drilling rates. From the time the road building/site prep is completed until a rotary drill rig moves onsite may be as little as a day up to several months afterward depending on drilling priorities.

Diamond Drilling: Refer to section c; Surface Drilling; Diamond Drilling section for drilling rates. From the time the rotary portion of a hole is completed until a diamond drill moves onsite may be as little as a day up to several months afterward depending on drilling priorities.

Remove Casing/Plug Rotary Portion of Hole: Refer to section c; subsection iv. Plugging Methods. This portion of the drilling program is generally completed within 60 days.

Drill Site Reclamation: Recontouring of drill site may take between a half to one and half days. Hydroseeding generally takes less than one day. Refer to section c; subsection v. Surface Reclamation for scheduling of reclamation activities.

Variations in the timeline may occur due to the following reasons:

- Certain holes are cored from surface to obtain geologic data on the upper Cambrian formations such as the Potosi and the Derby Doe Run formations.
- Certain holes are drilled as angle holes from surface where the drill target may be inaccessible due to topography.
- Certain holes maybe drilled to test the Precambrian formation. Depending on the depth of the Precambrian to be cored, drilling of the Precambrian portion may take several months due to the hard ground encountered in the Precambrian.

Excerpts from the 2017 Operations Plan

BLM Section 3592.1 C(4)

Mining & Milling Operating Plan

All mining taking place will be done underground. The mining method used is "Mechanized Room and Pillar" utilizing rubber tired equipment. The mining occurs in three phases; primary, secondary, and tertiary.

Primary Mining: Drifts measuring approximately 32 feet wide and averaging approximately 14 feet high are cut creating pillars that are approximately 28 feet by 28 feet. Ground conditions do cause this to vary. Drift rounds are drilled approximately 12 feet to 14 feet in depth by either Joy two boom jumbos or Tamrock single boom self-contained jumbos or similar equipment. Blast holes are charged with ANFO or emulsion explosives, utilizing Getman charging rigs or similar equipment. Shot rock is typically loaded out utilizing a Cat 980 loader or similar, dumping into either Cat or Volvo 40 ton articulated haul trucks or similar. Where the ore thickness allows, additional mining passes may be cut utilizing overcut and undercut mining passes leaving approximately 15 feet minimum thickness sills. Ground support where needed is accomplished by Secoma, Cannon, or Fletcher bolting machines or similar installing 6 foot to 8 foot long bolts.
Various types of bolts are used which include resin bolts, split set bolts, and conventional bolts.

Secondary Mining: After the primary mining is complete, additional mining may be needed utilizing bottom cuts, back cuts, and sill cuts. These secondary cuts may range from approximately 5 feet to 20 feet depending upon the ore thickness in the area.

Tertiary Mining: Involves the extraction of ore left in the remaining pillars. This is accomplished with Tamrock single boom pillar drill jumbos or similar and CAT, Volvo, or Elphinstone remote controlled loaders or similar. The extraction percentage for these pillars is dependent upon the number of pillars that are required to be left behind to maintain pillar stability for safe extraction. All broken ore materials are transported back to the main shaft by truck haulage and hoisted to the surface. Broken ore is then placed in storage bin from which it is then fed into the mill. Once in the mill the ore is then crushed down to the appropriate size for processing through the mill flotation circuits which produce lead, zine and copper concentrates. These concentrates are then transported by truck to a port facility where they are loaded onto barges. All tailings generated by the milling process are placed into monitored and permitted tailings storage ponds located adjacent to the four mill processing facilities.

Ventilation: Air for the mines is provided utilizing vent shafts that are either intakes or exhausts. Most of these vent shafts have fans either at the surface or underground ranging from 800HP down to 50HP. Once fresh air arrives underground via the vent shafts it is moved into the work areas either by free flow or by utilizing auxiliary fans and vent bags. These auxiliary fans range in horsepower from 50HP up to 200HP. Future mining may require the installation of additional vent shafts from surface down to the ore horizon. These average 1,000 feet in depth and are typically 6 feet in diameter.

Five Year Production Plans

Currently Doe Run has five mines operating along the SEMO Viburnum Trend. The Buick Mine went on standby in January of 2016, although some of its reserves continue to be mined via the Brushy Creek and Casteel operations. The current five active mines will continue production for the five year period 2017-2021.

BLM Section 3592.1 C(6)

Maximum Recovery of the Resource

All of the Doe Run Mills use process controls to maximize recoveries and maintain high quality concentrate production. Doe Run has on stream X-ray analyzers to monitor the flotation process. These analyzers are calibrated through a series of "check samples" that are processed routinely. Doe Run also has PSI and/or nuclear density gauges to control grinding circuit operations, assuring of the proper particle liberation and sizing for the flotation process. Algorithms have been generated based on historical performance to utilize computer control of reagent addition. Finally, Doe Run mill operating and support personnel attend a Milling 101 training course acquainting them with the principles and theory of our milling operations.

