ADEQ Arizona Department of Environmental Quality

DRAFT FACT SHEET

Aquifer Protection Permit 103998
PLACE ID 14513, LTF 47916
Silver King 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 at the Point of Compliance (POC); and 2) demonstrate Best Available Demonstrated Control Technology (BADCT). The purpose of BADCT 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

Name of Permittee:	Silver King Mining Company, LLC
Mailing Address:	56389 E. Simmons Way Kearny, AZ 85237
Facility Name and Location:	Silver King Mine Silver King Mine Road (Forest Service Road FS229) Superior, Arizona Pinal County

Regulatory Status

This Aquifer Protection Permit (APP) application was received on June 25, 2008 to reactivate the Silver King Mine (SKM) owned and operated by the Silver King Mining Company LLC (SKMC). In response to the Comprehensive Request for information letter dated April 10, 2009, a revised APP application was received on September 3, 2014. In the late 1990s, SKM was operated by the applicant and tailings were generated for a period of time. Cessation of operations by the applicant in the late 1990s is unclear, but appears to have happened in late 1999. The SKMC entered into a Consent Order (P-41-01) with ADEQ in March 2001. The order was renewed on September 28, 2011.

SKM is located on Silver King Road (Forest Service Road FS 229), Superior, Pinal County, Arizona, in Township 1 South, Range 12 East in the northwest ¼ of the southeast ¼ of the south ½ of Section 24.

Facility Description

The Silver King Mining Company LLC. (SKMC), is authorized to operate the Silver King Mine (SKM), located within the 20-acre unpatented El Medico mining claim, on an approximately five-acre parcel, three miles north of the Town of Superior, Arizona. The land occupied by the SKM is owned and managed by United States Forest Service (USFS).

The SKM is an underground mining operation discovered in 1875 and operated between 1875 through 1891, and intermittent operations through the 1920's. The SKM's underground operations extend to a total depth of 750 feet below ground surface (ft bgs) with seven main levels. In the 1980's there was a short period of time when a cyanide leaching operation occurred using existing low-grade waste dump materials. After the cyanide leaching operation occurred, the property was inactive from the 1980's through 1997, when SKM was purchased by the applicant, SKMC. In the late 1990s, SKM was operated by the SKMC and tailings were generated for a period of time. The tailings were placed in the tailings impoundment and the secondary pond was used to contain stormwater and overflow water from the tailings impoundment. Cessation of operations by the applicant in the late 1990s.

SKM is reactivating the underground mine to recover silver ore from a standard square set drift development with open stoping mining operation. SKM will mill the ore on-site using grinding and crushing with a jaw crusher, double-deck screen, cone crusher and ball mill. From the ball mill, the crushed and ground ore will go to the flotation facilities using a conditioning tank, flotation cells, a thickener, filter plant, dryer holding tank and concentrating table. The tailings slurry will then be placed within the tailings impoundment.

SMK has five existing discharging facilities and two future discharging facilities. The two existing ore stockpiles, tailings impoundment, secondary pond and tertiary pond are the current discharging facilities. Of the five current discharging facilities, the tertiary pond is covered under SKM's Multi-Sector General Permit (MSGP) and is therefore covered under Arizona Revised Statutes (A.R.S.) § 49-245.01 Storm Water General Permit. The future discharging facilities are the new Ore Stockpile and the SKM shaft and related underground workings since tailings mixed with cement will be placed back into the mine.

Facility No.	Facility Name	Latitude (North)	Longitude (West)
1	Tailings Impoundment	33° 19' 47.0"	111° 05' 18.0"
2	Secondary Pond	33° 19' 47.2"	111° 05' 19.8"
3	Mine Shaft	33° 19' 48.1"	111° 05' 14.3"
4	Existing Ore Stockpile 1	33° 19' 48.2"	111° 05' 16.9"
5	Existing Ore Stockpile 2	33° 19' 49.0"	111° 05' 15.7"
6	(Future) New Ore Stockpile	33° 19' 47.7"	111° 05' 16.6"

Tailings Impoundment

The 0.63 acre tailings impoundment was developed in the late 1870's for tailings deposition. The tailings impoundment will be separated into two areas; the lower portion and the upper portion. The tailings will be discharged to lower area of the tailings impoundment and every six to 12 months the tailings in the lower area will be moved to the upper area for drying. Once the tailings are dry they will be mixed with cement for use as underground fill material through the mine workings.

