AN ADAPTIVE MANAGEMENT PLAN FOR PCBs IN STORMWATER AND SEDIMENTS

City of Spokane Wastewater Management
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Introduction

- City of Spokane – Wastewater Management Department
- Riverside Park Water Reclamation Facility
- Wastewater Maintenance
PCBs

• Manmade compounds
• Transformer fluids, adhesives, cements, additives, lubricants, fire retardants…
• Manufacturing “banned” 1977
  • Sources remain
  • Inadvertent production in manufacturing
• Recycling facilities
  Paper products
  Asphalt roofing
PCB Standards (parts per billion)

- **TSCA Regulation Limit**: 50,000
- **WA Residential Soil Cleanup Standard**: 1,000
- **EPA Surface Water Quality Standard**: 0.00017
- **Spokane Tribe Water Quality Standard**: 0.00000337
Stormwater Management in Spokane

- Potential pathway for PCBs to enter the Spokane River
  - MS4: Municipal Separate Storm Sewer System
  - CSO: Combined Sewer Overflow (less frequent)

PCB Sample Locations

WHERE DOES YOUR STORMWATER GO?

- MS4 – Separated Storm to River
- CSO – Combined Sewer Overflow
- Infiltration to Ground
Regulatory Requirements

- Ecology’s 2007 Stormwater Loading Analysis Report
  - PCBs in City outfalls vs. WQ Standards
- NPDES E WA Phase II Municipal Stormwater Permit
  - S4. Compliance with Standards: Adaptive management response
- NPDES Waste Discharge Permit
  - S13. Combined Sewer Overflows
  - Occasional point sources
  - No authorization to impact receiving water
Adaptive Management Plan

• Reduce PCBs in stormwater discharges

1. Analyze and interpret existing data

2. Identify likely sources of PCBs. Design and implement remedial actions and BMPs.

3. Adaptive approach – further data collection and remedial action

• Phase I: remedial maintenance, sampling, analysis of existing information
  • PCBs particulate bound: sample catch basin sediments
Priority Investigation Areas

2010
432 Catch Basins

2011
333 Catch Basins

Union Stormwater Basin

Heavy Industrial CSO 34

2011 CSO 34 Sample Area
Priority Investigation Areas

Legend
- City Boundary
- CSO 34
- 2011 Groups
  - CSO
- 2010 Groups
  - CSO
  - Drywell
  - Stormwater
- Zoning
  - Heavy Industrial

Drywells
CSO/DW
MS4
Union Basin
CSO
Example Group
Sampling Procedures

- Four sediment samples per catch basin
  - Mix thoroughly
  - Store in cooler on ice
- Composite contents of each catch basin sample in the sample group
  - Fill laboratory-prepared jars: Anatek, Pacific Rim and storage
- Chain of custody procedures
- Decontaminate sampling equipment:
  - DI water rinse → Liquinox soap → DI water → acetone → air dry → foil wrap
Sampling Procedures:
Each Catch Basin

Refrigerate sample
Sampling Procedures:
Making a Composite Sample

Set up table with all necessary equipment.

Sampling Procedures:
Making a Composite Sample

Remove sediment from each jar and place in stainless steel bowl. Mix thoroughly.

Fill 3 lab jars with composite mixed sediment.

Identify testing groups on labels.
Chain of custody record for releasing samples to laboratory for testing
Composite Samples

First set:
Aroclor analysis
EPA Method 8082
Detection limit 0.1 mg/kg
(0.1 ppm = 100 ppb)

Second set:
Congener analysis
EPA Method 1668
Detection limit 0.003 ug/kg
(0.003 ppb)

Third set:
Store in freezer in case of need
Can be stored up to 6 months in freezer
Remedial Maintenance

- Review Aroclor analysis results
  - Residential cleanup std. 1.0 mg/kg
- Remove all sediments from catch basins
- Dump on separate pad, mix with sawdust
- Haul to lined cell at landfill
Curb Markers

• Install markers at each basin after cleaning

Place marker on top of curb
Windshield Evaluations

• 2010 Sample Area
• Visually inspect properties from right of way
  • Possible sources of PCBs to stormwater
    • If stormwater flows onto right of way
    • Paved or unpaved driving surfaces
    • Potential for sediment tracking onto right of way
  • Current and previous types of businesses
  • Current and historic potential PCB sources
**Windshield Evaluations**

