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Statement of Basis and Fact Sheet for a Underground Injection and Control (UIC) Class III Draft Area Permit

October, 2020

Lisbon Valley Mining Company, LLC
PO Box 400
Moab, Utah 84532

Lisbon Valley Mine, San Juan County, Utah



Figure 1. Lisbon Valley mine site location and UIC Permit Area.

<u>Location:</u> San Juan County, Utah	<u>Operator:</u> Lisbon Valley Mining Company, LLC
<u>Facility Contact:</u> George Shaw Director and Chairman Lisbon Valley Mining Company LLC P.O. Box 400 Moab, UT 84532 gshaw@lvmcholdings.com 801.435.355.0755	<u>Regulatory Contact:</u> Drummond Earley Utah Department of Environmental Quality Division of Water Quality UIC Program 195 North 1950 West Salt Lake City, UT 84116 dearley@utah.gov Tel. 801.536.4088

Purpose of the Statement of Basis and Fact Sheet

The Utah Division of Water Quality (Division) has prepared this draft Fact Sheet and Statement of Basis (FSSOB) for the draft Underground Injection Control (UIC) Class III Area Permit (Draft Permit) for Lisbon Valley Mine Company, LLC (Lisbon Valley). Pursuant to the Utah UIC administrative rules in Utah Administrative Code R317-7 et. seq. and federal regulations in Title 40 of the Code of Federal Regulations (CFR) incorporated by R317-7-1. The purpose of this FSSOB is to briefly describe the principal facts and the significant factual, legal, methodological and policy questions considered in preparing the draft permit. To meet these objectives, this FSSOB contains:

- Background information on the permit process and names and telephone numbers of contacts for additional information (listed on the first page of this FSSOB above);
- A description of the draft permit review process and public participation;
- A brief discussion of the facility and process;
- Basis for draft permit conditions;
- A brief discussion of Lisbon Valley's aquifer exemption request and approval process.

Permit Process

Application and Review Period

Early in 2020 Lisbon Valley applied to the Division to obtain a Class III UIC Area Permit to construct and operate injection wells for in situ copper recovery in San Juan County, Utah. This is the first operation of its kind proposed in Utah but other operations have been permitted in Arizona. Class III UIC area permits are renewed on a regular five-year cycle. However, the permit is subject to revision or revocation at any time if permit conditions are not met based on a determination by the Division Director. The draft permit area is shown in Figure 1 and the 2 mile area of review that has been investigated for any potential impacts to underground sources of drinking water from the project and the permit conditions that are necessary to prevent any impacts. The Division completed its review and draft permit which includes stringent injection zone monitoring, well construction and testing methods, wellfield operation and closure practices.

Public Participation

The draft permit was prepared by the Division for public notice and public comment. Public comments will be accepted by the Division for 30 days following the first day of public notice in the local newspaper that serves the affected community. A public hearing may be held by the Division if public comments are substantial and the Draft Permit requires revision based on these comments.

Description of the Facility and Process

Brief Description of the Facility

Lisbon Valley is currently an existing open pit heap leach copper mine and proposes to construct and operate Class III in-situ copper recovery injection wells in south central San Juan County, Utah to continue extraction of copper from ore within mineralized zones of the Burro Canyon aquifer (including the Dakota and Burro Canyon Formations) generally between 200 and 900 feet below the ground's surface. These resources are currently uneconomical to develop using

open pit mining methods and Lisbon Valley is planning to extend the life of the mine by adopting in situ copper recovery technology. A general location map is included in the inset to this Fact Sheet and Statement of Basis (Figure 1).

In-Situ Copper Recovery

The injectate is raffinate produced by the Solvent Extraction Electrowinning (SXEW) facility that is currently used to recover copper metal from leach solutions. Raffinate is initially barren of copper and consists of a dilute sulfuric acid solution containing other dissolved minerals like iron to assist in copper recovery. Makeup water and sulfuric acid are added to the raffinate to regenerate the solution for the in-situ recovery process. The raffinate is injected into the ore zone of the Burro Canyon aquifer using injection wells. The dilute acid and iron solution dissolves copper minerals in the ore and the copper bearing solution is recovered by pumping wells which return the solution to the SXEW plant where copper is recovered and turned into copper cathode by electroplating. The barren raffinate solution is then regenerated and recirculated to the in situ copper recovery wellfield in a closed loop circuit.

