

FACT SHEET

(Pursuant to Nevada Administrative Code (NAC) 445A.401)

Permittee Name: **Southern Industrial Minerals L.L.C.**

Project Name: **P & S Barite Mine Project**

Permit Number: **NEV2014120**

Review Type/Year/Revision: **New Permit 2015, Revision 00**

A. Location and General Description

Location: The P & S Barite Mine Project is an open pit barite mine located in the central Toiyabe Mountain Range approximately 65 miles north-northeast of Tonopah, Nevada. The mine is located on public land administered by the U.S. Forest Service, Austin Ranger District in Nye County within Sections 11 and 14, Township 13 North, Range 45 East, Mount Diablo Baseline and Meridian.

Site Access: The P & S Barite Mine site is accessed from Tonopah, Nevada by traveling east on U.S. Highway 6 (US-6) approximately 5.5 miles to the intersection of US-6 and State Route 375 (SR-375). Turn left (north) on SR-375 and travel 78.6 miles on SR-375 to Northumberland Road/National Forest road NF-023. Turn right (east) on NF-023 and travel 16.4 miles on an unimproved gravel road to the intersection of NF-023 and the mine road. Turn right (south) on the mine road and travel 1.2 miles to the mine.

General Description: The P & S Barite Mine will utilize conventional drilling and blasting on 40-foot benches within the proposed open pit to mine the barite ore deposit. The Permittee will mine up to 120,000 tons of barite ore per year for two (2) to five (5) years. The barite ore will be handled and loaded as run-of-mine material and deposited to an on-site stockpile. The ore will be transferred from the stockpile to an off-site processing facility. A separate Water Pollution Control Permit application will be required if the off-site processing facility is located in Nevada. If necessary, crushing of the barite ore will be performed using a mobile crusher on the active mine bench within the pit. Processing of the ore on the P & S Barite Mine site is not permitted. The use of chemicals will only be permitted within the proposed on-site laboratory. The laboratory will consist of specific gravity measuring devices utilizing kerosene. The facility is designed to not release or discharge any process or non-process contaminants that would result in degradation of waters of the State during operation and closure.

The former mine workings on the project site consist of one (1) small, approximately 100 feet deep open pit from crest to toe and several waste piles. The disturbed area within the mine workings is approximately 7.9 acres. Additional disturbance in the Project area includes a 6,100 feet long access and

haul road up to 40 feet wide (5.6± acres) and an area nearby to West Northumberland road used by previous operators for crushing and stockpiling ore roughly (0.5 acres). Numerous exploration roads and pads border the Project area to the northeast.

B. Synopsis

Site History

Barite deposits at the head of West Northumberland Canyon were explored by stripping and drilling in the early 1960's. No barite was known to have been produced prior to 1964, but significant production followed. In late 1967 and 1968, United Exploration, Inc. produced 200-300 tons per day of high purity barite from what is believed to be this locality, even though the Engineering and Mining Journal attributed the production to East Northumberland Canyon. A total of 45,000 tons of ore might have been mined. The barite was trucked to a stockpile in Tonopah and sold to several chemical and drug companies. The Old Soldier Mining Company mined chemical or paint-grade barite in 1972-1974, curtailing shipments in late 1974; Standard Slag Company then explored the property and began mining about 500 tons per day in 1976. The property is in the West Northumberland area, where All Minerals, Incorporated also may have mined more than 65,000 tons of barite in 1975. Source: Nevada Bureau of Mines and Geology, Bulletin 99B, Mineral Resources of Northern Nye County, Nevada, 1984. In January 2013 Southern Industrial Minerals (Permittee) acquired the right to develop and operate the Property through a lease and option to purchase the non-patented mining claims from the current mining claim holders, the Frye and Harmon families.

Deposit Geology

The barite deposits of Nevada lie in a belt that is coincident with the approximately northward trending Antler orogenic belt. The barite is believed to represent a sedimentary facies with siliceous sedimentary rocks associated with transitional and eugeosynclinal rocks of Cambrian, Ordovician and Devonian age.

Three main types of barite deposits are found in northern Nye County: (1) fine crystalline, bedded, and lenticular deposits, (2) vein barite and related coarsely crystalline barite coating fracture surfaces in hydrothermal ore deposits and (3) secondary residual or placer deposits. Shawe, et. al., (1978), considered the Northumberland Canyon barite deposits to be of syngenetic or early diagenetic in origin that formed in an eugeosynclinal origin.