BLM Section 3592.1 C(7)

Maps & Cross Sections

(i) There are no Indian leases. See the **Exploration Plan** submitted separately by Doe Run's Exploration Group for list of BLM lease serial numbers and accompanying maps showing locations of leases.

(ii) For surface ownership and boundaries see the **Exploration Plan** submitted separately by Doe Run's Exploration Group for maps showing locations of leases.

(iii) There are three mines in the Viburnum Trend which have been abandoned. They are #27, #28, and Indian Creek.

BLM Section 3592.1 C(8)

Environmental/ Reclamation/ Closure

Environmental management responsibilities through the SEMO mining and milling division include issues associated with the six underground mines and four mills, as described in other sections of this plan, and management of all surface facilities, including tailings impoundments and mine water ponds. Currently, the SEMO environmental department functions as a branch of the larger Corporate environmental department. The Environmental Department responsibilities consist of assisting operations with compliance, sampling and monitoring, oversight/management of outside consultants associated with permitting and construction projects, and interacting with the regulators.

Environmental management program objectives for SEMO are designed to integrate the operations staff into the day-to-day environmental management and are determined by SEMO management on

an annual basis. Program objectives are integrated into the divisional environmental management system and tracked monthly. An outside consultant developed the individual Environmental Task Management Systems (ETMS) based on permit requirements and site conditions. At each operation, the responsibilities for maintaining permit compliance (e.g., multi-media sampling, inspections, reporting, etc) are distributed as appropriate and task completion is monitored.

(i) Please refer to specific NPDES Missouri State Operating Permits (MSOP) for site specific monitoring and discharge limitations.

(ii) Protective measures will be taken to ensure no environmental hazards will affect the BLM Lease areas. Small foot print drill sites approximately 0.15-0.20 acres in size, will be utilized to perform test drilling. Any compounds used during the drilling process will be environmentally safe and non-toxic to the environment. All drill holes will have a cuttings collection pit at each hole and all drill cuttings produced during the drilling process will be caught in these pits. A series of samples of these cuttings will be collected, analyzed and entered into a data base that will be reported at the completion of each drill hole. Upon completion of drilling, the cuttings collection pit will be reclaimed and the drill site will be remediated to meet the US Forest Service standards. Doe Run will ensure that no materials generated by the drilling process will enter the drainage from these areas. Protection of groundwater will be performed by ensuring that no spilling or dumping of any materials (petroleum product, toxic chemicals etc.) will take place on BLM Lease areas. Doe Run will plug each surface exploration test hole with approved materials as specified by Missouri Department of Natural Resources to ensure that the Ozark and St. Francois aquifers waters do not mix. Doe Run maintains NPDES discharge permits. The State of Missouri requires construction project permits for any new projects that are going to affect the waters of the State. Based on these requirements, Doe Run develops permitting documents in conjunction with planned storm water improvements and other projects that affect the waters of the State. These permits require a Storm Water Pollution Prevention Plan (SWPPP), erosion control measures and other BMPs to be implemented. BMPs are utilized and effectiveness monitored by environmental staff during regular inspections. For reference, see following table for NPDES MSOP permit information:

SEMO Missouri State Operating Permits (NPDES)

Operation	MSOP Permit #	Issued Date (Revised)	Expiration Date
Brushy Creek	MO-0001848	02/26/2010 (10/28/2011)	02/25/2015
Buick	MO-0002003	09/25/2009 (10/25/2011)	09/24/2014
Casteel	MO-0100226	03/19/2010 (10/28/2011)	03/18/2015
Fletcher	MO-0001856	11/13/2009 (10/28/2011)	11/12/2014
Sweetwater	MO-0001881	07/10/2009 (10/25/2011)	07/09/2014
Viburnum	MO-000086	12/04/2009 (10/25/2011)	12/03/2014
Viburnum Quarry	MOG490268	10/17/2011	10/05/2016
West Fork	MO-0100218	03/12/2010 (10/25/2011)	03/11/2015

Doe Run has constructed several water treatment facilities to improve effluent quality and comply with MSOP permit limits. All water treatment facilities will be functional within

2017. MSOP permits for SEMO facilities are currently expired, but facilities are allowed to operate under the expired permits until new permits can be finalized with Missouri Department of Natural Resources as long as a permit application has been filed in a timely fashion for each facility. Doe Run is currently working closely with the Department of Natural Resources to finalize new permits for all SEMO facilities.

Mill tailings will be deposited in approved permitted valley fill impoundment areas and will follow all state and federal regulations pertaining to them. Monitoring programs have been established at each facility to ensure safeguard the transport of tailings via pipeline to the permitted tailings storage facilities. With respect to dams in these impoundment areas, the Engineering Department develops and finalizes construction permits for the Missouri DNR - Dam Safety Program. These dam permits deal directly with design, construction and maintenance of the tailings and mine water impoundments.