Permit Conditions

Part I of the permit is the Authorization to Construct and Inject. Part II includes all general permit conditions required in all UIC permit with the focus on Class III permits. Part III contains all the specific permit conditions required of all Class III solution mining permits and particularly for Lisbon Valley.

Lisbon Valley's application is consistent with standard permit conditions and requirements in R317-7. The Division has developed permit conditions for the UIC Class III In-Situ Copper Recovery area permit to ensure compliance with the Utah UIC administrative rules for Class III injection well activities, R317-7. Additionally, the in-situ minerals recovery and environmental industries have standards for the construction, development and monitoring of wells and which were used to develop draft permit conditions where they apply to the injection, recovery and containment of solutions. Permit conditions also require plugging and abandonment of the wells plus post closure rinsing of the wellfield.

The following references were used for developing the draft permit conditions:

- Arizona Mining Guidance – BADCT, Arizona Department of Environmental Quality.
https://static.azdeq.gov/wqd/app_badctmanual.pdf
- EPA, 2016. Underground Injection Control Program Area Permit, Class III In-Situ Production of Copper Permit No. R9UIC-AZ3-FY16-1. Gunnison Copper Project Cochise County, Arizona. Issued to Excelsior Mining Arizona, Inc. Concord Place, Suite 300 2999 North 44th Street Phoenix, Arizona 8501.
<https://www.epa.gov/uic/uic-class-iii-situ-production-copper-permit-no-r9uic-az3-fy16-1-excelsior-mining-arizona-inc>
- ASTM D5092 / D5092M - 16 Standard Practices for Design and Installation of Groundwater Monitoring Wells.
<https://www.astm.org/Standards/D5092.htm>
- EPA, 2016. Underground Injection Control Program Area Permit, Class III In-Situ Production of Copper Permit No. R9UIC-AZ3-FY11-1. Florence Copper Project, 1575 West Hunt Highway Florence, Arizona 85132. Issued to Florence Copper Inc., 1575 West Hunt Highway Florence, Arizona 85132.

<https://www.epa.gov/uic/uic-class-iii-situ-production-copper-permit-no-r9uic-az3-fy11-1-florence-copper-project-florence>

Because Utah does not have specific statutes and regulations for the construction and operation of in-situ recovery wells and well fields, in general, and for copper recovery, specifically, the Division used in-situ copper recovery UIC permits issued by the EPA Regions 8 and 9 and the state of Arizona's Best Available Discharge Control Technology (BADCT) guidance manual as guidance for the writing of this draft permit. Moreover the Draft Permit is justified on the basis of the limited extent and use of the Burro Canyon aquifer in the proposed permit area, the occurrence of mineralization of potential commercial value and relatively poor water quality. The Burro Canyon aquifer is contained within a closed water recharge system by the regional geologic anticlinal structure within a graben bounded by faults with low hydraulic conductivity owing to the occurrence of fine grained fault gouge material. In addition, vertical confinement of injectate is enhanced by the Mancos and Morrison formations, both having shale beds with low hydraulic conductivity, that lie stratigraphically above and below the Burro Canyon aquifer, respectively, and are considered to be aquitards in the regional hydrogeology of the area. Furthermore, Lisbon Valley will overproduce solution from production wells in order to maintain an inward hydraulic gradient and contain leach solutions within the permit area. Monitoring wells will be installed to ensure that no injectate or leach solution escapes from the wellfields and permit area. Any vertical migration will also be detected by deep monitor wells within the Morrison and Navajo Formations. Groundwater restoration will commence after in-situ copper recovery operations by rinsing the wellfield with fresh water.

Aquifer Exemption Request

Lisbon Valley is seeking an Aquifer Exemption for the Burro Canyon Aquifer beneath the permit area (Figure 1) according to R317-7-4 and the Division has identified aquifers that may be exempted as sources of underground drinking water following the procedures and based on the requirements outlined in [40 CFR 144.7](#) and [40 CFR 146.4](#). The exemption is subject to approval by the Environmental Protection Agency (EPA) UIC Program Administrator following public notice and comment. Public comments received by the Division will be considered and changes may be incorporated into the exemption request record submitted to the EPA.