

Rubble Disposal Area Long-Term Monitoring - 2007

**Restoration Advisory Board Meeting
May 8, 2008**

**Phoebe Call
Tetra Tech NUS**



Tonight's Objectives

- Update RAB on long-term monitoring (LTM) activities completed in 2007.
- Describe LTM components installed in 2007.
- Discuss 2007 LTM analytical results.
- Summarize 2007 facility inspection observations.
- Present 2007 post-remedial wetland monitoring results.

LTM Plan Activities

- Quarterly for 1st 2 years, then semi-annual:
 - Groundwater, surface water sampling and analysis
 - Landfill gas monitoring
 - O&M facility inspection
- Semi-annually:
 - Wetland monitoring
- Annually:
 - Sediment sampling and analysis*
 - Settlement survey

*2007, 2008, before 5-year review in 2009, either 2010 or 2011.

ROD-Specified Cleanup Goals

- **Groundwater:**
 - **Arsenic – 10 µg/L**
 - **Benzo(a)pyrene – 0.2 µg/L**
 - **Manganese – 313 µg/L**
- **Groundwater data also compared to MCLs/MMCLs.**
- **No cleanup goals specified for surface water and sediment.**

LTM Groundwater Components

- 7 wells, 7 piezometers, and 7 staff gauges installed on/near RDA in February-March 2007.
- All 10 wells (7 new, 3 existing) and 7 piezometers developed.
- Groundwater sampling and field measurements completed in March, June, September, December.

Monitoring Well Installation in Wetland



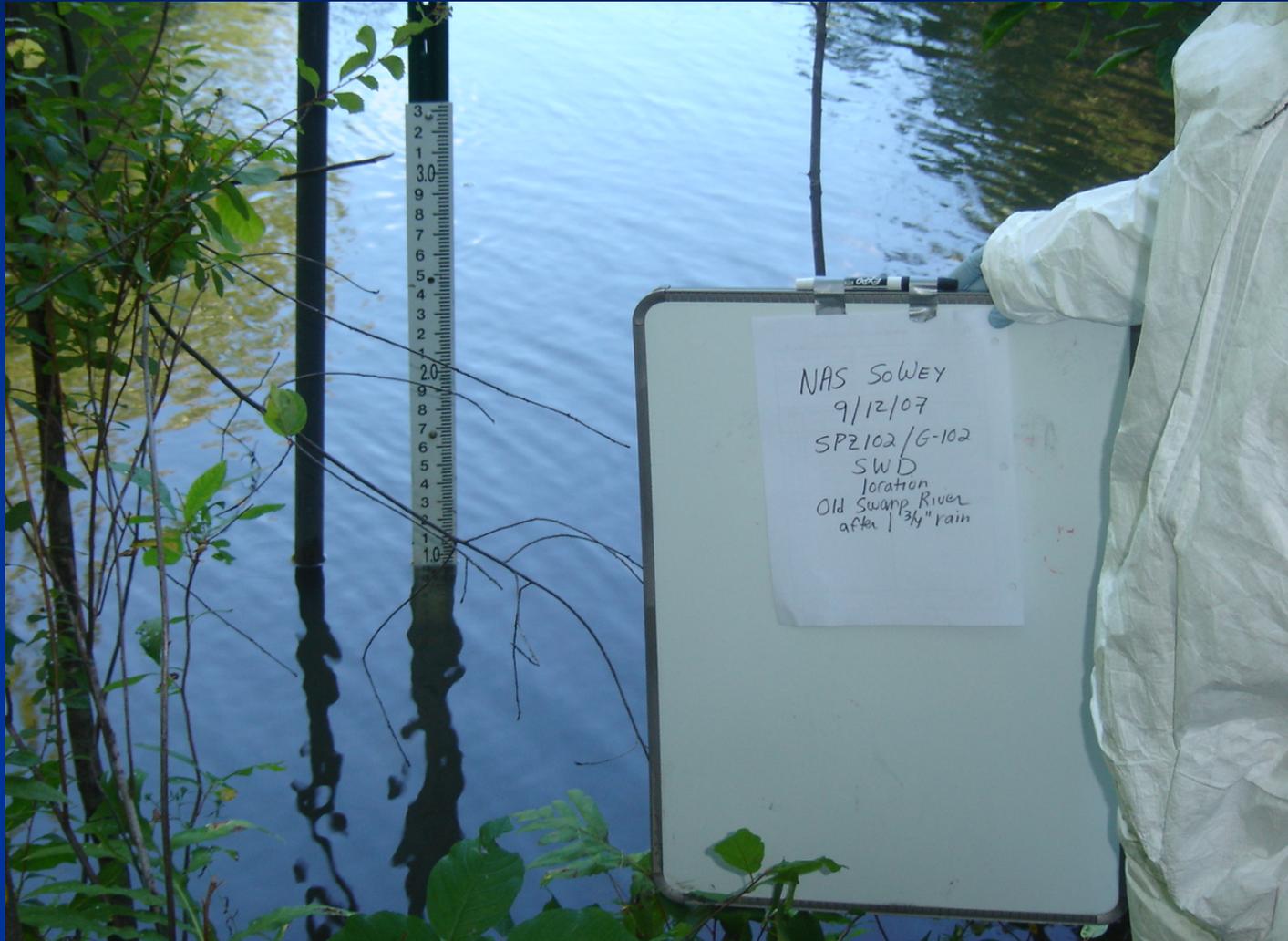
Monitoring Well Development



LTM Surface Water and Sediment Components

- **2 stream piezometers and staff gauges installed in Old Swamp River, upstream and downstream – May 2007.**
- **Surface water sampling locations:**
 - 3 in wetlands along eastern edge of the landfill.
 - 2 in Old Swamp River (upstream, downstream).
- **Surface water sampling completed in June, September, December.**
- **3 sediment samples in wetlands co-located with the 3 surface water locations.**
- **Sediment sampling (annual) completed in June.**

