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Canada

Testing & Validation of Regional Response Team Federal Region 5 RRT 5 Protocol for the Approval of Shoreline Surface Washing Agents in Freshwater Environments

Freshwater Spills Symposium

April 2009

Sankaran KrishnaRaj, Environment Canada

Russ Proctor, US Coast Guard

Jon Gulch, US Environmental Protection Agency

Mike Gerber, Ohio Environmental Protection Agency

Timothy Murphy, Toledo Department of Environmental Services

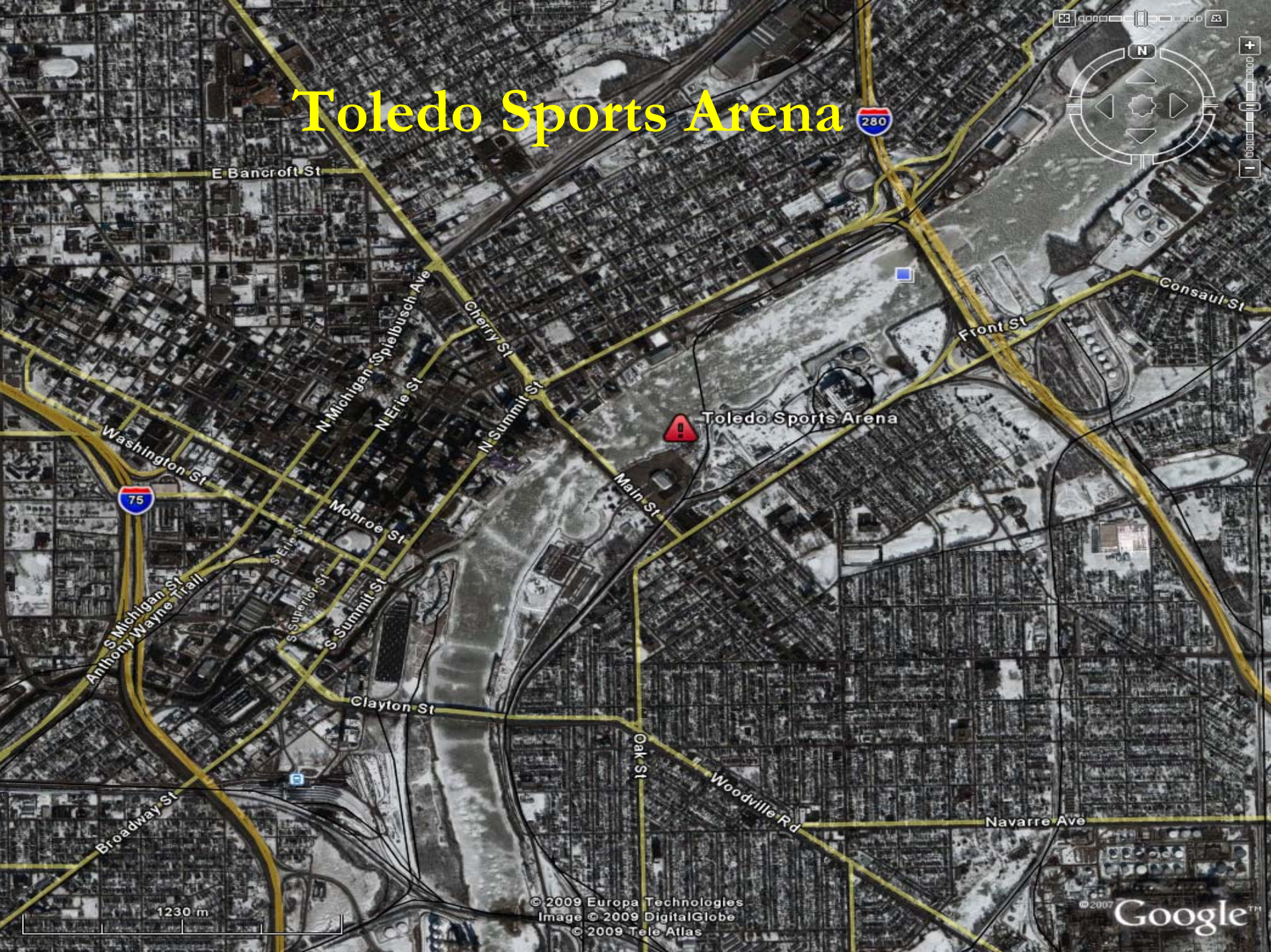
Overview

- Incident Details (Spill & Site Conditions)
- RRT V Shoreline Cleaner Test & Protocol Validation
  - RRT V Shoreline Cleaner Agent Test Protocol
  - Bucket Test
  - Field Protocol Validation Test
  - Sampling – Analysis – Results – Interpretation
- Conclusions & Discussion

