SURFACE MININNG LAND USE PLAN
SAUNDERS DEMONSTRATION MINE (MINE ID NO. 2073)
SUPPLEMENTAL NARRATIVE

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1. Introduction

The Twin Pines Minerals, LLC (TPM) Saunders Demonstration Mine site is located near St. George, Charlton County, Georgia. The Heavy Mineral Sands deposits including zircon, titanium minerals (ilmenite, leucoxene, rutile), and staurolite occupy a portion of a relict beach ridge along Trail Ridge in Charlton County. The location and adjacent property owners are shown on the Mining Land Use Plan (MLUP) Sheets 1 and 2, respectively. The mine will extract these HMS reserves in a safe, cost effective, and environmentally sound manner for export by truck and rail to national and international customers.

The purpose of this demonstration mining project is to develop a high-quality HMS reserve to produce HMS concentrate products including titanium mineral concentrates and zircon concentrates to meet demands in a safe, cost effective, and environmentally sound manner. This purpose is also to confirm that HMS mining can be accomplished in an environmentally sensitive area with negligible impact to the site and surrounding resources.

The TPM mining plan and associated groundwater and surface water monitoring plan will be used to confirm the ability of HMS mining to be conducted within close proximity to sensitive environmental resources. The strategic significance of HMS is notable as this project will serve to decrease the United States dependence on foreign imports of critical minerals and the potential threats related to disruptions to those supply chains. As the economically viable locations for mining HMS within the United States are becoming scarce, it is vital that new mines be developed in such a manner as to minimize environmental impacts. TPM has completed extensive geologic and hydrogeologic evaluations of the Saunders Tract which culminated with the production of a groundwater hydrology model demonstrating that mining can be safely conducted within the demonstration mine area with negligible impact to the site, the surrounding area, and the Okefenokee Swamp. Small scale projects, such as the one, that can demonstrate sound environmental practices for extracting heavy mineral resources in environmentally sensitive locations, represent good stewardship of the environment.

2. Operator and General Information

2.1 Description of Twin Pines Minerals, LLC.

The Saunders Demonstration Mine is owned and operated by Twin Pines Minerals, Inc. The underlying real estate is owned by Trail Ridge Land, LLC, a wholly owned subsidiary of TPM.

TPM is a privately held mining company established to develop, construct and operate mines throughout the United States and to sell output to consumers throughout the world through long-term forward purchase contracts. Key management team has over 180 years of combined mining and geological experience.

3. Mine Information

3.1 Affected acreage

As shown on Sheet 2- Boundary Sheet, the mining area consists of one mining block (Saunders Tract) bounded by Georgia Highway 94 to the south, Trail Ridge Road to the east, T-Model Road to the west, and surveyed boundaries on the north. As shown on the Site Layout (Sheet 3 – Mining Plan Sheet), 703-Acre Permit Area includes the mine site (approximately 582 acres), a Pre-Concentration Plant (PCP), a Wet Concentration Plant (WCP), and a material transport road.

The approximate center of the site is located near latitude 30.523552°N and longitude -82.114521°W. According to the USGS Topographic Map, the elevation at the site mine excavation area ranges from approximately 155 to 175 feet above mean sea level (amsl). Currently a burnt-over pine plantation, the mine site has been used for industrial silviculture for at least the last 50 years.

3.2 Description of The Minerals to Be Mined

Mineral sands, titanium minerals (ilmenite, leucoxene and rutile), zircon, and staurolite occur in the upper 50 feet of sand in the Trail Ridge physiographic landform, which is an ancient beach ridge in Charlton County.

These minerals will be extracted, separate, and concentrated on site. After the HMS products have been separated, the final products will be containerized, bulk shipped or loaded onto trucks or rail dependent upon customer requirements.

These deposits include the primary ores of titanium dioxide (TiO_2) and zircon ($ZrSiO_2$). TiO_2 is primarily obtained from mining and processing the minerals ilmenite, rutile, and leucoxene. Leucoxene, not technically a mineral, is a higher quality derivative of ilmenite resulting from the preferential weathering and leaching of iron, which increases the TiO_2 percentage to greater than 70 percent. Zircon is recovered as a co-product from the processing of HMS deposits.