Metallic mineral mine sites in Missouri are governed by the State's Metallic Mineral Waste Management (MMWM) law. This law requires metals producing mines to provide proper permitting, bonding, closure plans, and operations/maintenance of these closed facilities including all tailings disposal areas. For reference, see table below for specific MMWM permits:

Metallic Minerals Waste Management Act Permits

Operation	Permit Number
Viburnum	MM-008
Fletcher	MM-009
Brushy Creek	MM-010
Buick Mine	MM-011
West Fork	MM-005T
Sweetwater	MM-004T

(iii) Doe Run will work with the US Forest Service and local community firefighting departments to prevent and control fires. Each mine site has an emergency plan in place to deal with fires and other emergencies at their site. The contents of the plan are revised regularly and all updates are communicated in personnel training. To prevent soil erosion, erodible areas will be re-contoured as needed and stabilized with the use of hay bales and silt fencing. There are no areas of subsidence on the lease areas. All mining areas are evaluated for potential subsidence and mine plans are created to prevent subsidence from occurring. Doe Run will work with the US Forest Service, US Fish and Wildlife Service to ensure that drilling and mining activities do not have any adverse effect on Threatened and Endangered Species (Indiana Bat, Hinds Emerald Green Dragonfly, etc.).

BLM Section 3592.1 C(9)

Reclamation Measures and Stipulations

All surface drill site construction and reclamation, including access roads, are governed under the Mark Twain National Forest Minerals Management Plan. Noted below are the main stipulations from that plan.

General stipulations on each site are determined by the District Forest Ranger and are as follows;

- Keep sites as small as possible.
- Remove and stockpile the topsoil.
- Dig a pit for drill cuttings and make sure it is deep enough so that the cuttings do not overflow.
- Finish drilling in a timely manner and rehabilitate drill sites as soon as possible after drilling is completed.
- Re-spread the topsoil on the site as soon as possible after drilling is completed.
- Construct new temporary roads along the contour where the gradient does not exceed 8%. (grades up to 15% are allowed if the slope distance is less than 150 feet)
- Place water bars on temporary roads to facilitate drainage. Recommended spacing between drainage features is as follows:

Grade %	Distance between features (feet)
5-10	125
10-20	60
20-30	40

- Close temporary roads with a berm where possible. Temporary roads that will be used again can be closed temporarily by dragging slash and tops into the roadway.
- Apply at the following per 100 square feet of bare soil: 50 pounds agricultural lime, 1 pound of P-K-N (13-13-13), and 1 pound of winter wheat.
- Cover all soil with straw mulch.
- Avoid dead standing trees 6" diameter and greater where possible (that are not a safety hazard) when clearing roads and drill sites.
- The Metallic Minerals Waste Management Plans cover the vegetation and reclamation of each mine site and tailings impoundment through a required closure plan. See BLM Section 3592.1 C(8) on page 10 of this document for a list of these permits.

BLM Section 3592.1 C(10)

The method of abandonment of operations is described in the Metallic Mineral Waste Management Permits which are filed with the state of Missouri. A list of these permits is included on page 10 of this document. These permits include procedures as to how Doe Run proposes to fill in, fence off, or close all surface openings which would be a hazard to people or animals.

Appendix C: Data Tables

Table C-1. Mapped Soils in Fletcher Mine Lease Modification Parcels

Soil Map Unit Name & Landform Position	Percent of Parcel Areas	Drainage Class	Erosion Hazard	Runoff Class	Rutting Hazard	Mechanical Site Preparation Suitability	Road Suitability
Alred-Arkana Complex, 8-15% slopes, rocky, summit/shoulder	1.8%	Well	Moderate	Medium	Slight	Moderately suited	Moderately suited
Alred-Rueter complex, 15-35% slopes, very stony, backslopes	0.7%	Well	Severe	High	Severe	Moderately suited	Poorly suited
Cedargap gravelly loam, 1-3% slopes, rarely flooded, toeslopes	0.5%	Well	Slight	Low	Moderate	Well suited	Well suited
Clarksville-Scholten complex, 15-45% slopes, very stony, backslopes	44.3%	SWE	Severe	High	Slight	Poorly suited	Poorly suited
Coulstone-Bender complex, 15-50% slopes, very stony, backslopes	14.4%	SWE	Moderate	High	Slight	Moderately suited	Poorly suited
Gepp-Arkana complex, 15-55% slopes, rocky, backslopes	3.6%	Well	Severe	High	Slight	Unsuited – slope and rock fragments	Poorly suited
Lecoma loam, 8-15% slopes, footslopes	0.5%	Well	Severe	Medium	Severe	Well suited	Well suited
Niangua-Bardley complex, 15 to 50%	6.2%	Well	Severe	Very High	Slight	Poorly suited	Poorly suited slope & rock fragments