Incident Details

Site Location & Spill Details

- Release to the Maumee River between the I 280 and Martin Luther King Jr. Bridge (Coordinates: 41 39'08" North & 83 31'29" West).
- 1000 gallons of 'boiler oil' (furnace oil).
- Rip-rap, solid man-made structures, and shelving bedrock shores.


Toledo Sports Arena
280
E Bancroft St
N Michigan St
Spielbusch Ave
Cherry St
N Erie St
N Summit St
Front St
Consaul St
Toledo Sports Arena
Washington St
75
Monroe St
Main St
S Erie St
S Michigan St
Anthony Wayne Trail
S Superior St
S Summit St
Clayton St
Oak St
Woodville Rd
Navarre Ave
Broadway St
1230 m
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U.S.
COAST
GUARD

Timeline

- 17 October 2005 - Large amount of oil released from an underground storage tank at Toledo Sports Arena located on the Maumee River.
- 18 October 2005 - USCG contacted USEPA regarding the potential validation of the protocol.
- 19 October 2005 - USCG received verbal concurrence from USEPA and contacted the State of Ohio.
- 20 October 2005 - Ohio EPA provided a Director's Emergency Final Findings and Orders allowing the USCG/USEPA to proceed with the test.
- 22 October 2005 – USCG requested scientific support from Environment Canada.
- 24 October 2005 – Shoreline Cleaner Test and Protocol Validation initiated.

RRT V Protocol

RRT V Protocol - Intent

Protocol designed for limited testing and evaluation of pre-selected surface washing agents (COREXIT 9580 or Cytosol)

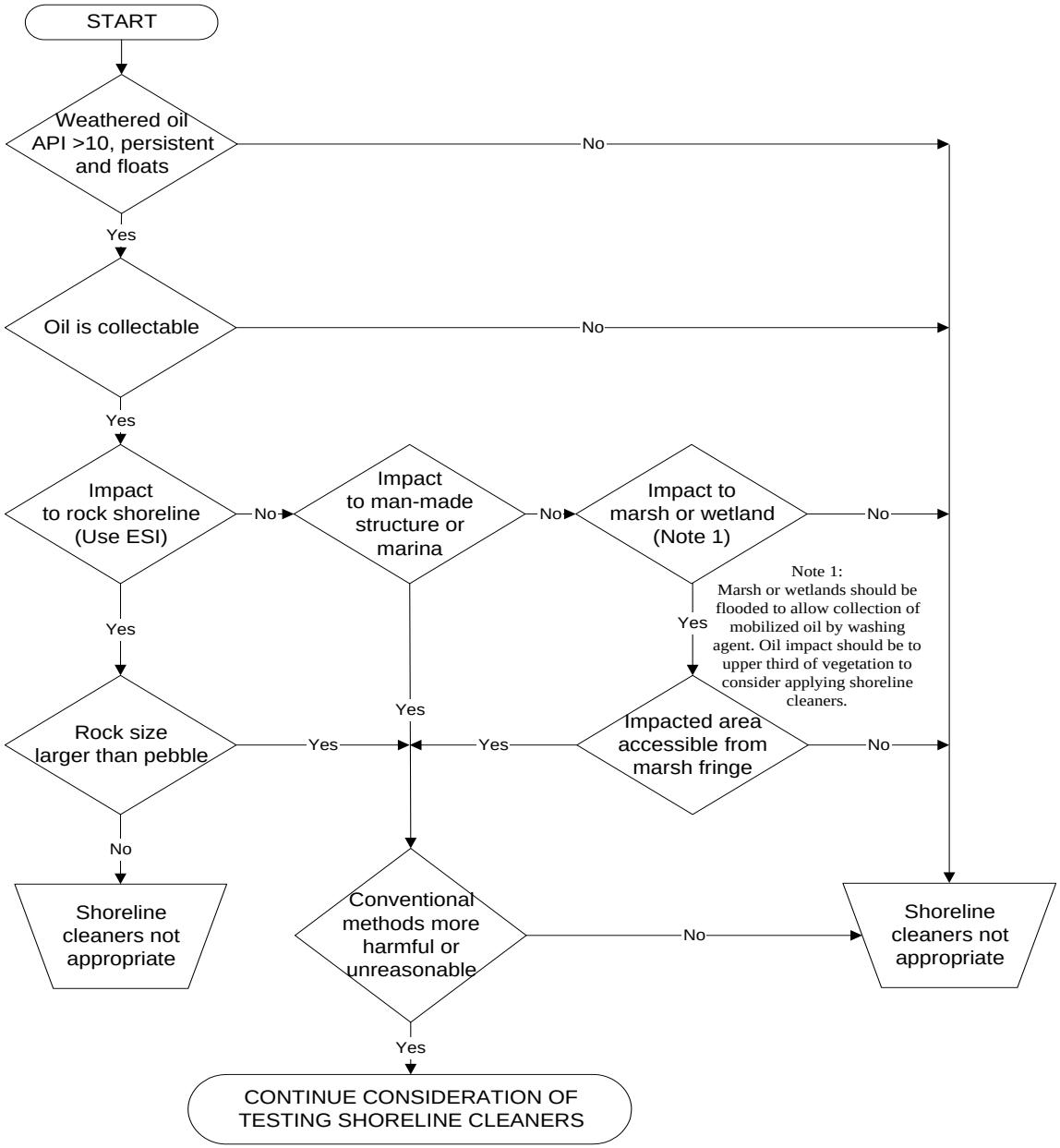
- Intent is to provide guidance and preauthorization (to FOSC) to test surface washing agents, subject to the constraints and practices identified in the protocol.
- Protocol provides guidance on decision-making, preparation, application, monitoring and reporting process for testing surface washing agents in freshwater environments.