The bedded deposits at Northumberland consist of a dark-grey barite unit approximately 59 feet thick and thinner barite units, which contain some intercalated chert and shaly mudstone and which are part of an allochthonous eugeosynclinal sequence composed principally of dark-grey and black chert and siliceous mudstone of the Devonian Slaven Chert.

Some recrystallization of the bedded barite deposits was described at the P & S Project site, where the typically dark-grey aphanitic to very fine-grained barite had been converted to white and light-grey granular materials in the contact metamorphic aureole of the Northumberland stock. Impurities in the barite include silica as quartz, amorphous organic material, apatite, and calcite.

Ore and Waste Rock Characterization

Acid-base Accounting (ABA) has been conducted on the ore and waste rock to estimate the acid generating and acid neutralizing potentials of rock within the proposed mine pit. The Nevada Modified Sobek Procedure protocols were followed for the ABA analysis. The Meteoric Water Mobility Procedure (MWMP) is designed to determine the potential for release of chemical constituents from a solid that is exposed to precipitation (rain or snow melt). X-ray Diffraction (XRD) is used to determine the mineralogical constituents and inductively coupled plasma mass spectrometry (ICP-MS) is an analytical method used to determine the elemental composition of rock material. Net Acid-Generation (NAG) testing is not an NDEP approved analytical method but may be useful in determining acid-generation potentials for highly acid-insoluble sulfate minerals such as barite.

In order to characterize the waste and ore material, two representative samples from drill cuttings were collected from recently completed drill holes in the bottom of the existing mine pit. One sample was representative of barite ore material (PS-4-O) and one sample was representative of low grade barite bearing waste rock (PS-1-W). Samples were delivered to McClelland Laboratory in Sparks, Nevada for preparation, then delivered to SVL Analytical in Kellogg, Idaho for ABA and NAG testing and to Western Environmental Testing Laboratory in Sparks, Nevada for MWMP and ICP-MS metals analysis. XRD analysis of the samples was performed by American Assay Laboratories, Inc. in Sparks, Nevada.

Nevada Modified ABA results show that the PS-1-W and PS-4-O samples displayed a greater potential to generate acid than to neutralize acid in a natural environment. Results are summarized as follows:

- Paste pH's were 6.40 and 5.96 for the PS-1-W and PS-4-O, respectively;
- Pyritic sulfide contents were 4.93 and 1.62 weight percent, respectively, and resulted in AGP values of 154.1 and 50.6 tons of calcium carbonate (CaCO_3) equivalents per 1,000 tons of solids respectively;
- ANP values were 1.0 and 1.5 $\text{CaCO}_3/1,000$ tons, respectively;
- NNP values were -153.1 and -49.1 $\text{CaCO}_3/1,000$ tons, respectively; and

- Ratios (ANP/AGP) were 0.01 and 0.03, respectively.

Overburden waste rock is comprised of weathered granitic material. The results of the ABA analysis on the granitic overburden (PS-7-W and PS-8-W) returned paste pH values of 7.11 and 6.88 respectively and low sulfide sulfur content. ANP/AGP ratio for these samples were 1.15 and 0.32 respectively. The volume of granitic overburden to be mined is 97,700 cubic yards (yd³). The volume of low grade barite sediment to be mined is 17,800 yd³ which has been determined to be PAG. Therefore, the volumetric ration of non-PAG to PAG is 15.4 percent. The volume of the PAG barite ore to be mined and hauled offsite is 198,450 yd³.

Mining Components

The mining components include, but are not limited to, a dozer, loader, excavator, haul trucks, portable crusher, 4,000-gallon water truck for dust control, 1,000-gallon water tank for the on-site laboratory, 4,000-gallon fuel tank with containment pad, and ancillary facilities.

Water Supply

Water used for dust control and for the laboratory will be obtained from an existing well located in Big Smokey Valley. Water will be trucked in using a 4,000-gallon water truck. A 1,000-gallon water tank will be used for the laboratory. Bottled water will be used for drinking by the mine staff.