3.3 Description of Lands and Community to Be Affected

The mine site is located within a rural area that has historically and is currently managed for silviculture; specifically slash pine plantation in various stages of production. Off-site impacts due to dust and noise are not anticipated. Dust will be managed by applying water to haul roads and other high traffic areas. An electrically powered dragline will be utilized to minimize noise disturbance. The following land use types were identified within the mining area during pre-mining field evaluations:

- Southeastern North American Temperate Forest Plantation
- Recently Logged-Herb and Grass Cover
- Southern Coastal Plain Nonriverine Cypress Dome
- Developed-Roads
- Southeastern Ruderal Grassland
- Southern Coastal Plain Seepage Swamp and Baygall Woodland
- Atlantic Coastal Plain Upland Longleaf Pine Woodland
- Southern Coastal Plain Nonriverine Basin Swamp
- Southeastern Ruderal Shrubland
- Southeastern Native Ruderal Flooded & Swamp Forest

Land use types are classified in accordance with land use cover descriptions by Natureserve: *The Descriptions of Ecological Systems for Modeling of LANDFIRE Biophysical Settings, Ecological Systems* (2020). The dominant land use was managed pine silviculture (Southeastern North American Temperate Forest Plantation, Recently Logged-Herb and Grass Cover), which comprises greater than 88% of the existing land use.

4. Timeframe

After permit issuance, initial prep and facility setup is expected to take six months to one year to complete. Next, excavation of the mine pit will commence. The moving mine pit will progress at a rate of approximately 10 to 15 acres per month once all infrastructure is in place. The extraction of minerals sand is anticipated to take 4 to 5 years. The start of reclamation monitoring will begin after the dragline has moved approximately 1,000 feet north from each completed excavation transect line. Final site reclamation will be completed within 24 months following the completion of mining. Total expected mine life is 7 to 8 years.

5. Description of Mining Methods

5.1 Process

TPM has developed a heavy mineral sand mining technique using a dragline excavator, conveyor system for materials transport, and land-based processing plants. This mining technique is different from conventional "wet mining", which utilizes a dredge and floating concentrator to mine and process heavy mineral-bearing sands. In general, a dragline is a more efficient method for moving bulk material where long mining cuts and pits can be utilized. Employing elongated cuts allows for simultaneous mining the mineral sands and tailings placement to

occur in the same pit. This process will allow backfilling and rough grading to occur as close to +/-500 feet behind the dragline dig face.

The dragline method involves a large crane-like earthmoving machine equipped with a bucket to scoop material. The large-capacity bucket swings from cables on the end of the boom, scooping material that is then moved to adjacent areas. Draglines are electrically powered and run by two employees, an operator and an oiler. When mining is occurring, measures must be taken to protect the areas adjacent to the mine property. Appropriate sediment-control measures will be utilized to ensure that sediment-laden waters do not leave the mine property and affect local waterways.

A conveyor system is utilized to transport mined material to the PCP and WCP. Trucks will be used to transport the HMS concentrate from the WCP to the off-site Mineral Separation Plant (MSP). The locations of the mineral processing plants are depicted on Sheet 3 – Mining Plan Sheet The mineral processing plants are situated so that mineral processing activities are located close to the mining areas, which decreases material transport distances and energy demands. Process water ponds will be constructed adjacent to the processing plant creating an efficient method for process water reuse and recirculation. Sheet 5 – Mining Plan Sheet depicts a process flow diagram for the mining operation.

Mining will commence after the topsoil has been removed from the initial dragline mining cut. The topsoil will be stockpiled near the excavation, generally beneath or alongside the conveyor lines. Mine tailing stockpiles will not be mixed with topsoil stockpiles. The dragline will then excavate and temporarily stockpile the mined material. The material will then be transferred onto the conveyor system for transport to the processing plant. After processing, the tailings will be temporarily stockpiled adjacent to the processing plant. The tailings will then be transported back to the open mining cut via a tailings conveyor system. The back-filled area will then be recontoured, covered with topsoil and revegetated to comply with reclamation standards. The operation is a continuous process and while the dragline is operating, backfilling of the cut is occurring simultaneously.