Approval to use surface washing agents is still required from federal, state and all other stakeholder agencies.

RRT V Protocol - Process

- Is the surface washing agent the right response option?
- Is the surface washing agent effective on the 'oil'?
- Are the site conditions 'ideal'?
- Are necessary approvals in place? (federal, state, local)
- Is there a test area identified (@ a spill of opportunity)?
- Do we have all the equipment / resources required to test?
- Do we have access to surface washing agents?

RRT V Protocol – Decision Flowchart

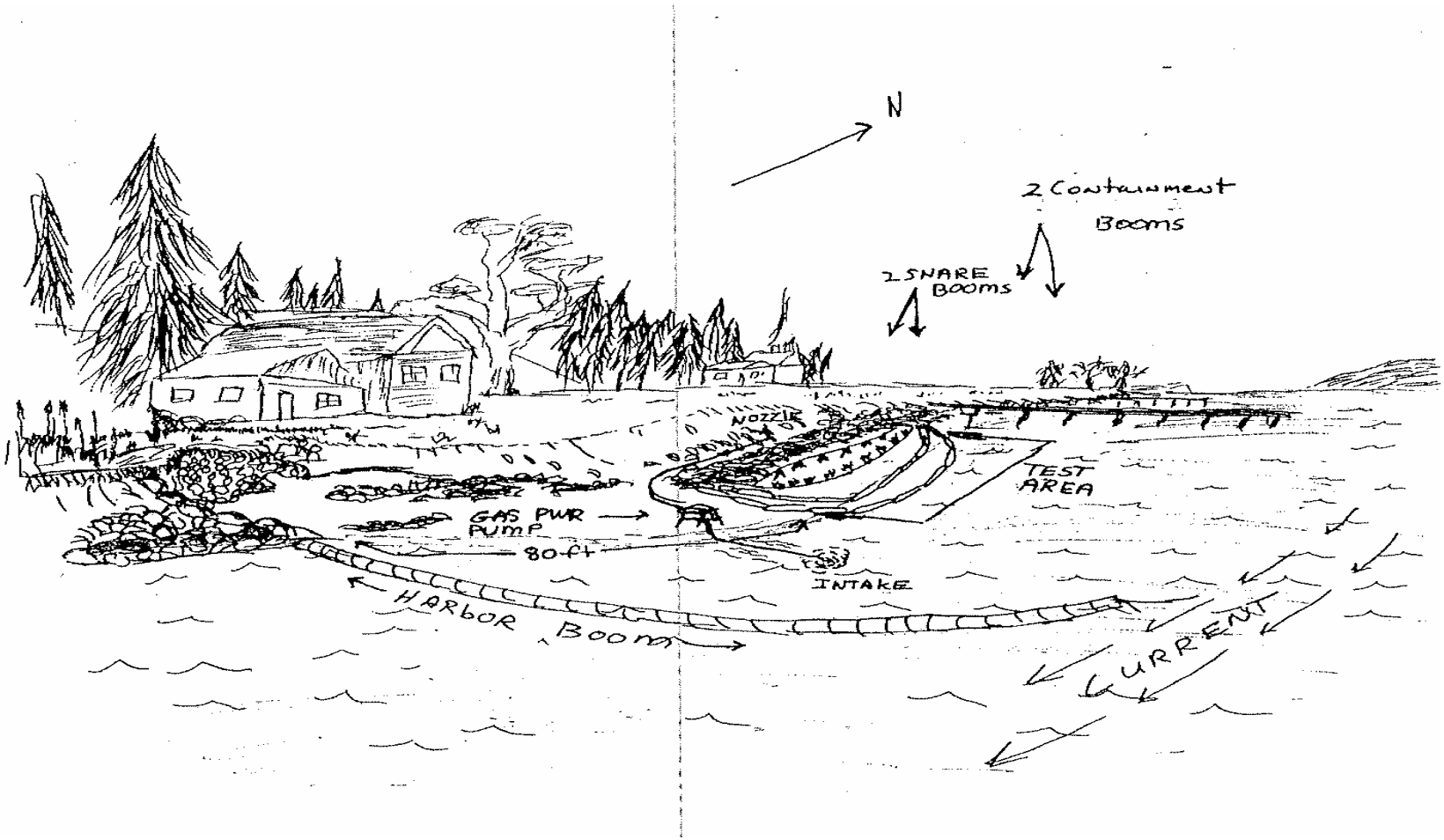


RRT V Protocol - Considerations

- Water velocity not to exceed 1 knot
- No breaking waves
- No heavy rain
- No high winds or temperature
- Ambient air temperature > 50 F (ideal)

- Boom placement to account for resurfacing oil
- Absorbent booms to line inside containment boom
- Down gradient boom placed > 80 ft (??)

RRT V Protocol – Treatment Plan



RRT V Protocol – Treatment Plan

- Approx. 1 gal COREXIT 9580 for 100 sq. ft.
- Soak time 0 – 30 mins
- Water flush time 30 mins
- Ambient water temperature & deluge or low pressure flush

- Bucket test on Oct 24, 2005
- Shoreline Cleaner test with COREXIT 9580 on Oct 26, 2005

Test Team & Responsibilities

- USCG-District 9: Funding and Protocol
- USCG-MSU Toledo: BOA (with Lab for toxicity) and Safety
- Environment Canada: Science Coordination & Project Management
- EPA: Project Oversight & START Support
- Ohio EPA: Sampling Technicians
- City of Toledo: Initial Responders & TPH Analysis for Test
- NOMMAD: Video Documentation
- Marine Pollution Control (MPC): Response Organization

Bucket Test

Stakeholders

Bucket Test - Supplies

Bucket Test – COREXIT Trial

Bucket Test – COREXIT Trial

COREXIT 9580

Water Treated

Bucket Test – COREXIT Trial (5 mins)

Bucket Test– COREXIT Trial (15 mins)

Bucket Test – COREXIT Trial (30 mins)

Bucket Test – Results & Interpretation

- COREXIT 9580 was efficient in product removal.
- Significant amount of the product resurfaced in less than 15 mins (water column cleared in 30 mins).
- Product removal was minimal in water treated sediments.
- Low energy washing (minimal agitation of sediments) was sufficient to remove product from the sediment surface.
- COREXIT 9580 shows potential – progress to field testing in test areas – continuous monitoring with water/sediment sampling to validate protocol.

