

Recovery of Oil from Sludge Pits Using Three Phase Centrifuge Technology

Water Resources Development and Environmental Protection in GCC

5th Joint KISR-JCCP Environmental Symposium

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Dec. 15-17, 2014

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Presentation Outline

- Typical Waste Stream Generated by O&G Industry
- Impacts of Hazardous Waste
- Sources of Oily Waste Generation
- Oily Waste Management
- Waste Management Hierarchy
- Case Study GOSP
- Summary

Typical Waste Steams Generated by O&G Industry

- Oily water
- Oily sludge
- Spent catalyst
- Spent caustic
- Spent cleaning solvents
- Spent filters
- Pyrophoric scales
- Contaminated soil
- NORM waste
- Laboratory waste









Impacts of Hazardous Waste

- Public health
- Soil degradation
- Groundwater contamination
- Surface water contamination
- Impact on flora and fauna
- Air quality
- Property value depreciation







Sources of Oily Waste Generation

- Upstream
 - Emergency oil pits
 - Drill cutting waste
- Downstream
 - Pipeline scraping
 - Refinery & GOSP wastewater
 - Tank bottom sludge







Oily waste Management Old Practices

- Unlined oil pits
 - Soil and groundwater contamination
 - Ecological risks
- Landfarming
 - Resource degradation
 - Soil and groundwater contamination
 - Liability risks

Oily Waste Management New practices

- Resource recovery technologies
 - Three phase centrifuge
 - Thermal desorption
 - Waste to Energy
 - Bioremediation
 - RR is no longer feasible
 - Reduce contaminants concentration
 - Effective under controlled conditions









Waste Management Hierarchy

- Prevent waste generation
- Minimize waste generation
- Reuse waste whenever possible
- Recover resources from waste
- Treat and dispose waste





Case Study- GOSP

Project Objectives

- Oil recovery from a legacy pit
 - Separation of oil, water, and solids
- Enhanced bioremediation
 - Excavate contaminated soil / sand
 - Use a bioremediation technology to treat soil



Centrifuge Set Up for Oil Recovery





Separation of Oil, Water and Solids

- Three-Phase Centrifuge Unit
 - Production capacity -10 m3/h
 - Quick Mobilization &
 Demobilization time
 - Removal of oil and sludge
 - Heat treatment
 - Centrifugation to separate oil, water & solids
 - Over 8,500 m3 of oily water removed





Engineered Biopiles







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Process Condition in Biocells

- Microbial inoculum developed on site
- Moisture: 8-12%
- pH 6.7 7.4
- Total Microbial count: 105 108 CFU/g
- Air / O2 supply
- Covered to retain moisture
- Treatment time 4-12 weeks



Approximately 3,000 m3 of contaminated sand was removed and treated



Biopile Treatment Results

Average TPH and Moisture Treatment Biocells





Treated Biocell Being Leveled



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Recovered Oil Sample

- Around 50,000 bbl of oily sludge removed from the pit
- 47,000 bbl (>7,700 m3) of oil removed
- Recovered oil value covered remediation costs and generated revenue.



Summary



- Oily waste shall be looked at as a resource NOT as a waste
- Recovery of oily waste reduce environmental risks and increase company's revenues
- Bioremediation can reduces hazardous contaminates in soil
- On-site oil recovery and bioremediation can reduce transportation risks



Thank You

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