# Storm Water Update

South River Science Team Meeting
February 8, 2005

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# Phase II Storm Sampling Objectives

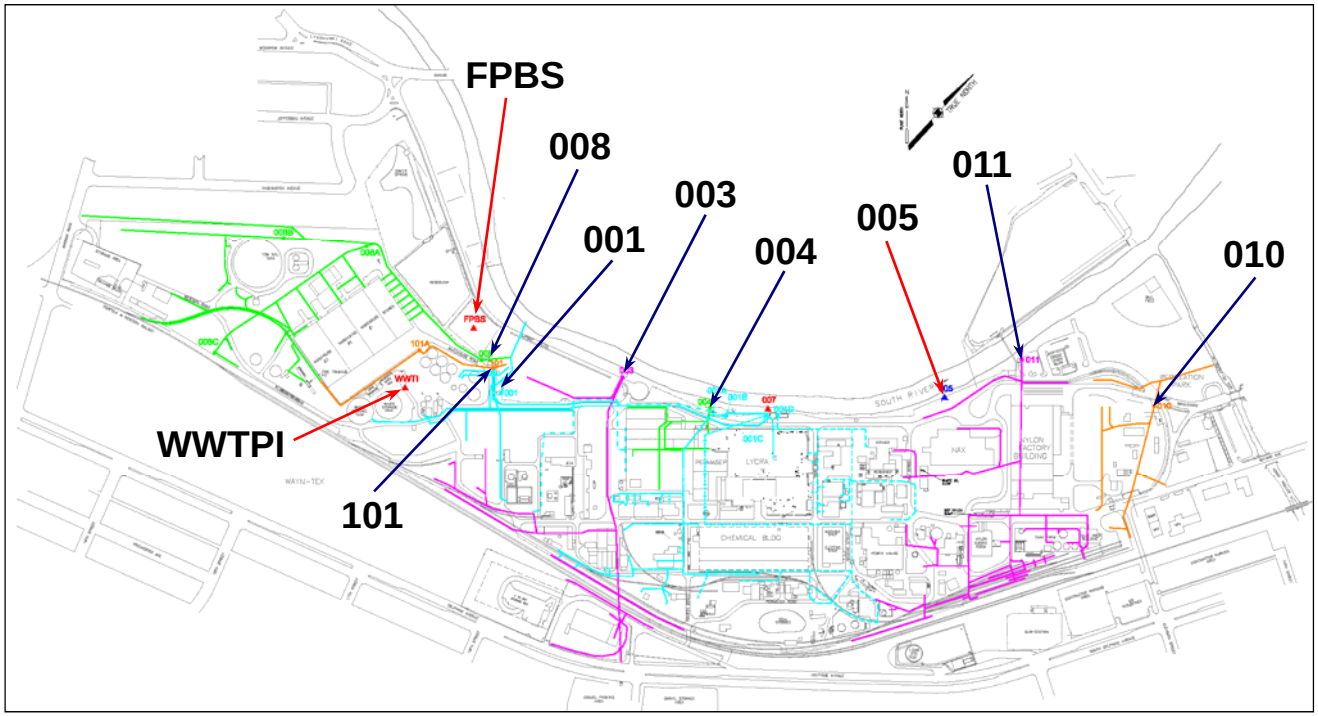
- Primary - determine if the mercury identified in the site's storm water system is bio-available.
  - Additional base flow and storm flow sampling
  - Use dissolved total Hg as surrogate for bio-available Hg (conservative assumption)
- Secondary - further characterize the up-stream portions of the affected storm water systems at the site.
  - Survey of sediment and water quality within the storm water system

# Phase II Sampling Program

- 3 base flow sampling events (varying flow conditions)
  - 10 sampling locations
  - total Hg (1631), dissolved total Hg (1631), high resolution TSS (0.45 µm filtration)
  - all dissolved Hg samples filtered during collection

- 2 storm flow sampling events (low and medium size storms)
  - 7 sampling locations (3 base flow stations that are not included do not receive storm flow)
  - total Hg (1631), dissolved total Hg (1631), high resolution TSS (0.45 µm filtration)
  - First flush samples for dissolved Hg will be filtered during collection
  - Flow-weighted composite samples will be filtered in the lab (duplicates will be field filtered for confirmation)

