LARGE TAILINGS PILE (LTP) ALTERNATIVE TREATMENT TESTING PROGRAM

Assessment of Potential Environmental Impacts

The zeolite testing on the LTP should decrease the concentration of uranium being injected into the tailings. The zeolite process should remove the majority of the low concentrations of contaminants that are presently being injected into the tailings. The uranium can be stripped from the zeolite if the pH is dropped. The pH will be automatically monitored at this test site which should enable adjustments to be made if pH conditions are getting too low. The total amount of uranium injected into the tailings would not increase, even if all the uranium loaded on the zeolite bed was stripped with a malfunction of the pH. Therefore, the zeolite testing on the LTP should not have any environmental effects because it cannot increase the quantity of uranium being injected into the tailings and very likely will significantly reduce the uranium quantity that is injected into the tailings.

Each of the *in situ* ground-water treatment test sites on the LTP are in areas where the uranium concentrations are elevated and therefore future restoration is required in each of these areas. The proposed additives have the potential to affect the tailings water concentration within 100 feet of the injection wells. Each of the additives will be consumed within a few months after the injection ceases. No water quality changes would be expected for a few months after the injection ceases, with the exception of observed uranium concentrations which will be significantly reduced if the treatment process is proven successful. The long-term potential for water quality change in the tailings water is the remobilization of uranium that has been precipitated as a solid phase in the tailings material. With time these tests should evaluate the stability of the constituents precipitated in the tailings material and if a significant increase in solubility of the uranium occurs restoration will have to be extended in the local area.

These long-time travel distances show that a constituent would have to be extremely conservative to move beyond the LTP. All of the planned additives are very reactive in the tailings solutions (e.g., phosphate amendments and sulfur-based reductants will react with tailings solution minerals and become immobilized; organic carbon will degrade away due to biological activity). Testing has shown that irrespective of the injection concentration of polyphosphate, all phosphorus, including degradation products, was removed via sorption and precipitation reactions (PNNL, 2009). This work also showed that in rigorous column testing effluent concentrations of phosphorus were at or below background groundwater concentrations. Additionally, phosphate readily precipitates with cationic species (e.g. calcium) as highly insoluble phases. Thus, the potential for downgradient transport and potential migration is minimal; there is also minimal concern

regarding mobilization of sedimentary components during treatment. Moreover, these studies have shown that there is no significant impact on the hydraulic conductivity of the aquifer. Finally, the test areas are under hydraulic control and water in the tailings is extracted and collected. Therefore, the potential for ground water changes in water quality from the alternate treatment testing does not exist.