Water Quality Nutrients, Contaminants and Sustainable Sediment Management Session

Wastewater Management at a Rubber Processing Facility, Liberia, West Africa

Wednesday, August 3, 2011
9:10 – 9:30

Nicholas Albergo, P.E., DEE
President & CEO

HSA Engineers & Scientists, Tampa Florida
Water Quality Nutrients, Contaminants and Sustainable Sediment Management in Liberia, West Africa

Nicholas Albergo, PE, DEE  President & CEO
Harbel, Liberia (West Africa)
Raw Material Cultivation

Latex Harvesting

Rubber Storage
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Improving Water Quality of Farmington River

- Discharged to River for at least 80 Years
- COD, BOD, TSS, Nutrient Loading
- River Used for Fishing, Drinking Water, Bathing, cooking and Laundry
- Aesthetics
Primary Wastewater

Latex Collection

Latex Processing
Secondary Discharges

Rubber Processing

Rubber Storage
River Used for Everyday Life

Primary Goal to **Eliminate** Discharge to River

- Travel
- Drinking Water
- Bathing
- Cooking
- Laundry
- Swimming
- Fishing
- Hunting
Separate Stormwater from Process Water

- Utilize Existing Collection System to Separate Flows
  - Gravity Flow (Power Savings)
  - Less Water to Treat
- Design and Construct Stormwater Ponds
- Route Stormwater to New Ponds
- Route Process Water to Central Location for Treatment
- Primary Treatment System
  - Equalization of Flows
  - Biological Treatment (COD and BOD Reduction)
  - Sedimentation (TSS and Nutrient Removal)
- Wetland Treatment
  - Power Savings
  - Polishing of Residual Nutrients
Existing Infrastructure
Primary Treatment

Stormwater Treatment
Utilization of Wetlands

- Secondary Treatment for Removal Residual Nutrients and TSS
- Reduction of Power Consumption
- Low Maintenance
Utilization of Wetlands

- Large flat land area
- Established vegetation
- Long residence time
Material Selection

4x8 glass lined steel plates
- Fit in shipping container
- Replaceable

HDPE Pipe
- Flexible
- Corrosion Resistant
- No Leaks
Power Limitations

Power Generated from Hydroelectric Dam and Diesel Generators
- Low Water in Winter
- Fuel Costs

Treatment System Designed to Limit Power Consumption
- Complete Gravity Flow for Stormwater
- Gravity Flow through Treatment Tanks
- Wetlands Treatment
Utilization of Local Manpower

- Hired Up to 200 Local Residents During Project
- Several Residents Achieved Full Time Employment
- Influx of Money into Local Establishments
Specialized Training

Trained Selected Group with Skills for Future Employment
The Results

Trained Selected Group with Skills for Future Employment