# Sampling Locations




## Legend

**010** — Base flow and storm flow sampling location

**005** — Base flow only sampling location

| Sampling Location | Type | Description |
|---|---|---|
| 001 | Outfall | Main plant outfall, discharges to the South River |
| 003 | Outfall | Discharges to the South River |
| 004 | Outfall | Discharges to the South River |
| 005 | Outfall | Discharges to the South River |
| 008 | Outfall | Discharges to the South River |
| 010 | Outfall | Discharges to the South River |
| 011 | Outfall | Discharges to the South River |
| 101 | Internal Outfall | Discharge from plant WWTP, contributes flow to 001 outfall |
| FPBS | Outfall | Frew Pond (Baker Spring) overflow, discharges to the South River |
| WWTPI | Up-stream location | Input to plant WWTP, contributes to flow to 001 outfall |

# Current Status

- Base Flow Sampling
  - 3 rounds completed in 2004
- Sediment and Water Quality Survey
  - Phase I completed in November 2004
- Storm Sampling
  - Spring 2005
  - Will follow installation of flow monitoring equipment at 008 (in February)

# Base Flow Sampling Results

**Base Flow 1 Results**

| Sample Location | Flow Rate (gpm) | Flow Rate (Lpd) | HgT (ng/l) | HgD (ng/l) | HgD/HgT | HgT Loading (lbs/Day) | HgD Loading (lbs/Day) | HgT Loading (g/d) | HgD Loading (g/d) |
|---|---|---|---|---|---|---|---|---|---|
| 001 | 2500 | 9463 | 38.8 | 6.88 | 0.18 | 0.00116 | 0.00021 | 0.52869 | 0.09375 |
| 003 | 2.66 | 10.07 | 12.6 | 2.71 | 0.22 | 0.00000 | 0.00000 | 0.00018 | 0.00004 |
| 004 | 144 | 545 | 20.1 | 1.73 | 0.09 | 0.00003 | 0.00000 | 0.01578 | 0.00136 |
| 005 | 8.00 | 30.28 | 1.99 | 0.90 | 0.45 | 0.00000 | 0.00000 | 0.00009 | 0.00004 |
| 008 | 299 | 1132 | 11.9 | 9.80 | 0.82 | 0.00004 | 0.00004 | 0.01939 | 0.01597 |
| 010 | 0.01 | 0.04 | 26.4 | 5.24 | 0.20 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 011 | 68.0 | 257 | 107 | 28 | 0.27 | 0.00009 | 0.00002 | 0.03966 | 0.01053 |
| 101 | 650 | 2460 | 7.12 | 6.48 | 0.91 | 0.00006 | 0.00005 | 0.02522 | 0.02296 |
| FPBS | 5047 | 19103 | 6.09 | 0.68 | 0.11 | 0.00037 | 0.00004 | 0.16752 | 0.01871 |
| WWTPI | 250 | 946 | 32 | 8.57 | 0.27 | 0.00010 | 0.00003 | 0.04360 | 0.01168 |
| **Total Estimated Loading to the South River** | | | | | | **0.00167** | **0.00034** | **0.75688** | **0.15282** |

