

CASE STUDY #27

- Client:** I-10 Farms
- Location:** Interstate 10 on Harquahala Valley Road, Tonopah, Arizona
- Problem:** Soil contamination was discovered on the site as a result of the removal of five (5) underground storage tanks previously used for gasoline and diesel storage. The contamination was confined to the areas of the former tank pit and the adjacent fuel island.
- The results of the original sampling conducted when the tanks were removed reflected contamination in the range of 72 ppm of TPH to 26,000 ppm of TPH. No BTEX was discovered.
- Site characterisation, to determine the vertical and lateral extent of the contamination, was performed on April 21, 1997. In order to perform site characterisation, utilising a truck mounted drill rig, the tank pit had to be back filled with the original soil previously removed and stock piled.
- Laboratory analysis results, confirmed that the contamination was in a confined area, approximately 5 feet to 10 feet below surface grade (BGS), and along the sidewalls of the tank pit. No contamination was discovered below 15 feet (BGS).
- Biological Treatment:** On July 10, 1997, PHase III, Inc. & RAL Consulting initiated in-situ (in place) bioremediation (bioaugmentation) of the tank pit and the back filled soil.
- A truck mounted drill rig was utilised to provide eight (8) pilot holes 6 inches in diameter and 12 feet deep along the contamination zone in the tank pit.
- Eight (8) 4 inch by 12 foot plastic perforated pipes were installed in the pilot holes.
- In order to provide a seed base for the hydrocarbon consuming bacteria (PDM-7 HC), 150 lbs. of water soluble 20-20-20 fertiliser. was mixed with 4,200 gallons of water and injected under pressure into the eight (8) perforated pipes.

Biological Treatment Continued:

On July 30, 1997, the initial inoculation of the tank pit was conducted. 330 gallons of PDM-7 HC Microbial Cultures were mixed in approximately 1,000 gallons of water and was pressure injected into the perforated piping. Broadcast spraying over the entire surface of the tank pit with 110 gallons of PDM-7 HC Microbial Cultures mixed into 1,000 gallons of water followed the injection process.

At the time, a sprinkler system was set-up in the tank pit area in order to provide continual moisture application to the soil.

On August 7, 1997, the tank pit was again inoculated with 220 gallons of PDM-7 HC mixed in 800 gallons of water. Broadcast spraying and visible flooding of the tank pit followed (sprinkler was removed).

On September 4, 1997, verification soil sampling was conducted on the tank pit. A truck mounted drill rig with a hollow stem auger was utilised to advance borings to a depth of 10 feet BGS adjacent to each injection pipe. Soil samples were obtained with a stainless steel split-spoon sampler with brass sleeves that was advanced through the hollow-stem auger.

Samples No. 94-1 thru 94-5 were taken at 10 feet BGS. Samples No. 94-6, 94-8 and 94-10 were taken a 5 feet BGS. Samples No. 94-7, 94-9 and 94-11 were obtained in the same boring locations at 10 feet BGS.

The brass sleeves were sealed with Teflon wipes and capped with plastic caps. The samples were placed in an ice filled cooler for transportation to Aqualab Laboratories for analysis. The samples were analysed for Total Petroleum Hydrocarbons (TPH) Method 418.1 AZ Modified., and Benzene, Ethylbenzene, Toluene and Xylenes (BTEX method 8021A).

Biological Treatment Results:

<u>Sample Number</u>	<u>Prior To Inoculation (TPH)</u>	<u>After Bioremediation (TPH)</u>	<u>Reduction Percentage</u>
94-1	3,000 ppm	29 ppm	99%
94-2	16,000 ppm	294 ppm	98%
94-3	16,000 ppm	270 ppm	99%
94-4	16,000 ppm	3,160 ppm	81%
94-5	17,000 ppm	828 ppm	95%
94-6	4,000 ppm	625 ppm	85%
94-7	4,000 ppm	0 ppm	100%
94-8	26,000 ppm	1,470 ppm	99.5%
94-9	26,000 ppm	23 ppm	99.8%
94-10	13,000 ppm	29 ppm	99.9%
94-11	13,000 ppm	0 ppm	100%

Summary: Successful in-situ bioremediation of the former tank pit was achieved in **56** days (July 10-September 4).

In addition, because of the amount of PDM-7 HC that is still active in the tank pit, continued degradation of TPH will be ongoing until there are no more hydrocarbons to absorb.

Cost: