

Mining Land Use Plan Summary
Twin Pines Minerals, LLC
January 19, 2023

Twin Pines Minerals, LLC (TPM) has submitted environmental permit applications to the Environmental Protection Division (Division) proposing a demonstration project for mining heavy minerals sands near St. George, Charlton County, Georgia. The northern boundary of the site is located approximately 2.9 miles southeast from the nearest boundary of the Okefenokee National Wildlife Refuge.

The TPM Mining Land Use Plan (MLUP) will be used to determine the ability of mining to be conducted within proximity to sensitive environmental resources.

The O.C.G.A. § 12-4-72 Surface Mining Act and the Rules for Surface Mining 391-3-3 require the MLUP to contain a specific plan of action, being based on sound engineering and conservation principles, for accomplishing the operator's reclamation objective and for protection of adjacent watersheds from effects of erosion and siltation. In addition, where a mining site is to be located on lands or adjacent to lands containing natural or other resources which may be adversely affected by the mining operation, the mining operator shall include as an attachment to the Mining Land Use Plan, a plan to alleviate and/or mitigate adverse effects of such impacts.

The Division has been providing TPM with technical comments on the draft MLUP and accompanying documents. The draft MLUP is currently the only draft document open for public comment. While all comments are welcome, the Division is specifically interested in comments to address whether the draft MLUP and supporting documents adequately meet these statutory and regulatory requirements. All documents can be found at: <https://epd.georgia.gov/twin-pines>.

Once the MLUP is finalized, the Division will proceed with the draft permit process, including a public notice and comment period on the Surface Mining permit as well as any additional public comment periods for other required permits.

Environmental Provisions Addendum

The Division requested TPM to complete the Environmental Provisions Addendum Checklist. The checklist originates from the Georgia Environmental Policy Act as a tool to identify any significant adverse effects on the quality of the environment. After comments asking for more thorough explanations, the final draft is dated September 17, 2021. The Addendum provides a detail checklist with explanations of the resources of the State that may be impacted by the proposed mine.

Water

Stormwater

TPM has applied for an Industrial Stormwater NPDES Permit. Stormwater will be managed by eight outfalls and covered under the Industrial Stormwater NPDES general permit. Any pumped water or rainfall on the pit, process areas or ponds will be considered process (waste) water.

Process

No process water will be discharged from the site.

Process water will be managed under the Water Use Management Plan that is Exhibit L, dated November 28, 2022. Three lined process water ponds (P1-P3) and one lined process water overflow pond (P4) will be constructed for storing process water as part of the closed-loop water recycling system. The initial process water will be drawn from wells from the Floridan Aquifer pursuant to a groundwater use permit. To reduce the amount of groundwater withdrawn, all process water will be returned to the basin so that it can be continually recycled after use.

Along with the Process Water Ponds (Ponds P1-P4 on C-205), are supplemental water management ponds M1-M4. These additional lined ponds are shown on Drawing C-200 along with their total and working volumes. The ponds are interconnected with sluice gates so that the impounded water can be effectively managed.

In addition to storing rainwater, pond M1 will be used to store water pumped out of the mining pit should dewatering be necessary due to mining equipment breakdown or maintenance. Mine pit dewatering is a manual process consisting of personnel placing submersible pumps inside the mine pit and connecting them to above ground hoses that transmit the water to the pond M1. Planned shutdown/start-up of the mining operation requiring dewatering will only occur when adequate storage is available and when significant rainfall events are not forecast.

167 individual Varimax-40 evaporation units (or equivalent) will be installed within the Water Management Ponds to remove excess water. These units can remove up to 1,000 gpm in South Georgia. Details of the evaporation units are provided in SMULP Appendix U. A total of 193 units can be placed in the ponds based on the manufacturer's spacing recommendations, so additional units could be added if needed. An overall layout of potential evaporator locations is shown on C-530, C-532, and C-533. Evaporators are mobile and will be relocated as necessary to control water in Ponds M1 – M4. The floating platforms for the 167 evaporator units displace a total of 0.022 MG of water.

Reclamation

The Division has ensured that the MLUP Reclamation Plan clearly states how the proposed mine will be reclaimed. There are no jurisdictional wetlands on the proposed mine property.

At the end of the mining operation, the property will be graded and sloped with pond liners and berms removed. Water remaining in the ponds will be evaporated or hauled off in accordance with Division regulations.