Soil Map Unit Name & Landform Position	Percent of Parcel Areas	Drainage Class	Erosion Hazard	Runoff Class	Rutting Hazard	Mechanical Site Preparation Suitability	Road Suitability
slopes, extremely stony, backslopes							
Poynor-Clarksville-Scholten complex, 8-15% slopes, stony, summit/shoulder	15.6%	Well	Moderate	Medium	Severe	Moderately suited	Moderately suited
Relfe sandy loam, 1-3% slopes, occasionally flooded, toeslopes	0.9%	Excess	Slight	Very Low	Moderate	Well suited	Well suited
Rueter-Gepp complex, bench, 8-15% slopes, summit/shoulder	1.6%	SWE	Moderate	Medium	Severe	Well suited	Moderately suited
Scholten-Bendavis-Poynor complex, 8-15% slopes, backslopes	7.2%	ModWell	Moderate	High	Slight	Moderately suited	Moderately suited
Tonti-Hogcreek complex, 3-8% slopes, summit	2.9%	ModWell	Moderate	High	Severe	Well suited	Moderately suited

[1] Soil descriptions and interpretations retrieved from the Web Soil Survey (SSURGO) database.
[2] Drainage classes: excessively drained (Excess), moderately well-drained (ModWell), somewhat excessively drained (SWE), and well-drained (Well).

Table C-2. Mapped Soils in Sweetwater Mine Lease Modification Parcels

Soil Map Unit Name & Landform Position	Percent of Parcel Areas	Drainage Class	Erosion Hazard	Runoff Class	Rutting Hazard	Mechanical Site Preparation Suitability	Road Suitability
Clarksville-Scholten complex, 15-45% slopes, very stony	36.9%	SWE	Severe	High	Slight	Poorly suited	Poorly suited
Coulstone-Alred complex, 15 to 50% slopes, very stony	12.7%	SWE	Moderate	High	Slight	Moderately suited	Poorly suited
Poynor-Clarksville-Scholten complex, 8-15% slopes, stony	19.6%	Well	Moderate	Medium	Severe	Moderately suited	Moderately suited
Scholten-Bendavis-Poynor complex, 8-15% slopes	17.6%	ModWell	Moderate	High	Slight	Moderately suited	Moderately suited
Tilk very gravelly sandy loam, 1-3% slopes, rarely flooded, toeslopes	1.0%	Well	Slight	Low	Slight	Moderately suited	Well suited
Viburnum silt loam, 3-8% slopes, summits	12.3%	ModWell	Moderate	Medium	Severe	Well suited	Moderately suited

[1] Soil descriptions and interpretations retrieved from the Web Soil Survey (SSURGO) database.
[2] Valves are rounded to nearest integer.
[3] Drainage classes: excessively drained (Excess), moderately well-drained (ModWell), somewhat excessively drained (SWE), and well-drained (Well).

Table C-3. Mapped Soils in the Brushy Creek Mine Lease Modification Parcels

Soil Map Unit Name & Landform Position	Percent of Parcel Areas	Drainage Class	Erosion Hazard	Runoff Class	Rutting Hazard	Mechanical Site Preparation Suitability	Road Suitability
Alred-Rueter complex, 15-35% slopes, very stony	42.4%	Well	Severe	High	Severe	Moderately suited	Poorly suited
Clarksville-Scholten complex, 15-45% slopes, very stony	74.2%	SWE	Severe	High	Slight	Poorly suited	Poorly suited
Lecoma loam, 8-15% slopes	0.9%	Well	Severe	Medium	Severe	Well suited	Well suited
Poynor-Clarksville-Scholten complex, 8-15% slopes, stony	24.3%	Well	Moderate	Medium	Severe	Moderately suited	Moderately suited
Tilk very gravelly sandy loam, 1-3% slopes, rarely flooded	0.9%	Well	Slight	Low	Slight	Moderately suited	Well suited

[1] Soil descriptions and interpretations retrieved from the Web Soil Survey (SSURGO) database.
[2] Valves are rounded to nearest integer.
[3] Drainage classes: excessively drained (Excess), moderately well-drained (ModWell), somewhat excessively drained (SWE), and well-drained (Well)

Table C-4. Summary of Permitted Outfalls for Fletcher Mine and Mill – MO-0001856[1,2]

Outfall	Description	Comments	Avg. Flow (MGD)	Design Flow (MGD)	Receiving Water[5]	Class[6]	Designated Uses[7]	12-Digit HUC
#001	Former Fletcher Mine water clarification basin – currently only stormwater; standpipe from the middle of the lake flows to Outfall #001.	Flows dependent upon precipitation but are fundamentally constant due to a seep in berm. See Note #3.	0.19	13.1	Tributary to Bee Fork	C	HHP, IRR, LWW, SCR, WBC-B, WWH (AQL)	Bee Fork 11010007-0102
#002	No. 46 Lake; tailings impoundment emergency spillway; discharge will occur during high volume precipitation events.	Flows dependent upon precipitation. See Note #4.	0.44	0.54	Tributary to Bee Fork	C	HHP, IRR, LWW, SCR, WBC-B, WWH (AQL)	Bee Fork 11010007-0102
#003	No. 46 Lake; toe drain basin overflow: toe drainage from tailings impoundment dam; under normal conditions basin water is pumped back into the tailings impoundment; power loss will cause discharge.	Flows dependent upon precipitation. See Note #4.	0.16	0.24	Tributary to Bee Fork	C	HHP, IRR, LWW, SCR, WBC-B, WWH (AQL)	Bee Fork 11010007-0102

Source: MoDNR 2020a. Missouri Clean Water Commission Missouri State Operating Permit Number MO-0001856 (May 1, 2019).