**Windshield Survey Worksheet**

<table>
<thead>
<tr>
<th>Date:</th>
<th>Group #</th>
<th>Time: AM or PM</th>
<th>Map Page</th>
</tr>
</thead>
</table>

**Business Name:**

**Type of Business:**

<table>
<thead>
<tr>
<th>Address 1</th>
<th>Parcel #</th>
<th>Address 2</th>
<th>Parcel #</th>
<th>Address 3</th>
<th>Parcel #</th>
</tr>
</thead>
</table>

**Contact Person:**

**Previous Business:**

**Type of Business:**

**Weather:**

- [ ] Dry
- [ ] Drizzle
- [ ] Rain
- [ ] Snow Melt
- [ ] Other

**Observations:**

**Parking lot / Driveway:**

- [ ] Paved
- [ ] Unpaved

**Does site run to City street:**

- [ ] Yes
- [ ] No

**Intersection:**

**Drains to:**

**Source List**

Check all that apply

**Current Potential Sources:**

- [ ] Transformers
- [ ] Railroad

**Older Potential Sources (Equipment and facilities from 1929-1979):**

- [ ] Chemical manufacturing
- [ ] Concrete crushing
- [ ] Electrical transmission and distribution
- [ ] Industrial machinery (hydraulic fluids and brake fluids)
- [ ] Metal scrap yard
- [ ] Metals smelting and refining
- [ ] Paints/coatings
- [ ] Printing inks
- [ ] Rail yard
- [ ] Salvage Yard
- [ ] Sawmill / Pulp and paper mill
- [ ] Slag operations
- [ ] Tire shredding
- [ ] Transformers
- [ ] Used oil spread for dust control
- [ ] Wood treatment

**Waste and Recycling Potential Sources:**

- [ ] Asphalt roofing materials
- [ ] Auto salvage yards
- [ ] Building demolition
- [ ] Dredge spoils
- [ ] Landfills
- [ ] Recycled paper
- [ ] Repair facilities (locomotive, auto, heavy equipment)
- [ ] Scrap metal recycling
- [ ] Used oil
2010 Sampling Activities and Results

• 432 Catch Basins – broken into 41 Groups
• Union Basin and HI CSO 34
2010 Sampling Activities and Results

- One composite sample set per group
- About 10 catch basins composited per group
- Aroclor analysis
  - Remedial maintenance
- Congener analysis
  - Detailed analytical results
    - 209 Congeners to 0.003 ppb detection limit
  - Results mapped spatially in GIS
2010 Sampling Activities and Results
2010 Sampling Activities and Results

280,000 lbs sediments removed (wet weight)
- % Moisture in sediments
* sample concentrations
26 grams PCBs removed
2011 Sampling Activities and Results

- 333 Catch Basins – 35 Groups
- CSO 34: LI, Commercial, Residential
2011 Sampling Activities and Results

- One composite sample set per group
  - About 10 catch basins composited per group
  - Aroclor analysis
  - Congener analysis
    - Detailed analytical results
      - 209 Congeners to 0.003 ppb detection limit
      - Results mapped spatially in GIS
  - Individual re-tests in selected 2010 Groups
    - Highest 2010 Groups in MS4 and CSO
    - Where sediments > 1”
    - Congener analysis
2011 Sampling Activities and Results

Composite group samples

268,000 lbs sediments removed (wet weight)
- % Moisture in sediments
* sample concentrations
3.7 grams PCBs removed
2011 Group Zoning
2011 Sampling Activities and Results

- Individual catch basin re-tests
  - Not all basins could be re-sampled (<1” sediment accumulated in basin)
    - Remedial maintenance temporarily effective?
  - PCBs detected in re-sampled basins
    - All sediments were pumped in 2010
    - Continual source of PCBs in sediments?
2012 Proposed Activities

- Sediment sampling: focus on 2010 Groups
  - Higher PCB concentrations than 2011
  - Compare “apples to apples”
    - Preference: group composites
    - Individual testing if entire group can not be sampled (sediment accumulation)
- Help determine continual PCB sources
2012 Proposed Activities

- **Stormwater Sampling**
  - 2 automatic flow-weighted composite samplers in Union Stormwater Basin
- **Coordinating with Urban Waters**