**Base Flow 2 Results**

| Sample Location | Flow Rate (gpm) | Flow Rate (Lpm) | HgT (ng/l) | HgD (ng/l) | HgD/HgT | HgT Loading (lbs/Day) | HgD Loading (lbs/Day) | HgT Loading (g/d) | HgD Loading (g/d) |
|---|---|---|---|---|---|---|---|---|---|
| 001 | 2800 | 10598 | 15.8 | 4.16 | 0.26 | 0.00053 | 0.00014 | 0.24113 | 0.06349 |
| 003 | 2.66 | 10.07 | 2.27 | 5.63 | 2.48 | 0.00000 | 0.00000 | 0.00003 | 0.00008 |
| 004 | 180 | 681 | 2.29 | 1.11 | 0.48 | 0.00000 | 0.00000 | 0.00225 | 0.00109 |
| 005 | 6.80 | 25.74 | 2.91 | 1.57 | 0.54 | 0.00000 | 0.00000 | 0.00011 | 0.00006 |
| 008 | 112 | 425 | 14.5 | 12.80 | 0.88 | 0.00002 | 0.00002 | 0.00887 | 0.00783 |
| 010 | 0.01 | 0.04 | 17.7 | 4.84 | 0.27 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 011 | 66.5 | 251.7 | 5,736 | 229 | 0.04 | 0.00458 | 0.00018 | 2.07902 | 0.08300 |
| 101 | 450 | 1703 | 4.69 | 1.03 | 0.22 | 0.00003 | 0.00001 | 0.01150 | 0.00253 |
| FPBS | 7312 | 27675 | 2.15 | 0.57 | 0.27 | 0.00019 | 0.00005 | 0.08568 | 0.02272 |
| WWTPI | 130 | 492 | 45.9 | 61.30 | 1.34 | 0.00007 | 0.00010 | 0.03252 | 0.04343 |
| **Total Estimated Loading to the South River** | | | | | | **0.00077** | **0.00022** | **0.34957** | **0.09778** |

HgD/HgT Ratios > 1.0 are suspect

NOTE: Total loading does not include 011 or WWPTI. Outfall 011 is in diversion and goes to WWTP. WWTPI is accounted for in outfall 101 (discharge from WWTP).

**Base Flow 3 Results**

| Sample Location | Flow Rate (gpm) | Flow Rate (Lpm) | HgT (ng/l) | HgD (ng/l) | HgD/HgT | HgT Loading (lbs/Day) | HgD Loading (lbs/Day) | HgT Loading (g/d) | HgD Loading (g/d) |
|---|---|---|---|---|---|---|---|---|---|
| 001 | 2500 | 9463 | 17.2 | 4.82 | 0.28 | 0.00052 | 0.00014 | 0.23437 | 0.06568 |
| 003 | 14.00 | 52.99 | 12 | 2.19 | 0.18 | 0.00000 | 0.00000 | 0.00092 | 0.00017 |
| 004 | 180 | 681 | 3.17 | 1.63 | 0.51 | 0.00001 | 0.00000 | 0.00311 | 0.00160 |
| 005 | 4.80 | 18.17 | 2.09 | 0.87 | 0.42 | 0.00000 | 0.00000 | 0.00005 | 0.00002 |
| 008 | 25 | 95 | 75.2 | 71.30 | 0.95 | 0.00002 | 0.00002 | 0.01025 | 0.00972 |
| 010 | 0.01 | 0.04 | 12.7 | 5.02 | 0.40 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 011 | 54.0 | 204.4 | 220 | 34 | 0.15 | 0.00014 | 0.00002 | 0.06475 | 0.00989 |
| 101 | 350 | 1325 | 5.28 | 0.85 | 0.16 | 0.00002 | 0.00000 | 0.01007 | 0.00162 |
| FPBS | 7312 | 27676 | 3.92 | 0.46 | 0.12 | 0.00034 | 0.00004 | 0.15623 | 0.01833 |
| WWTPI | 484 | 1832 | 37.2 | 12.90 | 0.35 | 0.00022 | 0.00007 | 0.09813 | 0.03403 |
| **Total Estimated Loading to the South River** | | | | | | **0.00091** | **0.00021** | **0.41499** | **0.09714** |

