low recharge rates, the permittee may conduct the sampling using no-purge sampling techniques using HydraSleeve™ or similar type methodology. The use of HydraSleeve™ or similar type samplers shall follow accepted EPA, USGS, and DOD protocols. In addition, the HydraSleeve™ or similar type sampler shall be placed just below the water table.”

### **Monitoring of Non-POC Wells**

Table 2.5.7 that lists the non-POC wells was modified to remove wells WMF-481, WMF-482, and WMF-483, their location coordinates, and ADWR Numbers.

### **Semi-Annual Groundwater Monitoring and Reporting for Non-POC Wells (WMF-481, WMF-482)**

The semi-annual groundwater monitoring and reporting (table 4.2.5) for non-POC wells (WMF-481, WMF-482, and WMF-483) was removed from the permit.

### **Required Inspections and Operational Monitoring**

References to UG-1 and UG-2 (stormwater control features) were removed. These two features will be covered by the expansion.

### **Name Changes**

Name of the Mulholland Tailings Pond was changed to Mulholland Tailings Impoundment throughout the permit.

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

Last Chance Pond, the WMF, and the Butte Stockpile, including the extension area, and the resulting change in the PMA, will lie entirely within the boundaries of the PCCZ. Therefore, any discharges from Last Chance Pond, the WMF, and the Butte Stockpile extension area to the underlying aquifer will eventually report to the Bagdad Pit and directly away from any relevant PMA boundary. In addition to the influence of the PCCZ, the physical characteristics of each site limits infiltration and migration to underlying bedrock aquifers. In addition, a POC is already located downgradient of Last Chance Pond. As a result, no additional POCs are proposed as a part of this amendment application.

As a result, no additional Point of Compliance (POC) monitoring is required. Compliance with AWQS will continue to be monitored at the existing POCs.