Secondary Pond

The Secondary Pond was constructed in the early 1980's. The pond has a capacity of approximately 112,000 gallons and is approximated 0.1 acres (100 feet by 45 feet) with a maximum depth of 5 feet. The pond was used for stormwater containment and overflow water from the tailings. The pond was constructed with a synthetic geomembrane liner that is anchored on one side with concrete. The secondary pond shall not be used for operation and shall be closed in accordance with Sections 2.9.1.1 and 3.0, item no. 3.7.

Mine Shaft

The underground mine was developed in 1875 and will continue to be mined. In addition dried tailings from the upper portion of the tailings impoundment will be mixed with cement for use as underground fill material throughout the mine workings.

Existing Ore Stockpiles

The two existing ore stockpiles (Stockpile 1and Stockpile 2) were developed prior to 1986. The stockpiles contain approximately 8,000 tons of ore and will be excavated for processing through the mill circuit. The stockpiles shall be protected from stormwater run-on and any stormwater run-off from the stockpiles shall be diverted to the Tailings Impoundment.

(Future) New Ore Stockpile

The excess ore from the underground mining operation that exceeds the mill capacity will be temporarily stored in the new ore stockpile. The ore stockpile shall be protected from stormwater run-on and any stormwater run-off from the stockpile shall be diverted to the Tailings Impoundment. The ore stockpile shall be constructed per ADEQ approved plans per the Compliance Schedule, Section 3.0, item no. 3.9.

II. BEST AVAILABLE DEMONSTRATED CONTROL TECHNOLOGY

All quality assurance and control procedures applicable to construction of the containment structure as approved by the ADEQ.

Engineering design for SKM Tailings Storage Impoundment BADCT
The SKM tailings impoundment shall be constructed in accordance with ADEQ approved plans. The tailings impoundment was designed and signed (sealed) by Paul Axelrod, P.E. (Professional Engineer), Axelrod Inc. dated April 14, 2016.

Sub-grade Preparation
The native soil sub-grade shall be a minimum of 6 inches, compacted to a minimum of 95 percent standard Proctor dry density (ASTM Method D698). The sub-grade shall be free of debris or angular material that could damage the clay liner.

Clay Liner Design
The clay liner shall be constructed of six inches of compacted clay with a permeability of less than 1×10^{-6} cm/sec installed over 6-inch engineered native soil sub-grade. The clay liner's permeability shall be tested in a laboratory. The QA/QC during construction shall be consistent with the specific limits determined from the laboratory test results.

Liner protection
To protect the clay liner one foot of fine grained material covered with a 6mm anchored visqueen black polyethylene sheeting.

Stormwater Containment and Diversion
The calculated holding capacity of the tailings impoundment includes containment of the 100-year, 24-hour storm event. Run-on from the 100-year, 24-hour storm event shall be diverted around the tailings impoundment.

III. COMPLIANCE WITH AQUIFER WATER QUALITY STANDARDS

<u>Monitoring and Reporting Requirements</u>

Ambient Groundwater
Eight rounds of groundwater quality samples will be obtained from the POC well over a two-year period to establish ambient groundwater conditions, and Alert Levels (ALs) and Aquifer Quality Limits (AQLs) for the SKM APP. The ambient groundwater quality samples shall be analyzed for the parameters contained in Section 4.2, Table 4.2.2 of the permit.

Point of Compliance (POC) [A.R.S. § 49-244]
SKM proposes installing a POC well near the location of the "Windmill" well. SKM will submit a work plan within three months of permit issuance per the Compliance Schedule. The screen interval must cross the water table. The POC well would then be installed within six months after ADEQ's POC well work plan approval per the Compliance Schedule. The location is as follows:

Well ID/Description	POC Locations	Latitude	Longitude
POC Well	Located Approximately 750 feet southwest of the edge of the PMA	33° 19.740' North	111° 05.464' West

Groundwater monitoring is required at the POC well. SKM will submit a work plan within three months of permit issuance per the Compliance Schedule. The screen interval must cross the water table. The POC well would then be installed within six months after ADEQ's POC well work plan approval per the Compliance Schedule, Section 3.0, items 3.2, 3.3, and 3.4 of the permit.