Notes:

1. Fletcher Mine and Mill is currently under enforcement action due to unpermitted discharges.
2. All process wastewater is sent to the West Fork Facility via pipeline for treatment and discharge at West Fork; MO-0100218. The transfer of process water to West Fork was completed in December 2016.
3. Since the transfer, monitored flows from Outfall 001 have averaged 0.19 MGD. Outfall 001 monitoring data since the transfer indicates that the facility is able to comply with proposed copper and zinc limits; however, there have been some exceedances of cadmium and lead limits. Data suggests that exceedances were caused by sediment management activities at the facility. Lead [and cadmium] concentrations were elevated immediately after the transfer of process waters to West Fork…likely due to residual impacts from the transfer. A steady downward trend in lead concentrations was observed during the following year. In March of 2018, a significant precipitation event resulted in increased concentrations, believed to be caused by resuspension of sediments. As a remedial effort, Doe Run began sediment excavation activities in the upper end of the mine water basin. During May 2018 excavation activities, concentrations were elevated but have been declining since remedial excavation activities and are anticipated to continue declining. Doe Run continues to monitor and implement additional corrective actions as needed. Prior to the 2016 transfer of process water at Outfall #001, the principal outfall, exceeded cadmium, lead, and zinc. Since the transfer in December 2016, exceedances of lead have been reported seven times and cadmium once. All exceedances occurred during times of higher stormwater flows.
4. Outfalls #002 and #003 rarely discharge. Outfall #002 exceeded lead parameters once and zinc twice. Outfall #003 discharged four times in the last four years and exceeded cadmium, copper, lead, zinc, pH, and total suspended solids.
5. Each outfall discharges to a different unnamed tributary of Bee Fork and connects to Bee Fork WBID #2760 (C) downstream. Bee Fork WBID #2760 was delisted from the 303(d) list in 2020. Mine water and tailings water discharges from Fletcher Mine and Mill have been discontinued. 2017 and 2019 data show the lead levels in water meet water quality standards due to restoration actions.
6. Class C - Streams that may cease flow in dry periods but maintain permanent pools that support aquatic life.

7. *10 CSR 20-7.031(1)(C)1.:* ***ALP*** *= Aquatic Life Protection (formerly* ***AQL****; current uses are defined to ensure the protection and propagation of fish shellfish and wildlife, further subcategorized as:* ***WWH*** *= Warm Water Habitat;* ***WBC*** *= Whole Body Contact recreation where the entire body is capable of being submerged;* ***WBC-B*** *= whole body contact recreation not supported in WBC-A;* ***SCR*** *= Secondary Contact Recreation (like fishing, wading, and boating) 10 CSR 20-7.031(1)(C)3. to 7.:* ***HHP*** *(formerly HHF) = Human Health Protection as it relates to the consumption of fish and drinking of water;* ***IRR*** *= Irrigation for use on crops utilized for human or livestock consumption* ***LWW =*** *Livestock and Wildlife Watering (current narrative use is defined as* ***LWP*** *= Livestock and Wildlife Protection)*

Table C-5. Summary of Permitted Outfalls for Sweetwater Mine and Mill – MO-0001881

Outfall	Description	Comments	Avg. Flow (MGD)	Design Flow (MGD)	Receiving Water	Class[4]	Designated Uses[5]	12-Digit HUC
#002	Mine dewatering and process wastewater from milling of lead, zinc, and copper bearing ores, tailings dam toe drain discharge, industrial sludge, truck wash water, laundry wash water, stormwater runoff from the facility and surrounding watershed that collects in Sweetwater tailings impoundment (No. 51 Lake or tailings impoundment) and undergoes treatment via settling.	Flows dependent upon precipitation. This is the main wastewater outfall for this facility. See Notes #1 and #2.	4.36	13.8 MGD Peak Flows	Adair Creek	C	HHP, IRR, LWW, SCR, WBC-B, WWH (AQL)	Headwaters Logan Creek 11010007-0401
#015	Stormwater retention basin. Under normal operations, the water in the retention basin is pumped back to the tailings impoundment with ultimate discharge through Outfall #002. Discharge permissible only under circumstances listed in special condition #15.	See Notes #1 and #3.	n/a	0	Tributary to Sweetwater Creek	C	HHP, IRR, LWW, SCR, WBC-B, WWH (AQL)	Headwaters Logan Creek 11010007-0401

Source: MoDNR 2020a. Missouri Clean Water Commission Missouri State Operating Permit Number MO-0001881 (February 1, 2021).
Notes:

