

TECHNOLOGY@ROCKY FLATS

Demonstration & Deployment Summary

New Treatment Rids RFETS of Largest Low-Level Mixed Waste Stream

Summary

Approximately 732,000 gallons of pond sludge was stored at the 750 Pad. This sludge required treatment to remove free liquids and to meet Land Disposal Restrictions (LDR) standards before disposal at Envirocare of Utah. Material Stewardship contracted with Rocky Mountain Remediation Services (RMRS), and later Duratek-LATA LLC using shared funds from the Office of Science and Technology to conduct treatability studies to develop a recipe to treat the pond sludge for disposal.

Successful treatment recipes for three pond sludge types have been developed and implemented through a Process Control Plan reviewed and approved by the Colorado Department of Public Health and Environment (CDPHE). As the project progressed, process equipment modifications were also made to the sludge process located at the 750 Pad to optimize the addition of the reagents and to offer better process control of reagent addition. The treatment recipe and equipment additions were successfully implemented and the sludge was treated to meet all LDR and disposal site criteria. The treated waste is now being disposed of at Envirocare of Utah.

The Need

The Solar Evaporation Ponds were drained into 79 10,000-gallon tanks located in three waste storage tents on the 750 Pad in 1994 and 1995. The waste was characterized as low-level mixed waste (LLMW). The sludge met the radiological criteria for disposal at Envirocare of Utah but there were two obstacles that needed to be overcome. The sludge could not be disposed of in its current form due to free liquids, and the sludge from C-pond was not LDR compliant because of its chromium and cadmium contents. RFETS had the option of treating the waste to remove the water and then



Pond sludge tanks are stored on the 750 Pad.

ship it to Envirocare where it would be treated again to meet LDR standards. Or find a treatment to produce a final waste product that was LDR compliant and met all disposal criteria of Envirocare.

Kaiser-Hill used part of the funding to conduct treatability studies using Envirobond on A/B-pond sludge. The treatment was based on phosphates and chelating agents. This resulted in an LDR compliant waste form but, during the field implementation, it did not work as planned due to complexity of the equipment. Also, C-pond sludge needed additional treatability studies.

Classified as an orphan waste because the treatment path had not been determined, pond sludge was the largest LLMW stream left at Rocky Flats. An alternative stabilization process that worked was necessary in order to rid Rocky Flats of nearly three-quarters of a million gallons of waste.

The Technology

Development of a treatment recipe for the pond sludge required performing treatability studies on the pond sludge. Samples of pond sludge were taken from the tanks. Various reagents were then tested on the sludge.

The treatability studies demonstrated that when mixed with the correct amount of polymer, the pond sludge solidified enough to absorb the free liquids.

Pond sludge from the C-pond presented additional challenges. It was found from the treatability studies, that the addition of lime and soda ash would bind the metals to make the treated sludge LDR compliant. More tests were conducted to determine the optimal quantity of these two reagents that would be cost effective and still pass LDR standards. Additional treatability tests were done to determine the optimal quantity of absorbent polymer needed to be added to the sludge in order to comply with the waste disposal site criterion of no free liquids in the final waste product. Based on the above tests, a Process Control Plan was developed for the pond sludge and approved by the CDPHE.

The Project

The project began with the treatment and shipment of A/B-Pond sludge. A large tent was constructed on the 750 Pad designed to protect the workers from weather as they blended and loaded the sludge into the intermodal container. Three pumps were used to pump the sludge from the tanks to the blenders where the polymer was added. A paint test was performed to ensure the A/B-pond sludge met waste shipping criteria. If the paint test was successful, approximately 18 m³ of solidified sludge was loaded into the intermodal for shipping to the disposal facility. At the same time, near-



Workers vacuum pond sludge out of the heel of the tank.

empty tanks were cut into pieces down to a 3-foot heel where the remaining sludge was pumped by hand using a vacuum-type system. The pieces of tank and other associated waste were loaded into the intermodal on top of the sludge solution to maximize the waste shipping process.

When treating the C-pond sludge, more efficiencies were built into the process to create a safer work environment. In order to implement the successful recipe found during the treatability studies, an evaluation of the existing sludge processing equipment was made. The existing system used to process A/B- pond sludge relied on manual addition of absorbent polymer by the operators since the quantities of polymer added were less than 100 pounds per batch. Since the quantity of soda ash, lime and absorbent polymer required for the C-pond sludge is significantly greater than that required for the A/B-pond sludge, several chemical feeders were evaluated. Duratek-LATA selected and successfully installed an automated chemical feeder that would measure the required amount of the three reagents and feed these quantities into the blender. This chemical feeder allows the above three reagents to be added quickly into the blender resulting in labor savings from not having to manually introduce the reagents and better process control of the reagent addition. This improvement expedited processing of the C-pond sludge.

Results and Benefits

Full-scale treatment of pond sludge was successfully implemented during fiscal year 2003. The pond sludge treatment and removal project should be complete by the end of August 2003. The treated sludge has met all disposal and LDR standards and has been successfully disposed of at the disposal facility.

The goal of this project is to dispose of approximately 732,000 gallons of pond sludge by the end of fiscal year 2003. Successful completion of this project benefits RFETS by ensuring that the closure schedule is not delayed by having to store this large quantity of LLMW at the 750 Pad. Choosing to hire a contractor to treat the pond sludge at RFETS rather than sending it to Envirocare for treatment saved the Closure Project approximately \$5 million.



06-30-03 Harrison K-H Communications

Technology Supporting the Path to Closure

For more information about Technology at Rocky Flats, contact David Maloney, Kaiser-Hill Company, (303) 966-7566, or Gary Huffman, DOE, Rocky Flats Field Office, (303) 966-7490

