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SITUATION REPORT ON BIOREMEDIATION OF SOIL AT OPERABLE UNIT 2 (OU 2) SITE 5

NAS CECIL FIELD FL

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ABB ENVIRONMENTAL SERVICES INC

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SITREP #1

NAS CECIL FIELD

Situation Report on Bioremediation of Soil at Site 5

What we had. Site 5 was a waste oil disposal pit containing 16,300 cubic yards of soil and rubble contaminated with petroleum and solvents. The major contaminant at the site was petroleum, measured as ***total recoverable petroleum hydrocarbons (TRPH)***, found at concentrations up to 24,000 mg/kg.

What we did. An interim action record of decision (IROD) was signed in September 1994. The IROD called for excavation and biological treatment of soil. A treatment unit, called a ***biocell***, was constructed and loaded with 2000 cubic yards of contaminated soil placed in 16 ***windrows***. A cleanup goal of 50 mg/kg TRPH was established in the IROD based on Florida cleanup levels for thermal treatment. There were no cleanup standards promulgated for biological treatment processes.

The soil in the windrows were aerated (turned with large machinery similar in concept to a garden roto tiller). Nutrients (fertilizer) were added periodically to enhance the biological activity. The biocell was in operation for about 6 months (December 1995 through June 1996). TRPH concentrations remained above the cleanup goal of 50 mg/kg (ppm). When the biocell operation was stopped, the TRPH concentrations had only reached 99 mg/kg. Heavy rains compounded the aeration process and created a water disposal problem.

Why we stopped. The biocell operation was terminated because the chosen cleanup technology proved cost prohibitive. Although the Team realized that the conservative cleanup goal of 50 mg/kg TRPH could not be readily achieved due to the organic carbon content in the soil,, simply changing the cleanup goal would not address the exorbitant cost of the aeration process.

Weekly operation costs were on the order of $13,000 and funds programmed for the entire cleanup were almost expended on the first 2000 cubic yards of soil. There is approximately 6,000 cubic yards of soil remaining requiring some form of treatment. The biocell operation was halted while the team evaluated the possibility of other less expensive technology, possibly combining the remaining soil treatment with the planned insitu air sparging groundwater treatment method.

What we've learned:

- A site-specific leachate test was performed on the remaining in place soil to see if the soil would continue to act as a source of contamination to groundwater (the sponge effect). The test confirmed that soil below 20,000 mg/kg does not pose a leachate problem, indicating insitu treatment methods are an acceptable alternative for treating the remaining soil.
- The remaining soil with concentrations of TRPH above 20,000 mg/kg may be treated *insitu* without contributing to further groundwater contamination.

- There is an extensive amount of large concrete rubble buried at the site, possibly posi for insitu soil treatment due to the potential for preferential pathways for any air in ground surface.
- We identified an optimum aeration rate for Site 5 soils in windrows of once every three

Future Cleanup Options:

1. Regardless of cleanup option(s) selected, amend the IROD and establish a new risk-base level that is protective of human health and the environment.

2. Continue to operate the biocell with the newly established cleanup goal. We will still t the high operation and maintenance costs and the water disposal problem.

3. Treat the remaining soil in conjunction with the *insitu* groundwater treatment method (Groundwater cleanup will be completed in 2-5 years. Soil cleanup time is unknown and the rubble causing preferential pathways for the air sparging is still in question. Howe groundwater must be treated, the option of trying the ***insitu*** soil treatment option appea it does not work, we can always excavate later. There is relatively little additional cos the soil in conjunction with the groundwater. There is no reuse driver at this site, s critical.

4. Excavate the remaining soil and treat ***exsitu*** using another technology, such as ***biop*** treatment includes excavating and stockpiling the soil on a liner and injecting compress lines placed throughout the piles to enhance biological activity. The piles are polypropylene to prevent any stormwater collection or runoff problems. However, requiring excavation is normally more expensive than *insitu* methods, depending on the ti method must remain in operation to meet cleanup goals.

5. Excavate only the hottest remaining soil and treat *exsitu* using either the biocell o technology, such as biopiles. After excavation of the remaining hottest soil, treat the re conjunction with the *insitu* groundwater treatment method. The only advantage of this it should reduce the soil cleanup time and reduce long term treatment costs. Additional is needed to determine the break-even point and will depend on the cleanup goal establis

What to do. The Team must evaluate treatment times of the various options, develop each option, and rank each option to total life cycle costs and potential for success.

Glossary

Biocell: A treatment unit where breakdown of contamination (biodegradation) takes place.

Biopile: Excavating and stockpiling soil on a liner and injecting compressed air via air lines placed throughout the piles to enhance biological activity.

Exsitu: Refers to first moving the contaminated material before treatment. This is usually accomplished by pumping groundwater or excavating soil then placing it into a treatment unit.

Insitu: Refers to treatment "in place" (i.e., moving the contaminated material into a treat

Total Recoverable Petroleum Hydrocarbo A laboratory measurement of the conc petroleum in a medium (e.g., soil or groundw

Windrow: A row of soil placed in a manner treatment of contamination.