1. The facility exceeded lead limitations twice at Outfall #002. There was no discharge from the stormwater basin, Outfall #015. A 2018 inspection of the facility found that it was not in compliance with permit limits. This facility is in Water Protection Program enforcement for limitation exceedances.
2. Outfall #002 - Mine water and process wastewater are pumped to the top of the tailings impoundment (No. 51 Lake) to undergo settling treatment. Stormwater is also pumped to the top of the tailings impoundment to achieve treatment via settling. A water treatment plant that became operational January 2017 treats process wastewater and stormwater from the tailings impoundment, as needed, by pH adjustment, coagulation, metals chemical precipitation, flocculation, clarification, and settling.
3. Permit No. MO-001881 Special Condition 15 (c) – "Discharge from outfall #015 in the absence of a chronic or catastrophic storm event is prohibited and a violation of the terms of this permit. The facility may discharge from outfall #015 when rainfall exceeds the 10-year 365-day rainfall event (chronic) or the 25-year 24-hour rainfall event (catastrophic) or other extreme or chronic events as included on the Design Storm Maps and Tables at http://ag3.agebb.missouri.edu/design_storm/, provided the facility manages the basins appropriately and makes all reasonable attempts to minimize discharges as a result of extreme or chronic precipitation events."
4. Class C - Streams that may cease flow in dry periods but maintain permanent pools which support aquatic life.
5. *10 CSR 20-7.031(1)(C)1.: **ALP** = Aquatic Life Protection (formerly **AQL**; current uses are defined to ensure the protection and propagation of fish shellfish and wildlife, further subcategorized as: **WWH** = Warm Water Habitat; **WBC** = Whole Body Contact recreation where the entire body is capable of being submerged; **WBC-B** = whole body contact recreation not supported in WBC-A; **SCR** = Secondary Contact Recreation (like fishing, wading, and boating) 10 CSR 20-7.031(1)(C)3. to 7.: **HHP** (formerly HHF) = Human Health Protection as it relates to the consumption of fish and drinking of water; **IRR** = irrigation for use on crops utilized for human or livestock consumption **LWW =** Livestock and Wildlife Watering (current narrative use is defined as **LWP** = Livestock and Wildlife Protection*

Table C-6. Summary of Permitted Outfalls for Brushy Creek Mine and Mill – MO-0001848[1]

Outfall	Description	Comments	Avg. Flow (MGD)	Design Flow (MGD)	Receiving Water	Class[6]	Designated Uses[7]	12-Digit HUC
#001	Mining and milling of lead, zinc, and copper-bearing ores, mine dewatering, personnel showers, sludge disposal, process wastewater, and stormwater runoff from tailing impoundments. Treatment via settling and additional treatment provided by a water treatment plant, as needed, by pH adjustment, chemical addition (CoMag) for metals precipitation, coagulation, flocculation, clarification, and additional pH adjustment.	See Note #2.	4.79	Treatment Plant = 7.2; max flow precipitation dependent	Lick Creek	C	HHP, IRR, LWW, SCR, WBC-B, WWH (AQL)	Upper West Fork Black River 11010007-0101
#002	Emergency spillway for the tailings storage structure basin. The tailings storage structure basin will be operated in a no-discharge fashion by pumping water to the treatment plant for treatment and discharge through Outfall #001. Discharge permissible only under circumstances listed in special condition #2.	See Notes #4 - #5.	0	0	Tributary to Bills Creek	C	HHP, IRR, LWW, SCR, WBC-B, WWH (AQL)	Upper West Fork Black River 11010007-0101
#003	Overflow toe drain basin. The toe drain basin will be operated in a no-discharge fashion by pumping water to the tailings impoundment for treatment and discharge through Outfall #001. Discharge permissible only under circumstances listed in special condition #2.	See Notes #3 - #5.	0	0	Tributary to Bills Creek	C	HHP, IRR, LWW, SCR, WBC-B, WWH (AQL)	Upper West Fork Black River 11010007-0101

Source: MoDNR 2020a. Missouri Clean Water Commission Missouri State Operating Permit Number MO-0001848 (July 1, 2020).

Notes:

1. This facility is not currently under enforcement actions with the Water Protection Program.
2. The facility has three outfalls. Outfall #001 may receive discharges directly from the treatment plant, the tailings impoundment, and the former mine water basin. Outfall #001 discharges to Lick Creek. The tailings impoundment is about 241 acres and has an emergency spillway discharging to Bills Creek through Outfall #002. The tailings impoundment includes a toe drain basin that has an emergency overflow discharge to Bills Creek through Outfall #003.
3. Permit No. MO-0001848 Special Condition 2 (b) – "Discharge from outfalls #002 or #003 in the absence of a chronic or catastrophic storm event is prohibited and a violation of the terms of this permit. The facility may discharge from outfalls #002 and/or #003 when rainfall exceeds the 10-year 365- day rainfall event (chronic) or the 25-year 24-hour rainfall event (catastrophic) or other extreme or chronic events as included on the Design Storm Maps and Tables at ttp://ag3.agebb.missouri.edu/design_storm/, provided the facility manages the basins appropriately and makes all reasonable attempts to minimize discharges as a result of extreme or chronic precipitation events. Any discharge from outfalls #002 and #003 must meet water quality standards in Table A of 10 CSR 20-7.031, and shall be monitored for the parameters, as described in (c) below".

4. Permit No. MO-0001848 Special Condition 2 (c) – "The facility must monitor daily for: the maximum discharge(s) flow in cfs, the median flow in Bills Creek upstream of outfalls #002 and #003 in cfs, the hardness in Bills Creek upstream of outfalls #002 and #003, and the content of total recoverable cadmium, total recoverable copper, total recoverable lead, and total recoverable zinc in the discharge(s) and upstream in Bills Creek".
5. Based on electronic discharge monitoring reports reviewed for the last five years prior to permit issuance, Outfall #002 did not discharge and Outfall #003 did discharge when limitations for cadmium, lead, and zinc were exceeded. Current Permit MO-0001848 establishes Outfalls #002 and #003 as no discharge permissible outfalls. The facility exceeded effluent limitations at Outfall #001 for total recoverable lead eight times; toxicity to Ceriodaphnia three times, and pH twice (below 6.5).
6. Class C – Streams that may cease flow in dry periods but maintain permanent pools which support aquatic life.
7. *10 CSR 20-7.031(1)(C)1.:* ***ALP*** *= Aquatic Life Protection (formerly* ***AQL****; current uses are defined to ensure the protection and propagation of fish shellfish and wildlife, further subcategorized as:* ***WWH*** *= Warm Water Habitat;* ***WBC*** *= Whole Body Contact recreation where the entire body is capable of being submerged;* ***WBC-B*** *= whole body contact recreation not supported in WBC-A;* ***SCR*** *= Secondary Contact Recreation (like fishing, wading, and boating) 10 CSR 20-7.031(1)(C)3. to 7.:* ***HHP*** *(formerly HHF) = Human Health Protection as it relates to the consumption of fish and drinking of water;* ***IRR*** *= irrigation for use on crops utilized for human or livestock consumption* ***LWW =*** *Livestock and Wildlife Watering (current narrative use is defined as* ***LWP*** *= Livestock and Wildlife Protection)*

Appendix D: Agency Coordination

Miller, Stephanie J

From: Weber, John S <John_S_Weber@fws.gov>
Sent: Wednesday, May 11, 2022 04:39 PM
To: Donkersloot, Danielle
Cc: Wadzinski, Kurt J
Subject: Re: Revised Section 7 Consultation, Doe Run acreage change

Importance: High

Dear Ms. Donkersloot,

The U.S. Fish and Wildlife Service has reviewed your May 11, 2022, email and enclosures requesting consultation on the proposed Doe Run Borehole Clearings in Iron and Reynolds Counties, Missouri and submits these comments pursuant to the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1544).

Based on the information the Service concurs with your determination that the proposed project is not likely to adversely affect federally listed species. Should the scope, timing, or manner of activity change, please contact this office.

Thank you for the opportunity to review the proposed project and please let us know what we can do for you in the future. We remain interested in discussing the lease in 2025.

Sincerely,

John Weber
Deputy Field Supervisor
Missouri Field Office
U.S. Fish & Wildlife Service
Cell: 573-825-6048

From: Donkersloot, Danielle <ddonkersloot@blm.gov>
Sent: Wednesday, May 11, 2022 10:17 AM
To: Weber, John S <John_S_Weber@fws.gov>
Cc: Wadzinski, Kurt J <kwadzins@blm.gov>
Subject: Revised Section 7 Consultation, Doe Run acreage change

Dear Mr. Webber, et al.

This is a revised Consultation Packet for proposed lease modifications. The only change to this proposed action is the disturbance area increased from **15.25 acres to 25 acres**.

In August 2020, the Doe Run Resource Corporation (Doe Run) requested a three separate lease modification for Fletcher Mine, Sweetwater Mine, and Brushy Creek Mine. The DOI-Bureau of Land Management (BLM) is requesting an informal Endangered Species Act Section 7 consultation on a proposed lease modifications in Shannon and Reynolds counties, Missouri, in the Mark Twain National Forest. The requested lease modifications support their mining activities on both forest service surface and private landowner surface. The current Doe Run leases includes mining of 3838 acres

and these lease modifications would allow access to another 1,550 acres of federal minerals, of which 50 acres are underlying Doe Run's private surface. They are proposing 61 drill sites, and up to 25 acres of clearing.

The Stipulations, Terms, and Conditions of the original 2015 leases of Brushy Creek, Sweetwater, and Fletcher, including the Forest Service Lease Stipulations, the BLM Terms and Conditions, Biological Opinion for the 2005 Forest Plan, and the 2015 Biological Opinion on Ongoing Activities on the Mark Twain National Forest, all still apply as this is a modification to existing leases.