5.1.1 Site Preparation

Prior to initiating mining activities, the project area will be delineated by survey markers, boundary markers, and flagging in the field to indicate the locations of permanent infrastructure and mining boundaries. A pre-mining survey using LiDAR will be used to create a topographic surface that will serve as a guide for design elevations for all post-mining reclamation. Merchantable timber will be harvested prior to the beginning of mining activities. Timber will be harvested on average 4 to 6 months prior to the initiation of mining in that area. Timber that is not merchantable and timber scraps will be removed by TPM and all areas within the limits of clearing and mining will be root raked, windrowed, and burned in compliance with Division of Forestry and/or county permits.

The first areas to be cleared will be for the processing facilities, initial mining area, and feed and tailings conveyors. Once the areas have been cleared, the permanent facilities and infrastructure will be constructed/installed along with the berms, stormwater controls, and other best management practices for sediment control.

The permanent facilities will consist of an interior road system, PCP/WCP processing facility, and off-site MSP, described further in the next section. Process water ponds will be constructed adjacent to the processing plant. TPM will also install two deep water wells (FWP-01 and FWP-02) screened in the Upper Floridan Aquifer to provide make-up water during times of need (locations shown on Sheet 3 – Mining Plan Sheet).

The feed and tailings conveyors will be constructed for the entire east-west length of the mining corridor from near T-Model Road to near Trail Ridge Road, where they will turn to the north towards the concentration plants, located near the northeastern portion of the mining area. A berm will be constructed along Georgia State Highway 94 to mitigate erosion and contain stormwater. Berms or other facilities may be constructed along T-Model and Trail Ridge Roads as necessary to control stormwater. Topsoil within each mining cell will be removed by heavy

equipment and transported to the topsoil storage piles adjacent to the mine pit. Additionally, silt fencing, brush barriers, and hay bales will also be utilized for erosion and sediment control (see Sheets 6 and 7– Erosion and Sediment Control Plan Sheets).

The topsoil storage piles/mining perimeter berms will serve to prevent stormwater runoff and sediment-laden waters within the active cut from leaving the site as well as preserve "seed banks" for native vegetation and a planting medium for later reclamation. Topsoil removal will be conducted two weeks in advance of mining activities. The topsoil storage piles will be stabilized with three horizontal to one vertical (3H:1V) internal slope and four horizontal to one vertical (4H:1V) external slope. As noted previously, silt fences and hay bales will be utilized along the outside of the topsoil storage piles to control post construction erosion.

The first step in the mining process will be rough clearing of the mining corridor ahead of the dragline. The initial mining corridor will be approximately 700 feet north to south which will allow for mining of three pit widths before relocating the feed/tailings conveyors. This clearing will extend +/-500 feet ahead of the mining and progress as the dragline advances. The clearing of this 700-foot north to south corridor is required to facilitate the advancement of the apron feeder and mobile conveyors as mining progresses to the east in the initial pit.

5.1.2 Excavation, Processing, and Backfilling

Excavation of the mining cuts will commence after the topsoil is removed. The mining process proceeds as follows: The dragline moves through the mining area excavating approximately 100-foot wide by 50-foot-deep cuts, in an east to west or west to east direction as shown on Sheet 4 – Mining Plan Sheet. A mining cut profile/cross-section is included as Sheet 5 – Mining Plan Sheet. Mining rates are anticipated to vary from approximately 100-200 feet of pit length excavation per day. The excavated material will be stockpiled nearby before being transferred to an apron feeder which feeds to a screen. The screen removes roots and other large objects. The material will then be transferred to a pit/feed conveyor system. The oversized organic material will be placed near the screen area for future deposit into the mining pit during the reclamation process. The pit/feed conveyor system feeds a mainline feed conveyor system. The mainline feed conveyor system will incline (or feed a stacker conveyor) and then feed the trommel (screen). The under-sized material from the trommel will be fed to the PCP as a slurry.

In the PCP, spirals will be used to separate the heavy mineral sands from the lighter clays and quartz sand. The heavy mineral sands will be fed to the WCP. The WCP further separates the lighter minerals from the heavy mineral sands creating the heavy mineral sands concentrate that will be trucked to the off-site MSP for final mineral separation. Process water will be recovered from the tailings and heavy minerals sands via a series of dewatering screens and hydrocyclones throughout the process. Humates and clays will also be separated from the process water as slimes within the PCP. The slimes will be separated from the process water in a thickener. The underflow from the thickener will be dewatered and temporarily stored before being transported back to and placed in the mined pit area for reclamation. TPM will utilize three lined process water ponds and one lined process water overflow pond to maintain the adequate volume needed to operate the PCP/WCP. Discharge from the overflow pond may occur due to heavy rain events. Such discharge will be routed to a NPDES-permitted outfall. Two water wells installed in the Upper Floridan Aquifer will be used to supply makeup water as needed to maintain adequate process water reserves.

