Supporting Documentation for Response to Comment 4(a)(iv)

Twin Pines Minerals, LLC (TPM) has conducted an analysis to evaluate the potential impacts to water supply watersheds in the vicinity of the proposed Saunders Demonstration Mine due to the pumping of process water from the Upper Floridan Aquifer.

Based on the well inventory prepared for the project, there are no public water supply wells in the area. The nearest known public water supply well completed in the Floridan Aquifer is located in Folkston, Georgia, approximately 22 miles northeast of the proposed Saunders Demonstration Mine Site. To the best of our knowledge, the nearest known private water supply well completed in the Floridan Aquifer is located at the Martin Marietta Materials – St Marys Sand Company, approximately 11 miles southeast of the proposed Saunders Demonstration Mine Site. Based on our review of readily available published information, there are four permitted water supply wells installed within the Floridan Aquifer in Charlton County, Georgia (see Table 1).

Three of the four water supply wells installed within the Floridan Aquifer are within the St Marys River Basin and one well is within the Satilla River Basin (Table 1). To compare the production capacity of Floridan Aquifer to the proposed withdrawal at the proposed Saunders Demonstration Mine Site, we evaluated the approved permitted withdrawal limits of the four permitted water supply wells to the proposed withdrawal rate at the mine site. The proposed withdrawal rate at the proposed mine site (1.44 million gallons per day (MGD)) is generally consistent with the permitted monthly withdrawal limit for the City of Folkston (1.50 MGD) and within the production capacity of the Floridan Aquifer.

The Theis (1935) solution is used to predict well drawdowns (s) caused by pumping in wells FPW-01 and FPW-02 over the 4-year life of the mine and determine the potential impact on nearby river basins. The Theis (1935) equation is given by

$$s(r,t) = \frac{Q}{4\pi T} W(u) , \qquad (1)$$

where Q is the pumping rate (500 gpm or 96,250 ft^3/day for each well), r is the radial distance from the well, T is the aquifer transmissivity, and $W(u)$ is the Theis well function, given by the exponential integral

$$W(u) = \int_u^\infty \frac{e^{-y}}{y} dy . \qquad (2)$$