

## Case Studies Using RemeZyme Technology

**Client:** Superfund Cleanup site contracted to Seven-Seven Inc.

**Operator:** Seven-Seven Inc.

**Location:** Grand Junction, Colorado (Operator based in Ohio).

**Time:** March 1995

**Problems:** To cleanup an aged lagoon bottom sediments listed as EPA Superfund site. The contaminated sediments (AHD sludge) look highly viscous, similar to molten asphalt in appearance. Typical sample analysis shows about 40+ % aged petroleum hydrocarbon, including about 20 ppm of PCB, about 50 % water and sediments, plus various amounts of heavy metals such as 1800 ppm lead, etc.

**Solutions:** A bench top feasibility study was carried out in Houston during March 1995. In order to lower the viscosity of the AHD sludge sample, a lightend hydrocarbon, such as hexane, was added to the original AHD sample in a volume ratio of 1: 2, with a slight mixing process to create a wet paste and to reduce viscosity.

**RemeZyme** (3% solution) was added to the treated AHD sample in volume ratio of 3:1. By using a strong and thorough mixing process, the whole biological reaction was completed in less than 20 seconds of time, resulting in three distinct layers as follows:

Bottom Layer: Cleaned and polished solid sediments  
Middle Layer: A clean and brownish colored **RemeZyme** solution.  
Top Layer: A black colored and non-viscous hydrocarbon solution

These three distinct layers can be separated easily from each other using a simple centrifuge for solid-liquid separation, and Apollo oil-water separator for hydrocarbon and **RemeZyme** recovery. The recovered hydrocarbon oil can be sold as fuel oil, and the recovered **RemeZyme** solution can be reused again for further treatment of the AHD sludge, since it does not degrade nor deteriorate.

**Results:** This study was a complete success. The laboratory analysis shows the complete recovery of both hydrocarbon oil and **RemeZyme** solution, as well as cleaned solid sediment, which meets the legal requirements for land bury permits, rather than the untreated AHD, which is classified as hazardous on the EPA Superfund list.