The HMS concentrate material from the WCP will be transported to the off-site MSP, via truck. Water needed for processing at the MSP will also be provided by the make-up water wells. Water will be piped from well FWP-01 to the MSP plant. Once water has been used in the mineral processing it may be recycled for re-use at the MSP or transported to the WCP to be used in the processing of sands.

The MSP further separates the valuable and non-valuable mineral products such as zircon, titanium minerals (ilmenite, leucoxene, rutile), and staurolite etc. After products have been separated, the final products will be containerized, bulk shipped or loaded on truck or rail dependent upon customer requirements.

The tailings from the PCP/WCP area will be temporarily stockpiled. Tailings and slimes will then be loaded onto the mainline tails conveyor system. The mainline tails conveyor system will convey material onto a reclamation conveyor. The reclamation conveyor deposits the tailings back into the mined pit area for reclamation.

Water within the active mining pit is anticipated to be withdrawn only during upset conditions, i.e., equipment maintenance/failure, or due to a heavy rain event. This water will be pumped and treated, and either used as process water, or discharged through the NPDES-permitted outfall.

5.1.3 Mining Progression and Schedule of Advancement

Mining will initiate in the southwest corner of the mine footprint and will proceed in a west to east transect until the dragline excavator reaches the eastern mining boundary. Heavy mineral sands will be excavated from a moving mine pit that has a length of approximately 500 feet and a width of approximately 100 feet. Within one to two weeks of the commencement of mining, sand tailings will be returned to the pit as mining continues to advance. Once the dragline reaches either the east or west limit of mining, the dragline will reverse its course and mine the next adjacent transect in the opposite direction (Sheet 4 – Mining Plan Sheet). Additionally, a portion of the filled pit will be re-excavated by the next, adjacent dragline pass. This east-west alternating mining will continue throughout the entire course of mining until termination along the northern boundary of the mine footprint.

Mining will commence upon authorization and is expected to be conducted over a four-year period. The moving mine pit will progress at a rate of approximately 10 to 15 acres per month once all infrastructure is in place.

6. Erosion and Sediment Control

The Erosion and Sediment Control Plan is provided on Sheets 6 and 7, which provide for BMPs employed to control sedimentation, protect adjacent watersheds, and prevent erosion on the periphery of the property.

7. Reclamation

The Reclamation Plan is provided on Sheets 8 and 9. The reclamation objective is to restore the land surface and groundwater elevations approximately to pre-mining levels. The mine pit will be back-filled with processed tailings; all structures and materials associated with the mine will be removed; and the site will be revegetated with plant communities appropriate to pine flatwoods. Although some wetlands may be restored and/or created, no lakes will be developed.

7.1 Topsoil Use; Overburden (Spoil) or Refuse Disposal Placement or Use; Backfilling

Topsoil will be stockpiled and returned to the mined area upon reclamation. Spoil will be used to backfill the excavation. No other refuse will be generated.

7.2 Highwall Reduction, Grading and Sloping

The site will be graded and sloped to mimic pre-mining contours. No highwalls will remain.

8. Other Provisions for the Protection of the Environment and Resources of the State

8.1 Consistency with land use in the area

The mine will maintain consistency with land use within the area. As noted in correspondence from the Charlton County Board of Commissioners, dated November 12, 2020, Charlton County confirmed the mining operation is consistent with the land use in the area. Currently, Charlton County has no zoning regulations that prohibit the mining operation.

8.2 Wetlands and Streams

The proposed mining operation will not impact jurisdictional wetlands or streams. Copies of the U.S. Army Corps of Engineers Approved Jurisdictional Determination documents are provided as Exhibit A.

8.3 Protection of Properties on the National Register of Historic Places

No properties on the National Register will be affected by the mine. A copy of the Cultural Resources assessment is included as Exhibit B.