Mining Plan

The existing mine pit highwall is very steep at an approximate slope angle of up to 80 degrees. The highwall has been relatively stable since the last round of mining in the 1990s. The relatively stable slope is contributed to the inherent stability of granite as the primary overburden material. The Permittee has designed the pit slope for mining of new ore at a shallower slope angle which will provide a high level of highwall slope stability. Additionally, the Permittee will push granite overburden waste against the highwall for buttressing the slope providing a second level of slope stability.

Mining will be conducted in a 4 phase sequence. The phased mining sequence will accomplish two (2) goals: (1) The lower portions of the highwall will be buttressed with neutral pH and low sulfide sulfur content granite waste and (2) the low-grade barite waste will be covered with a maximum thickness of granite waste.

Mining new ore will be accomplished by lowering the upper bench on 40 foot high benches at an inter-bench slope angle of 70 degrees. Once the existing pit floor elevation is reached, blast holes will be drilled to a maximum depth of ten (10) feet. Pit floor lowering will advance to a maximum of 30 vertical feet below the existing pit floor while maintaining a 70 degree inter-bench slope angle. The overall pit slope angle from crest to toe will be 62 degrees. The pit floor will not

be lowered below the groundwater table. The design elevation of the pit floor is 7,880 feet above mean sea level (amsl) where the predicted groundwater elevation is 7,280 feet amsl. Therefore, groundwater is approximately 600 feet below the proposed pit floor. If groundwater is encountered in any blast hole, pit floor lowering will cease and no blast hole which has been drilled out but not fired at the time will be detonated. Unused blast holes will be plugged with neat cement.

As each mining phase is completed, the subsequent phase will include the relocation of any mined low-grade baritic waste to the toe of the highwall prior to backfilling the developed pit with overburden granitic waste. This will ensure that any potentially acid generating (PAG) low-grade baritic waste will be covered by neutral granite overburden waste. Additionally, all exposures of un-mined PAG low-grade baritic waste remaining in the pit floor will be covered with ten (10) feet minimum thickness of neutral granitic overburden. Low-grade barite waste will not be stored outside of the mine pit.

Crushing of the barite ore will be conducted on each successive active bench in the mine pit. Because the crushing will occur on the active bench, containment will not be needed as each bench will subsequently be mined out. In the event that the Permittee elects to stockpile barite ore in areas outside of the mine pit, it will be done on an 8-inch thick native or amended soil layer compacted to a maximum hydraulic conductivity of 1×10^{-6} centimeters per second with an 8-inch thick aggregate protective cover layer or a geotextile clay layer with an 8-inch aggregate protective cover layer and will include a sump for the evacuation of meteoric accumulation.

Mineral Processing

Processing of the barite ore will be performed at an off-site facility. A separate Water Pollution Control Permit or modification of an existing Permit for a Nevada-Permitted facility issued by the Division will be required if the processing facility is located in Nevada.

Ancillary Facilities

Ancillary facilities include the following items:

- Fuel Storage: Up to 4,000 gallons of diesel fuel will be stored on the site to power equipment and generators. Fuel will be stored in one 4,000-gallon trailer mounted double-walled tank with built in containment sufficient to contain 110% of the tanks volume. An optional standard 4,000-gallon fuel tank will be located on a 60-mil High Density Polyethylene (HDPE) lined fuel containment pad constructed with berms for secondary containment to provide emergency capture of 110% of the fuel storage volume;
- Explosives Storage: A blasting powder magazine and blasting-cap storage container will be located on-site;

- Office: An office will be located on-site. The office will be composed of a sea-container or portable trailer. The proposed laboratory will be located in the same building;
- Sanitation Facility: One (1) porta-potty will be located on-site adjacent to the office;
- Laboratory: The laboratory will be located within a portion of the office trailer. It will consist of gravity measuring devices utilizing kerosene for specific gravity testing. No other chemicals will be used in the laboratory. The laboratory will have containment capacity sufficient to contain all kerosene stored in the laboratory;
- Truck Scale: A truck scale will be located on-site adjacent to the ore stockpile; and
- Tool Van: A semi-trailer tool van up to 40 feet in length will be located on-site.

Petroleum Containment

The Permittee is not authorized to dispose or treat Petroleum-Contaminated Soil (PCS) on the mine site without first obtaining from the Division approval of a PCS management plan. Any PCS will be disposed of at an off-site facility authorized to receive such material.