The Director may amend this permit to require installation of wells and initiation of groundwater monitoring at the POCs or to designate additional points of compliance if information on groundwater gradients or groundwater usage indicates the need.

Discharge Monitoring

Discharge Monitoring is not required.

IV. HYDROGEOLOGIC SETTING

Hydrogeologic information was summarized from three documents: 1) *Results of Baseline Sampling Program;* Aquifer Protection Permit Application; Silver King Mine near Superior, Arizona (G. Bender; AGRA Earth & Environmental, Inc., dated January 14, 2000; 2) *Silver King Mine, Site Development & Operations Environmental Assessment* (United States Department of Agriculture; Forest Service; Tonto National Forest; Globe Ranger District, Pinal County, Arizona, dated May 2003; and 3) *Results of Queen Creek Corridor Survey; Superior Basin; Pinal County, Arizona*, Montgomery & Associates, dated February 19, 2013. SKM is located in the Basin and Range Physiographic Province and near the Transition Zone. Local geology near the SKM includes sedimentary, igneous (both intrusive and extrusive), and metamorphic rocks of Precambrian through Quaternary in age. Quartz diorite, diorite porphyry and diabase intruded into the Dripping Spring Quartzite and Mescal Limestone (both of which are in the Precambrian Apache Group). The area near the SKM has been extensively faulted. The nearest recognized fault to the SKM is the Conley Spring Fault, located approximately one mile south of the SKM.

Shallow groundwater in the SKM area is derived from surface water percolating into the alluvium of Silver King Wash. Water level measured in the "Windmill" well in November 1999, located approximately 1,200 feet west-southwest of the SKM shaft, was approximately 17.6 ft bgs, representative of the alluvial aquifer.

The groundwater flow direction is parallel to Silver King Wash, approximately southwest, within the alluvial aquifer.

POLLUTANT MANAGEMENT AREA (PMA)/DISCHARGE IMPACT AREA (DIA)

The PMA for the SKM is a line circumscribing the discharging facilities including the stormwater general permitted Tertiary Pond. The DIA for SKM has been calculated as going a maximum distance of 1,861 feet downgradient of the PMA, primarily within the alluvial aquifer in Silver King Wash.

V. SURFACE WATER CONSIDERATIONS

Stormwater/surface water considerations included whether SKM is located within the 100-year flood plain and whether the discharge had the potential to impact surface water drainages located down-stream of SKM.

Flood plain maps are not available for the SKM area. SKM is located on a high spot between Silver King Wash, Yellowjack Wash, and Comstock Wash and located near Conley Spring Wash. All of the washes are ephemeral and converge southwest of SKM into the Silver King Wash. The confluence of the Silver King Wash with Queen Creek is approximately six miles south-southwest of the SKM.

VI. COMPLIANCE WITH AQUIFER WATER QUALITY STANDARDS

Groundwater monitoring is required at the POC well. Monitoring requirements for the Point of Compliance are listed in Section 4.2, Table 4.2.3.

VII. COMPLIANCE SCHEDULE

The Compliance Schedule items are listed in the permit under Section 3.0.

VIII. OTHER REQUIREMENTS FOR ISSUING THIS PERMIT

Technical Capability

The SKMC 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).

The permit requires that appropriate documents be sealed by an Arizona-registered Geologist or Professional Engineer. This requirement is a part of an on-going 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 has demonstrated financial capability under A.R.S. § 49-243(N) and A.A.C. R18-9-A203. The Permittee shall be required to maintain financial capability

throughout the life of the facility. The closure and post-closure costs have been estimated at $22,635.00. The financial assurance mechanism shall be demonstrated through A.A.C. R18-9-A203(C)(7). Updated closure costs, post-closure costs and the associated financial assurance mechanism shall be provided per the Compliance Schedule, Section 3.0 items 3.10 and 3.11.

Zoning Requirements

Under A.R.S. § 11-812 metallic mineral mining is exempt from local land use regulations.

VIII. 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 permit. 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.

IX. ADDITIONAL INFORMATION

Additional information relating to this permit may be obtained from:

Arizona Department of Environmental Quality
Water Quality Division – APP Unit
Attn: Monica Phillips
1110 W. Washington Street, Mail Code 5415B-3
Phoenix, Arizona 85007
Phone: (602) 771-2253