

AN INVESTIGATION OF SEPARABLE ORGANICS FOR THE HANFORD TANK WASTE PRE-TREATMENT

HK Meznarich, Process Chemistry, 222-S Laboratory, Washington River Protection Solutions,
Richland, Washington 99354

Huei_k_meznarich@rl.gov

The Hanford tank wastes have been characterized and processed in order to treat and/or reduce radioactive waste. Some of the tank waste will be staged in double-shell tanks within the waste feed delivery system and then transferred to the Waste Treatment and Immobilization Plant (WTP). Before being transferred to the WTP, waste feed needs to meet the acceptance criteria for the WTP Pretreatment Facility. One of the acceptance criteria for the WTP Pretreatment Facility is no immiscible separable organics formation in the tank samples (24590-WTP-ICD-MG-01-019, *ICD-19 – Interface Control Document for Waste Feed*, Table 7)¹.

Tributyl phosphate, normal paraffin hydrocarbon, and di (2-ethylhexyl) phosphoric acid are the primary separable organics and have been used to extract and to separate plutonium and uranium. Hence, separable organics are present in some Hanford tanks. It is assumed that separable organics are degraded by hydroxide, heat, and radiolysis and coated on the solid phase of Hanford tank waste, but it is not well understood whether the separable organics can form a separable layer after being mixed and pumped into the WTP Pretreatment Facility. If a separable organic layer is formed in the tank, the waste will not be accepted by WTP.

A testing method was established to develop simulated solids retained with separable organics, which were then tested for formation of a separable layer after being mixed with simulated supernate.

This report provides the results of an investigation on formation of an organic layer from separable organics retained on the simulated solids pre-mixed with simulated supernate and solvent(s) (e.g., separable organics). In addition, archived samples of tank waste known to contain these phases were suspended in an aqueous simulant and allowed to settle. Separable organic layers were observed to form in some cases.

¹ 24590-WTP-ICD-MG-01-019, 2013, *ICD 19 – Interface Control Document for Waste Feed*, Rev. 6, Bechtel National, Inc., Richland, Washington.