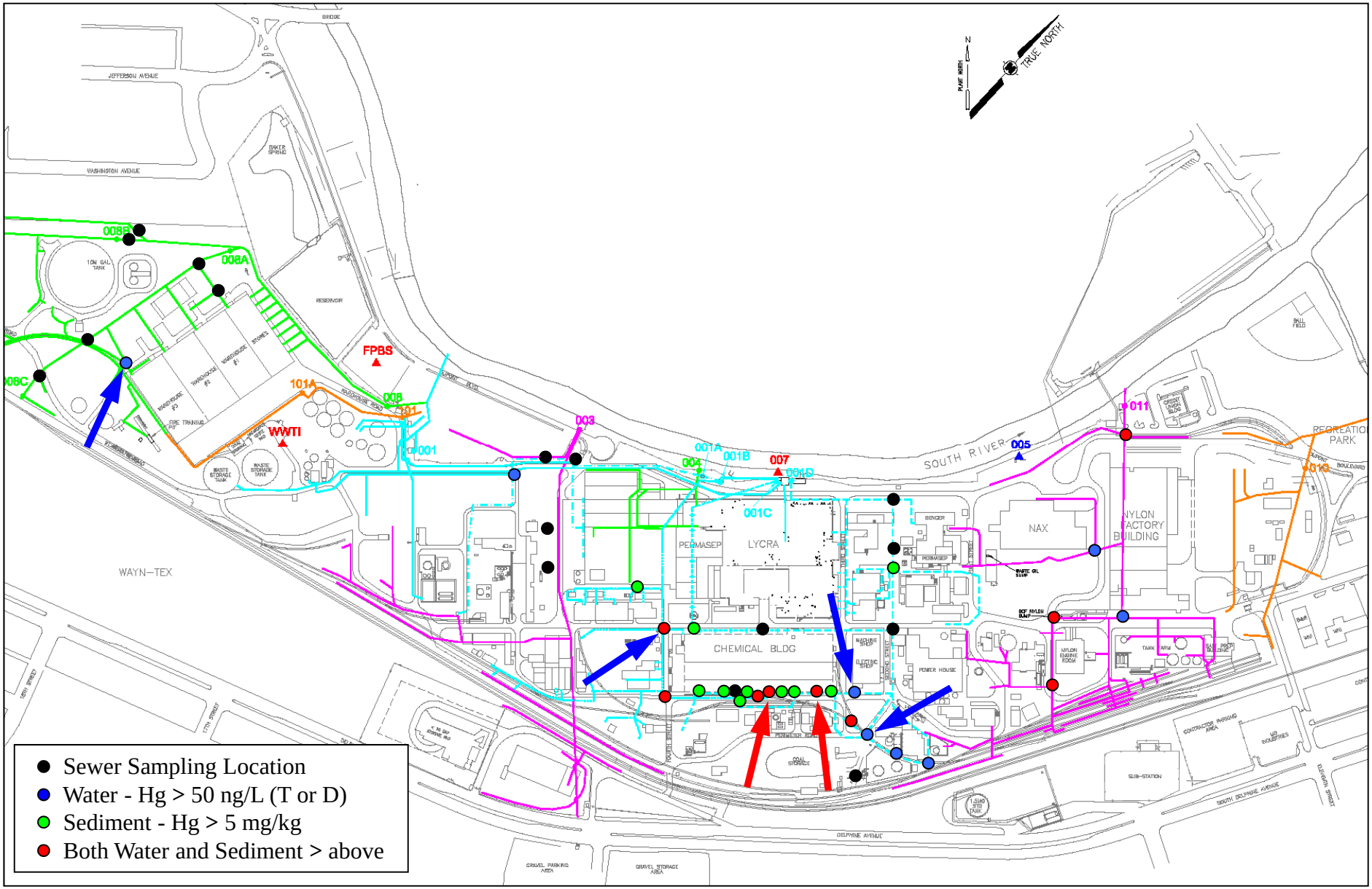
# Sediment and Water Quality Survey

- Aim was to identify potential source areas of mercury within the storm water sewer system at the site
- Survey conducted on several portions of the storm water sewer system based on Phase I results (001A, 001B, 001D, 008, 011)
- Accessible manholes visually inspected at 43 locations
- 31 sediment samples collected for Hg
- 33 water samples for total and dissolved mercury and TSS
  - Samples for dissolved mercury filtered during collection
  - Low detection limit method (1631)

# Survey Results

- Impact most significant at former Chemical Building and at Incineration Area
- Surprised at extent of impact in 011 sewer
- Free Hg observed in floor drains leading from former Chemical Building

# Sampling Locations and Results



# Future Activities

- Storm sampling - 2 events this Spring
- Clean-up of free Hg at Chem Bldg. - this month
- Sewer Action Plan - in preparation