Soil Amendment Plan

A soil amendment layer of 10.9% bentonite will be applied in an approximately 3-foot-thick layer. The purpose of this layer is to ensure that the homogenization of soils due to mining does not affect or alter the existing groundwater divide.

The soil amendment is intended to mimic the hydraulic conductivity of the consolidated black sands that underlay portions of the site. To provide information that may be needed for any future adaptive management response, the presence or absence of this soil type will be documented as the mining progresses. Soil borings will be placed in an approximate 200-foot by 200-foot grid within the mined areas. One sample will be collected from the approximate center of each grid cell before the cell is excavated. The presence or absence of humate-cemented black sands will be noted and documented.

TPM will submit the results (e.g., soil boring logs, cross-sections, isopach maps, etc.) of the subsurface mapping of the humate-cemented, consolidated black sands to EPD. If the mapping demonstrates the absence of humate-cemented, consolidated black sand within an area yet to be mined, TPM will request EPD's authority to proceed without the addition of the soil amendment layer in those specified areas. The bentonite layer recreating the humate-cemented, consolidated black sand will be continuous unless TPM receives EPD approval to discontinue application of the soil amendment layer in those specified areas.

Certification of the bentonite being placed will be verified quarterly to EPD.

Groundwater Monitoring

TPM will have a monitoring schedule (monthly during mining and semi-annual post mining) to ensure the bentonite put in place is doing what it is designed to do. Water levels will be tested, and a schedule will be followed. All work will be done with a PG or PE oversight.

A groundwater-level monitoring plan, action levels for compliance, and an adaptive management (or contingency) plan if groundwater levels are not restored is included in section 2, sheet 11 of the Groundwater and Surface Water Monitoring Plan of the Surface Mining Land Use Plan.

Post-mining groundwater levels will be considered to approximate pre-mining levels and the groundwater table will be considered to have been restored if:

1. post-mining groundwater levels remain within the normal range (2.7 feet above or below normal) established in the historic hydrograph data shown on sheet 13; and/or
2. post-mining groundwater levels fluctuate uniformly in the north, central, and south sections.

If the conditions described above are not achieved, TPM will notify the Director within 30 days of determining an impact condition exists. Such notice will include monitoring data along with relevant information.

No further action will be required if the unexpected condition can be attributed to factors unrelated to mining activity. If other causes for the change in water-level conditions cannot be identified, however, TPM will conduct further investigations to determine significance of the change,

potential causes, and potential solutions. A contingency plan to restore groundwater levels to pre-mining conditions will be prepared and submitted to EPD for its review and approval prior to implementation. The contingency plan will propose engineered solutions.

Monitoring will continue for a minimum of five years post mining.

Technical Comments

The Division has received several technical comments during the review of the MLUP. A concern regarding seepage from the surficial aquifer in the pit was thoroughly evaluated by the Division during the review process.

TPM has provided a conservative estimate of the rate of water seeping into the mining pit. This seepage rate is estimated to be 783 gallons per minute (or 1.13 million gallons per day, mgd). This estimate came from a revised version of TP's groundwater model. The process in determining this rate is reasonable. Assumptions made in the process indicate that estimated seepage rate is reasonable and yet conservative.

The seepage rate of groundwater seeping into the mining pit and the associated need to dewater the pit is an important input to the water management model. The evaporators and their ability to reduce storage in the water management pond system is another important input. The Divisions Hydrology Unit model also includes the updated consumptive water loss during the mining process (i.e. 10% of 3,000 gallons per minute, or 300 gallons per minute).

Assumptions made in the modeling process include (1) precipitation sequence from 1948 to 2021 as provided by NOAA and Georgia Automatic Environment Monitoring Network, (2) a constant inflow into the mining pit at a rate of 783 gallons per minute and the associated need to dewater the pit, (3) the stated consumptive loss at 300 gallons per minute in the mining process, (4) evaporators being turned on to reduce storage volume once water stored in the water management pond system is higher than five feet.

Modeling shows that the highest elevation reached under historical precipitation events is below six feet. It also shows that the average amount of make-up water needed from the Floridan Aquifer is de minimis. As described in TPM's responses, at the initial phase of this project, water needs to be pumped from the Floridan Aquifer (up to 1000 gallons per minute) to fill management ponds. Once the mining process is initiated, seepage water will likely supply most, if not all, of the makeup process water.

The hydrologic impact of a 1.44 mgd of water withdrawal from the Floridan Aquifer has been analyzed in a conservative way. The Hydrology Unit has modeled the impact of loss of water and concluded that water level in the swamp will be minimally impacted.