C. Receiving Water Characteristics

There are no surface water bodies within ½- mile down gradient of the Project and there are no springs or seeps within ½-mile radius of the proposed mine site. The nearest spring, approximately 1-mile north of the proposed mine site, located at the edge of Northumberland Road, has been sampled and analyzed for Profile I constituents. The spring has exceedances in Profile I reference values with aluminum at 0.46 milligrams per liter (mg/L), iron at 0.64 mg/L, sulfate at 900 mg/L, and total dissolved solids (TDS) at 1,700 mg/L. The seep has exceedances in Profile I reference values with arsenic at 0.018 mg/L, sulfate at 770 mg/L, and TDS at 1,500 mg/L. The complete results of the spring and seep water quality analyses are presented in the application.

Groundwater at the Project site is within Nevada Division on Water Resources Administrative Groundwater Basin 137B - Big Smoky Valley Northern Part. Information regarding groundwater in the Project area is limited; there are no groundwater wells within a 1-mile radius of mine site. However, it is assumed that the unnamed spring located approximately 1-mile to the north of the mine site is representative of the approximate ground water depth in that area. The elevation of the roadside seep is 7,280 feet amsl. The elevation of the mine site is about 8,000 feet amsl indicating that groundwater elevation at the location of the seep is approximately 700 feet below the mine site elevation. Additionally, based on conversations with the operator involved with past mining and exploration at the P & S mine, no water was encountered in any drill holes to a maximum depth

of 300 feet below ground surface. However, drill logs for the historic drilling documenting groundwater depths have not been located by the Permittee for validation.

D. Procedures for Public Comment

The Notice of the Division's intent to issue a Permit authorizing the facility to construct, operate, and close, subject to the conditions within the Permit, is being sent to the **Tonopah Times-Bonanza and Goldfield News** for publication. The Notice is being mailed to interested persons on the Bureau of Mining Regulation and Reclamation mailing list. Anyone wishing to comment on the proposed Permit can do so in writing within a period of 30 days following the date of public notice. The comment period can be extended at the discretion of the Administrator. All written comments received during the comment period will be retained and considered in the final determination.

A public hearing on the proposed determination can be requested by the applicant, any affected State, any affected intrastate agency, or any interested agency, person or group of persons. The request must be filed within the comment period and must indicate the interest of the person filing the request and the reasons why a hearing is warranted.

Any public hearing determined by the Administrator to be held must be conducted in the geographical area of the proposed discharge or any other area the Administrator determines to be appropriate. All public hearings must be conducted in accordance with NAC 445A.403 through NAC 445A.406.

E. Proposed Determination

The Division has made the tentative determination to issue the Permit.

F. Proposed Limitations, Schedule of Compliance, Monitoring, Special Conditions

See Section I of the Permit.

G. Rationale for Permit Requirements

The facility is located in an area where annual evaporation is greater than annual precipitation. Therefore, it must operate under a standard of performance which authorizes no discharge(s) except for those accumulations resulting from a storm event beyond that required by design for containment.

H. Federal Migratory Bird Treaty Act

Under the Federal Migratory Bird Treaty Act, 16 U.S. Code 701-718, it is unlawful to kill migratory birds without license or permit, and no permits are issued to take migratory birds using toxic ponds. The Federal list of migratory birds (50 Code of Federal Regulations 10, 15 April 1985) includes nearly every bird species found in the State of Nevada. The U.S. Fish and Wildlife Service is authorized to enforce the prevention of migratory bird mortalities at ponds and tailings impoundments. Compliance with State permits may not be adequate to ensure protection of migratory birds for compliance with provisions of Federal statutes to protect wildlife.

Open waters attract migratory waterfowl and other avian species. High mortality rates of birds have resulted from contact with toxic ponds at operations utilizing toxic substances. The Service is aware of two approaches that are available to prevent migratory bird mortality: 1) physical isolation of toxic water bodies through barriers (e.g., by covering with netting), and 2) chemical detoxification. These approaches may be facilitated by minimizing the extent of the toxic water. Methods which attempt to make uncovered ponds unattractive to wildlife are not always effective. Contact the U.S. Fish and Wildlife Service at 1340 Financial Boulevard, Suite 234, Reno, Nevada 89502-7147, (775) 861-6300, for additional information.

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