Assess  Design  Implement

Remediation Technologies Symposium
2009

Guaranteed Site Remediation Solutions
Remediation Technologies Symposium 2009

Biotreatment of Oily Sludges

Presented by: Jeff Dirks

Guaranteed Site Remediation Solutions
Site History

- Petrochemical plant near Montreal, Quebec, in an industrial area
- Sedimentation pond in use since the 1960s
- Oily sludge was characterized between 1998 and 2001
- TPH content averaged 170,000 mg/kg (17%)
- Pond had to be partially rebuilt
Mandate and Objectives

• Meet client’s and Biogenie’s expectations related to health and safety and environment
• Removal of oily sludge and impacted clay at the bottom of the pond
• Change the property of the impacted material in order for it to be received at a non-hazardous landfill
• Redesign of the pond to meet current provincial regulations
Treatability Study

- Determine the best bulking agent
- Sludge amended with organic and inorganic nutrients
- Estimate performance and duration of treatment
- Determine the presence of inhibitors (e.g. metals)
Sludge Characteristics
Remediation Strategy

Biotreatment of impacted waste using the ex situ Biopile

- Construction of two treatment pads (capacity of 5,000 m³ each)
- Soil amendment with bulking agent and nutrients
- Soil transport
- Periodic soil tilling
- Monitoring of equipment and soil condition
- Disposal at an authorized landfill
Treatment Pad Construction
Sludge - Initial State
Access Ramp
Sludge Loading
Stockpiling of the Sludge
Truck Cleaning
View of Treatment Pad #1
Sludge Watering
Project Results

• Hydrocarbons had a final average concentration of 10,000 mg/kg
• All others control parameters were below the applicable criteria (BTEX, PCBs, PAHs, metal leachate)
• Air treatment results showed concentrations below the applicable criteria\(^{(1)}\)
• Total treatment time: 5 months

\(^{(1)}\): Montreal Urban Community (CUM) and Provincial Guidelines
Temperature Evolution in Biopiles

- **Avg T at d=1.7 m**
- **Ambient T (diurnal)**

Time (Week)

Temperature (°C)
Mass Balance

(Sludge Mass Breakdown in m.t. before and after treatment)
Pond Reconstruction

- Reshape the berms and preparation of the bottom
- Installation of a drainage system and membrane
- Reconstruction of the dam
Berms Reshaped
Drainage System
Membrane Installation
Membrane Installation (continued)
Dam Prior to Reconstruction
Dam Following Reconstruction
Impermeable Liner Pipe Junction
Impermeable Liner Dam Junction
Health and Safety

• Approval of our Program by the client
• Job Safety Analysis process applied
• External audits were completed during the project
• Ambient air quality tests were performed by an industrial hygienist
• Training given by the Quebec Petrochemical Institute to all employees
• Blood screening prior to and after the project for field personnel
Questions?

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