Old Swamp River SW Location



Surface Water Sampling



Analytical Parameters and Field Measurements

- Laboratory analysis (GW, SW, sediment) for:
 - VOCs, SVOCs, pesticides/PCBs, herbicides, VPH/EPH (petroleum hydrocarbons), metals and cyanide, indicator parameters (GW, SW only).
- Field measurements (GW, SW):
 - Water level, turbidity, DO, ORP, pH, temperature, specific conductance, ferrous iron.
- Field measurements (landfill gas):
 - Methane, oxygen, carbon dioxide, hydrogen sulfide, LEL, total VOCs.

Exceedances of GW Remedial Goals (# of wells with exceedances in brackets)

Chemical	Q1	Q2	Q3	Q4
Arsenic	Yes [4]		Yes [5]	Yes [1]
Benzo(a)pyrene	Yes [1]			
Manganese	Yes [10]	Yes [9]	Yes [9]	Yes [9]
Total PCBs (MCL)	Yes [1]			
Lead (MCL)		Yes [1]		
Thallium (MCL)				Yes [8]

Surface Water Results

- Generally fewer chemicals and lower concentrations found in Old Swamp River samples.
- VOCs, VPH/EPH, SVOCs, PAHs, and pesticides found infrequently, at low concentrations.
- Benzo(a)pyrene not found in any samples.
- Arsenic (total) found in Q2; not detected in Q3 and Q4.
- Manganese found in all samples.
- Highest metals concentrations typically found at SW1.
- Herbicides found in Q3; not detected in Q2 and Q4.
- Aroclor 1260 found in Q2 slightly over the laboratory reporting limit; no detections in Q3 and Q4.

Sediment Results

- SVOCs, VPH/EPH, PCBs, and pesticides found at low concentrations.
- Highest PAH concentrations found at SD01 and SD02.
- Benzo(a)pyrene found in all samples; not found in co-located surface water samples.
- Highest concentrations of metals typically found at SD01.

Landfill Gas Monitoring



Monitoring at gas vent. 8 gas vents installed through the cap.

Monitoring at gas probe. 7 gas probes installed outside the cap limits.



Landfill Gas Measurements

- Potential methane enriched areas:
 - North end and apex of landfill – Q2, Q3, Q4
 - Western perimeter – Q3, Q4
 - Southwestern perimeter – Q4
- No hydrogen sulfide detected
- VOCs measured w/PID only in Q4
- Rodent nests observed in 2 gas probes each quarter; removed.

Facility Inspection – Items Routinely Checked

- Landfill cap – erosion, settling, vegetation coverage
- Stormwater drainage system – sediment accumulation, erosion, obstructions
- Gas vents and probes – damage, settlement, obstructions
- Access road – ruts, erosion, vegetation
- Fence, gate, signage – damage

Landfill Cap Vegetation Cover



Vehicle Ruts (to be repaired)



Facility Inspection – Fall 2007

Observations

- Landfill cap – minimal erosion, good vegetative cover, vehicle ruts
- Stormwater drainage system – nominal erosion, large shrubs in north channel, culverts free of debris
- Gas vents and probes – no damage observed
- Access road – vehicle tire ruts
- Fence, gate, signage – slight sign damage
- Recommendations: repair ruts, remove shrubs, mow cap in early summer 2008

Wetland Monitoring Performance Criteria

- **By end of Year 5:**
 - **Minimum 80% vegetative cover by non-invasive species**
 - **Over 50% of plants wetland species**
 - **Tree/shrub coverage, 500/acre**
- **Presence of hydric conditions, saturated soils**
- **Evidence of successful restoration/creation of 0.61 acres of emergent wetlands.**



Restored wetland along left and right fringe of emergent area, created wetland in center.

Wetland Monitoring - Fall 2007 Results

- **Restored wetland (0.22 acre)**
 - 75% vegetative cover by non-invasive species
 - Over 50% of plants wetland species
 - Spot treatment of common reed required.
 - Soils and hydrology should meet standard.
- **Created wetland (0.50 acre)**
 - Over 80% vegetative cover by non-invasive species
 - Over 50% of plants wetland species

On-going Activities

- 2007 annual report underway – evaluate trends, make recommendations.
- Q1 2008 LTM sampling and facility inspection completed.
- Q2 2008 LTM event planned for June, includes annual sediment monitoring.
- Repairs to cap planned – fix ruts, mow, remove large shrubs.
- Spring wetland inspection in early June.