In addition to the 2015 stipulations, terms and condition, Doe Run will comply with the attached USFWS Bat Tree Removal Decision Tree and as well as the USFWS General Project Design Guidelines for the species identified. We will still seek consultations for each site-specific proposal. The BLM Determinations for each species identified in iPaC is in the below. These determinations were made with the understanding that the stipulations, terms, and conditions will continue to be followed by Doe Run. Please see determination table below. Trees will only be cleared during the winter from November 1 to March 31. These leases are set to expire in 2025, at that time all stipulations, terms and conditions will be reviewed and updated accordingly.

For your review I have attached the following information:
iPaC Revised Species List **May 11, 2022**
Proposed project footprint
General Project Design Guidelines
USFWS Bat Tree Removal Decision Tree
Biological Opinion on Ongoing Activities on the Mark Twain National Forest (May 2015) (includes NLEB)
Biological Opinion for the 2005 Forest Plan

Let me know if you have any questions. We Look forward to your response within 30 business days. Thank you for your attention.

Regards,

Danielle

Species	**Scientific Name**	**Listing Status**	**BLM Determination**
Gray Bat	*Myotis grisescens*	Endangered	No affect
Hines's Emerald Dragonfly	*Somatochlora hineana*	Endangered	May affect but are not likely to adversely affect
Indiana Bat	*Myotis sodalis*	Endangered	May affect but are not likely to adversely affect
Mead's Milkweed	*Asclepias meadii*	Threatened	No affect
Monarch Butterfly	*Danaus plexippus*	Candidate	No affect
Northern Long Eared Bat	*Myotis septentrionalis*	Threatened	No affect
Ozark Hellbender	*Cryptobranchus alleganiensis bishopi*	Endangered	No affect

Virginia Sneezeweed	*Helenium virginicum*	Threatened	No affect
Indiana Bat Critical Habitat	*Myotis sodalis*	Final	May affect but are not likely to adversely affect

Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Michael L. Parson, Governor
Dru Buntin, Director

April 11, 2022

Wesley Willoughby
District Archaeologist
Bureau of Land Management
626 E. Wisconsin Ave., Suite 200
Milwaukee, WI 53202

Re: **SHPO Project No. 006-RE-22** – Proposed Doe Run Resources Company Lease Modifications in Reynolds County, Missouri (BLM/USFS)

Dear Wesley Willoughby:

Thank you for submitting information on the above referenced project for our review pursuant to Section 106 of the National Historic Preservation Act (P.L. 89-665, as amended) and the Advisory Council on Historic Preservation's regulation 36 CFR Part 800, which requires identification and evaluation of cultural resources.

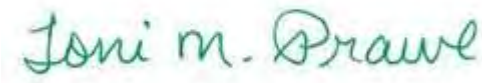
We have reviewed the information you provided regarding the above-referenced project. We concur with your determination that compliance with the existing lease stipulations and utilizing a deferred approach requiring additional site-specific review and analysis of proposed exploration areas, as well as requiring the avoidance and protection of any eligible or unevaluated heritage resources, will result in **no adverse effect** to historic properties.

Please be advised that, should project plans change, information documenting the revisions should be submitted to this office for further review. In the event that cultural materials are encountered during project activities, all construction should be halted, and this office notified as soon as possible in order to determine the appropriate course of action.

If you have any questions, please write Jeffrey Alvey at State Historic Preservation Office, P.O. Box 176, Jefferson City, MO 65102 or call (573) 751-7862. Please be sure to include the SHPO Project Number (**006-RE-22**) on all future correspondence or inquiries relating to this project.

Sincerely,

STATE HISTORIC PRESERVATION OFFICE



Toni M. Prawl, Ph.D.
Director and Deputy State
Historic Preservation Officer

c.: Daniel Cain, MTNF
Sherri Schwenke, MTNF

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Chuck Hoskin Jr.
Principal Chief
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Bryan Warner
Deputy Principal Chief
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April 19, 2022

Wesley Willoughby
United States Department of the Interior
Bureau of Land Management
626 East Wisconsin Avenue, Suite 200
Milwaukee, WI 53202-4617

Re: Doe Run Resources Corporation Lease MOBLMA-047477 (Fletcher Mine); Lease MOBLMA-079252 (Sweetwater Mine); Lease MOBLMA-046975 (Brushy Creek Mine)

Mr. Wesley Willoughby:

The Cherokee Nation (Nation) is in receipt of your correspondence about **Doe Run Resources Corporation**, and appreciates the opportunity to provide comment upon this project.

The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office (Office) reviewed this project, cross referenced the project's legal description against our information, and found no instances where this project intersects or adjoins such resources. Thus, the Nation does not foresee this project imparting impacts to Cherokee cultural resources at this time.

However, the Nation requests that the Bureau of Land Management (BLM) halt all project activities immediately and re-contact our Offices for further consultation if items of cultural significance are discovered during the course of this project. Additionally, the Nation requests that the BLM conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Office regarding historic and prehistoric resources not included in the Nation's databases or records.

If you require additional information or have any questions, please contact me at your convenience. Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs

Elizabeth Toombs, Tribal Historic Preservation Officer
Cherokee Nation Tribal Historic Preservation Office
elizabeth-toombs@cherokee.org
918.453.5389