TIPS Software Applied to Major Dewatering Effort and Mine Cleanup near Yellowstone National Park

The McLaren Tailings Site is an abandoned mine site near Cooke City, MT and is approximately 5 miles from Yellowstone National Park. The tailings are located in the historic channel of Soda Butte Creek. The majority of the tailings are water saturated; discharges of acid mine drainage from the tailings have contaminated Soda Butte Creek and are a primary source of dissolved metals entering Yellowstone National Park.

As the tailings are up to 35 feet thick and overlie an artesian sand and gravel aquifer, the design and implementation of a construction dewatering system represented a major component of the reclamation project. The dewatering system design included aquifer testing, drawdown analysis using the TIPs Aqtesolv software, and the design of a construction dewatering system including 17 groundwater pumping wells using the TIPs Groundwater Modeling System (GMS) software. As illustrated in Figures 1 and 2, the Aqtesolv software facilitated the estimation of key hydraulic parameters of the tailings and underlying aquifer.

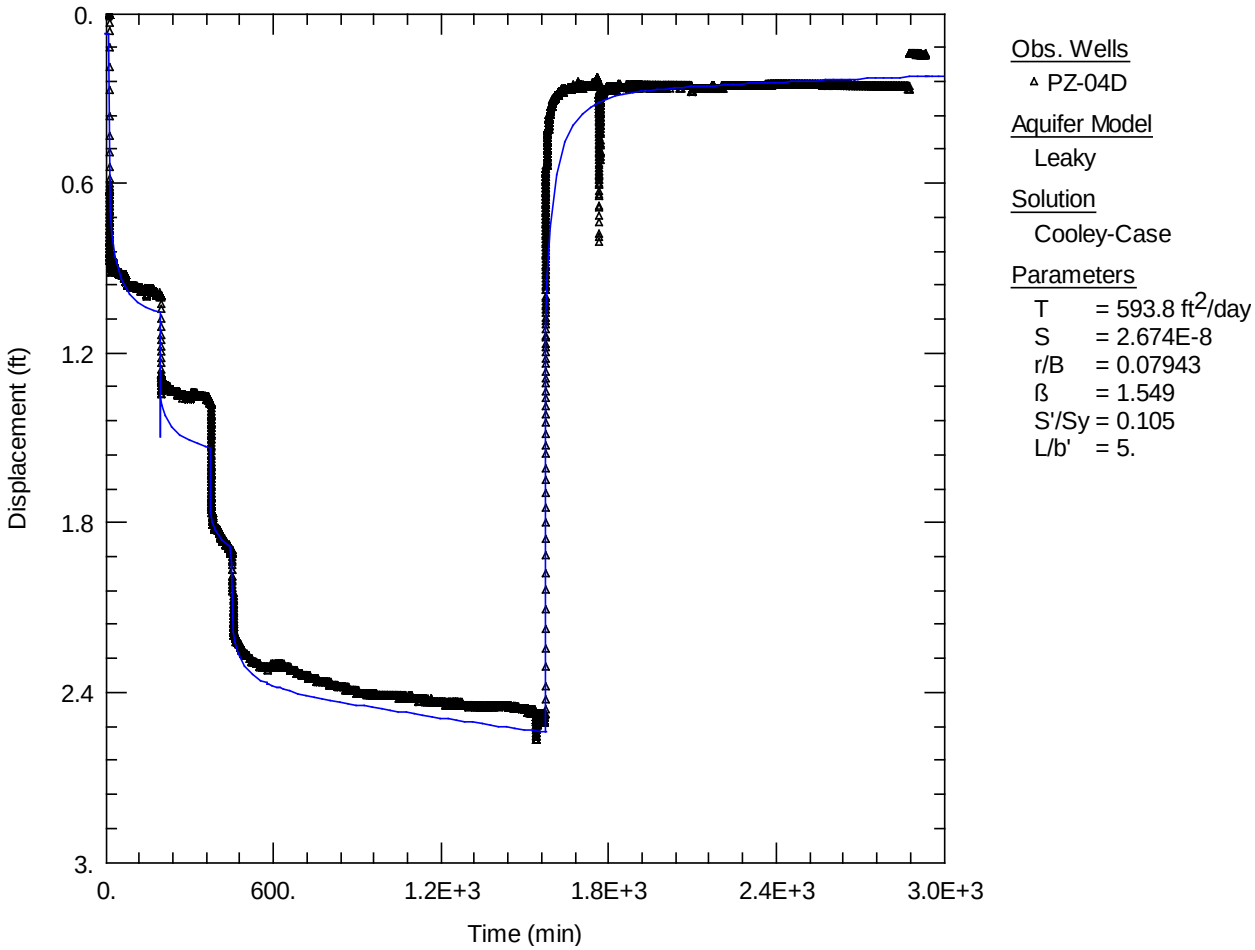

Figure 1 Drawdown in the alluvial aquifer modeled by Aqtesolv

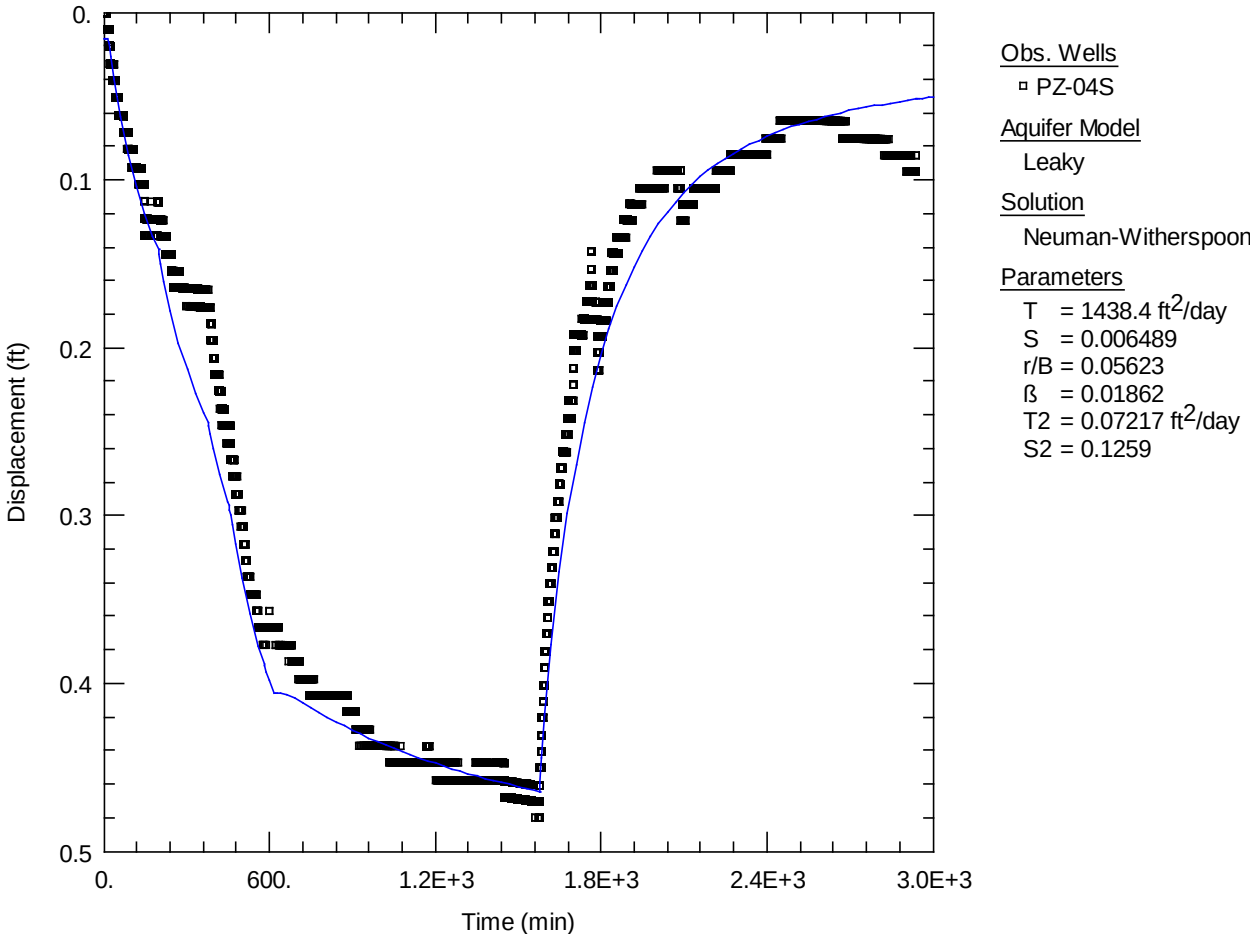

Figure 2 Drawdown in the tailings impoundment modeled by Aqtesolv

A three-dimensional mathematical model of the site was constructed using TIPS GMS software. The calibrated MODFLOW model was used to locate pumping wells, evaluate alternate design options, and develop a pumping schedule to address the seasonality of the hydrological system. Figure 3 illustrates the GMS MODFLOW model.

