List of Project Hydrogeologic Tasks Completed or in Progress

TTL, Inc. (TTL) was contracted by Twin Pines Minerals, Inc. (Twin Pines) to perform a hydrogeological investigation of the proposed mine area and the adjacent properties owned by either Trail Ridge Land, LLC and TIAA Timberlands, LLC. The objectives of these studies are to 1) characterize the pre-mining conditions along Trail Ridge, 2) predict the impact of mining operations on groundwater discharge to wetlands adjacent to the proposed mine, and 3) evaluate the post-mining hydrogeologic conditions to inform reclamation/restoration efforts. The list provided below itemizes the investigative tasks either completed or currently underway at the site.

Please note that in order to evaluate the subsurface geology and hydrogeology, data acquisition field activities were performed both within the proposed mining area and on adjacent properties outside of the proposed mining area footprint. Reference to "study area" in the text below refers to field activities conducted within the proposed mining area and adjacent properties.

1. A reference list of 51 reports and technical publications was compiled and reviewed as part of the research for the project. A brief summary of the reviewed data indicates that the site is underlain by the surficial aquifer system which is comprised of post-Miocene age, unconsolidated sand and some clay. Underlying the surficial aquifer is the upper confining unit of the Floridian Aquifer System which consists primarily of the Hawthorn Group of late and middle Miocene age. The upper confining unit is reported to be greater than 100 feet thick and unbreached in the general vicinity of the site. Rocks of the upper Eocene (Ocala Limestone) represent the top of the Floridan Aquifer system and underly the Hawthorn Group. The elevation of the top of the Floridan Aquifer System is estimated to be about 400 to 500 feet below ground surface (or -300 to -400 feet below mean sea level) near the site. A north-south trending ridge known as Trail Ridge is also present at the site. Trail Ridge is about 0.5 to 1 mile wide and extends from northeastern Florida to southeastern Georgia and is generally composed of a fine to medium grained quartzose sand body. The Okefenokee National Wildlife Refuge is located approximately 3 miles northwest of the proposed mining area.

2. To evaluate the subsurface geology, TTL drilled a total of 18 exploratory soil borings to depths ranging from 60 to 135 feet below ground surface (bgs) across the study area. Each of the exploratory soil borings were terminated approximately 10 to 20 feet into the Hawthorn Group. In addition, 108 piezometers/observation wells were drilled and constructed to varying depths across the study area to investigate geologic and hydrologic conditions. Data obtained from these borings indicates that the study area is underlain by the surficial aquifer which ranges in thickness from about 45 to 120 feet. The surficial aquifer is predominantly comprised of a thick sequence of fine to medium grained sand and a lower sand that is often, but not always, slightly coarser grained in its lower part. Discontinuous layers of consolidated to semi-consolidated humate-cemented sands and silty clayey sands were observed in the upper 40 feet of soil within the study area. Clayey sands and clays were also observed in borings across