8.4 Protection of Contiguous Natural and Other Resources

The mine will operate pursuant to the various permits issued by Georgia EPD, which are designed to ensure protection of the environment. Contiguous natural and other resources will not be disturbed or significantly affected by the mining project.

8.5 Threatened and Endangered Species

The Saunders Demonstration Mine site was evaluated for the presence of protected species and/or their associated critical habitat(s) during 2018 - 2020. Referenced species surveys and habitat assessment reports are provided in Exhibit C. With the exception of the (Threatened) Wood Stork (Mycteria americana), which may forage on-site, but are not known to nest on site, no Federal protected species are known to occur on the project site. Gopher tortoise burrows are located adjacent to the Saunders Demonstration Mine site, only some of which were occupied by resident tortoises at the time of the surveys. The site and mine layout have been designed to specifically avoid areas of gopher tortoise burrows. No additional federally listed plant or animal species are known to occur on the demonstration project mine site (reference Exhibit C). One State protected species, the (Threatened) parrot pitcherplant (Sarracenia psittacena), was identified within the limits of the proposed year 4 mining progression area. Prior to mining in this location, TPM will coordinate with appropriate agencies to ensure that applicable relocation protocols are utilized to avoid impacting the parrot pitcherplant specimen. The findings of the resource evaluations suggest that the mining activities, including the rough clearing, will not have significant consequences to protected species. Furthermore, the demonstration mine site is not considered "Critical Habitat", per the U.S. Fish and Wildlife Service definition of this term, for any federally listed species.

9. Other Permits

Other required permits include:

- National Pollutant Discharge Elimination System (NPDES) Permit issued pursuant to the Georgia Water Quality Control Act, O.C.G.A. 12-5-20;
- Coverage under the General Stormwater Permit for Stormwater Discharges Associated with Industrial Activity, Permit No. GAR05000 (Issuance Date June 1, 2017);
- A Groundwater Withdrawal Permit issued pursuant to O.C.G.A. § 12-5-90.
- An Air Quality Permit issued pursuant to the Georgia Air Quality Protection Act, O.C.G.A. 12-9-1.
- (Potentially) A Radioactive Materials License for the handling of naturally-occurring radioactive materials (NORM), if required pursuant to O.C.G.A. § 31-13-12.

10. Additional Operator Submissions

- Bonding – Bonding will be completed upon approval of this application for surface mining.
- Annual Permit Status Report – An annual status report will be prepared by the Operator and submitted to the Division as required.
- Amendments to Plan – The Operator will submit any future proposed changes in this proposed plan to the Division for approval.
- Change of Ownership of Mining Operation – Should a change in Operator ownership of this mining operation occur, the new owner(s) will submit a new application and a new bond within 60 days from the date of consummation of the ownership change.
- TPM acknowledges that additional mining operations not included in this demonstration mine will require a new set of permits and a full permitting process.

11. Attachments

Exhibit A – USACE Jurisdictional Determination

Exhibit B – Cultural Resources Surveys

Exhibit C – Species Surveys and Habitat Assessments

Exhibit D – Groundwater-Level Monitoring Plan

Exhibit E – Impact of the Proposed Twin Pines Mine on the Trail Ridge Hydrologic System; January 14, 2020

Exhibit F – Subsurface Lithology of the Surficial Aquifer at Twin Pines Mine; December 11, 2019

Exhibit G – Assessing the Impact of Soil Amendments During the Reclamation of the Proposed Twin Pines Minerals, LLC Saunders Demonstration Mine Using Groundwater Models; November 13, 2020

Exhibit H – Subsurface Continuity of Humate-Bearing Sands in the Surficial Aquifer, Trail Ridge, Georgia; January 25, 2021

Exhibit I - Modeling the Groundwater Flow System at the Proposed Twin Pines Mine on Trail Ridge; July 16, 2021

GEORGIA REGISTERED No. PE022021 PROFESSIONAL ENGINEER SHERYLE G. REEVES

TTL

SHEET 14: SUPPLEMENTAL NARRATIVE

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE (ID NO. 2073)

ST. GEORGE, CHARLTON COUNTY, GEORGIA

DRAWN BY: DEK
CHECKED BY: SGR
DRAWING DATE: 11/13/2020
REVISION DATE: 7/16/2021
TTL JOB NO.: 000180200804.00
APPROX. SCALE: N/A