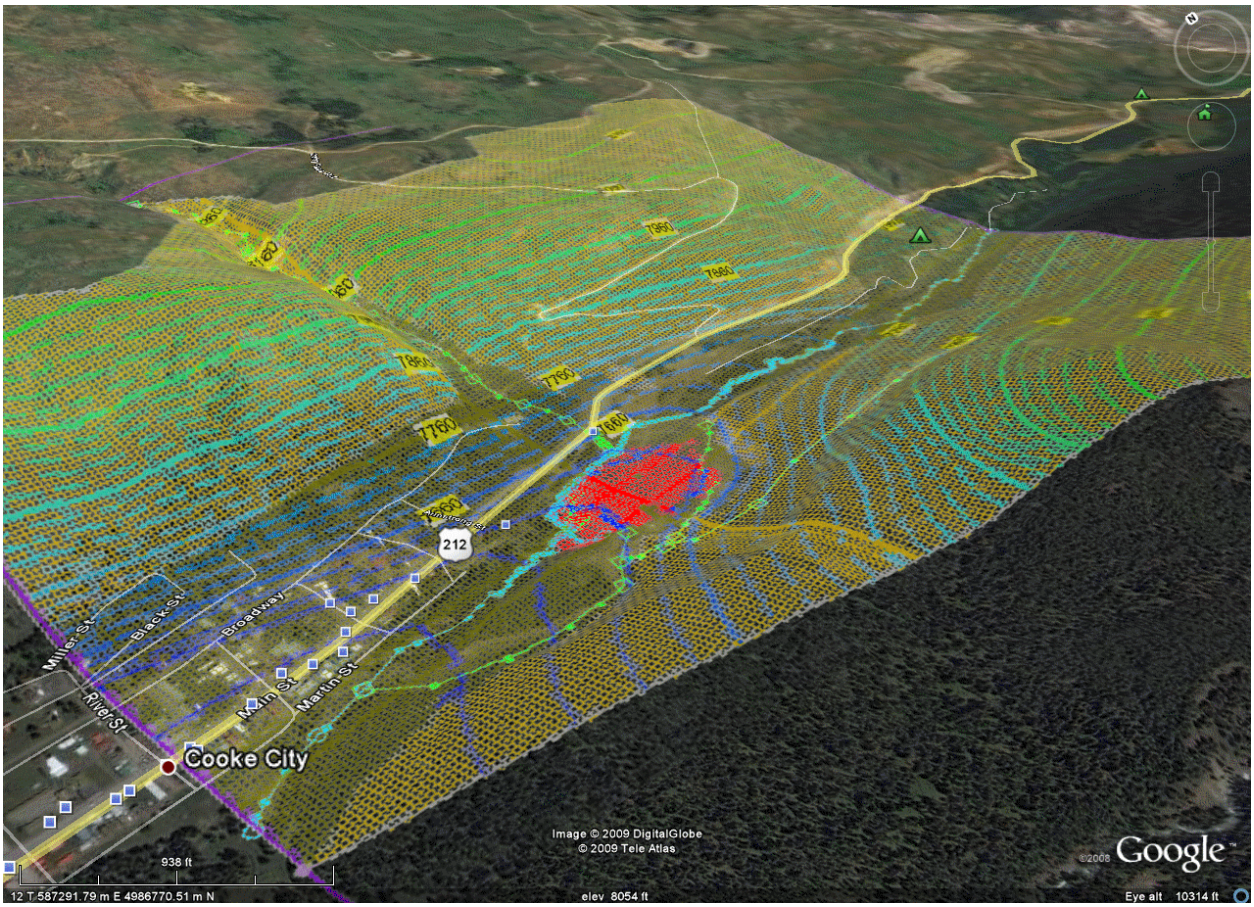

Figure 3 GMS MODFLOW model of the project area, with the tailings impoundment illustrated by the red area near the center of the figure.

The construction dewatering system was brought online in October 2011 and has remained in operation. The system has lowered groundwater in the tailings and underlying aquifer over 30 feet, allowing the excavation of the tailings. Prior to the dewatering , any excavation in the tailings rapidly filled with contaminated water. Figures 4 and 5 illustrate conditions in the tailings impoundment before and after the construction dewatering. Based on the success of the dewatering effort designed using TIPs software, the project is currently one year ahead of schedule. Major reclamation work is anticipated to be completed by October 2013.

In conclusion, the TIPs software has been a central component in the successful reclamation of a site characterized by difficult conditions located in an environmentally sensitive area.

Figure 4 Tailings prior to construction dewatering

Figure 5 Tailings excavation with active construction dewatering