Field Test

Test Area(s)

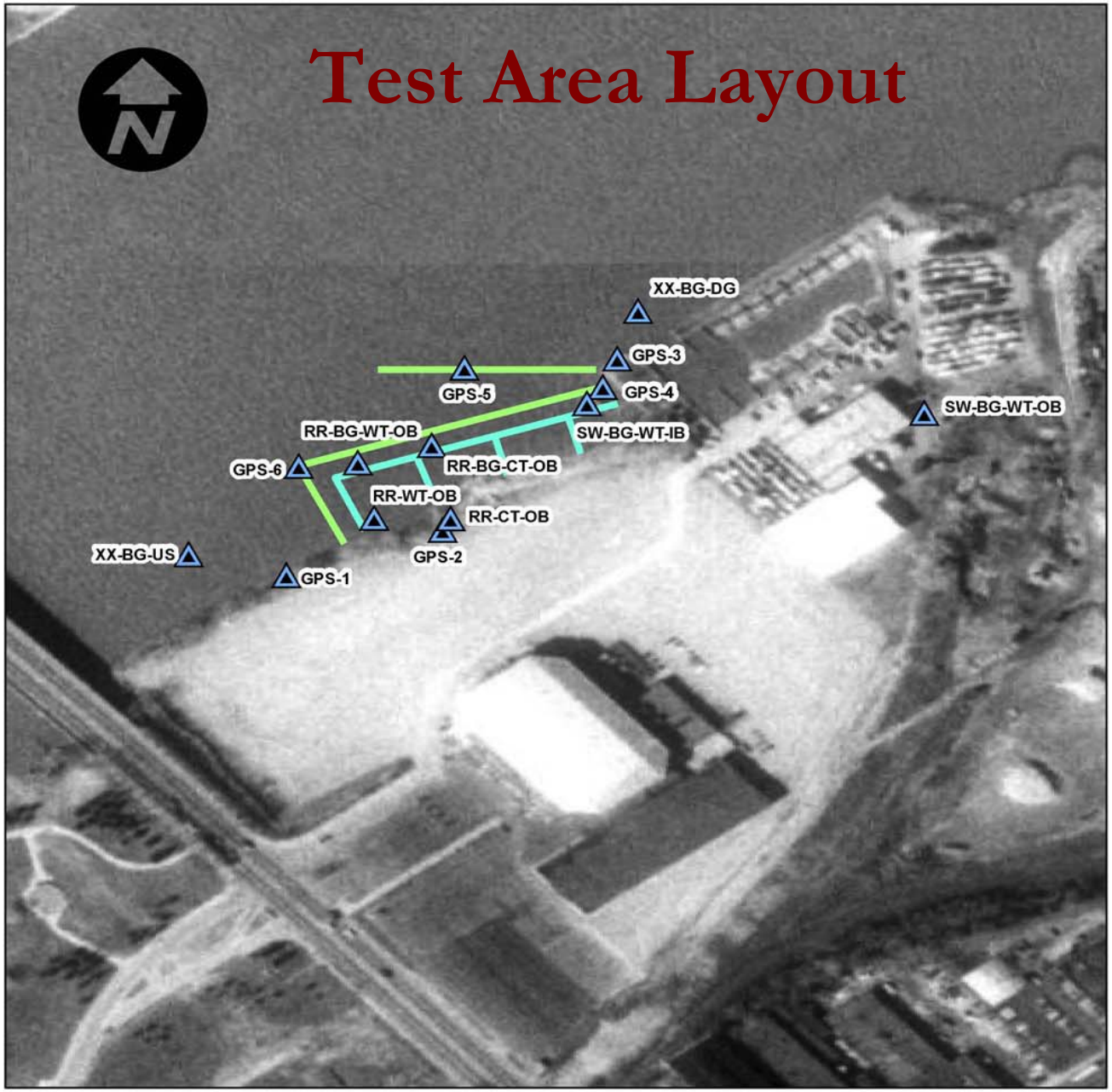
TEST SITE – I (SEA WALL)

- SW 1 (100 feet test strip – absorbent boom + 2 booms)
  - Treatment with COREXIT (1 gal / 100 sq. ft)
- SW 2 (100 feet test strip – absorbent boom + 2 booms)
  - No treatment – apply water / flush with water after 30 mins

TEST SITE – II (RIP RAP)

- RR 1 (100 feet test strip – absorbent boom + 2 booms)
  - Treatment with COREXIT (1 gal / 100 sq. ft)
- RR 2 (100 feet test strip – absorbent boom + 2 booms)
  - No treatment – apply water / flush with water after 30 mins

Test Area Layout



Legend

- Sample Locations

Boom Locations

- Absorbent
- Containment

0 100 200 300 400 Feet

U.S. Environmental Protection Agency
Region 5

Boom and Sample Locations
Toledo Shoreline Cleaner Test Site
Toledo, Ohio

TETRA TECH, INC.

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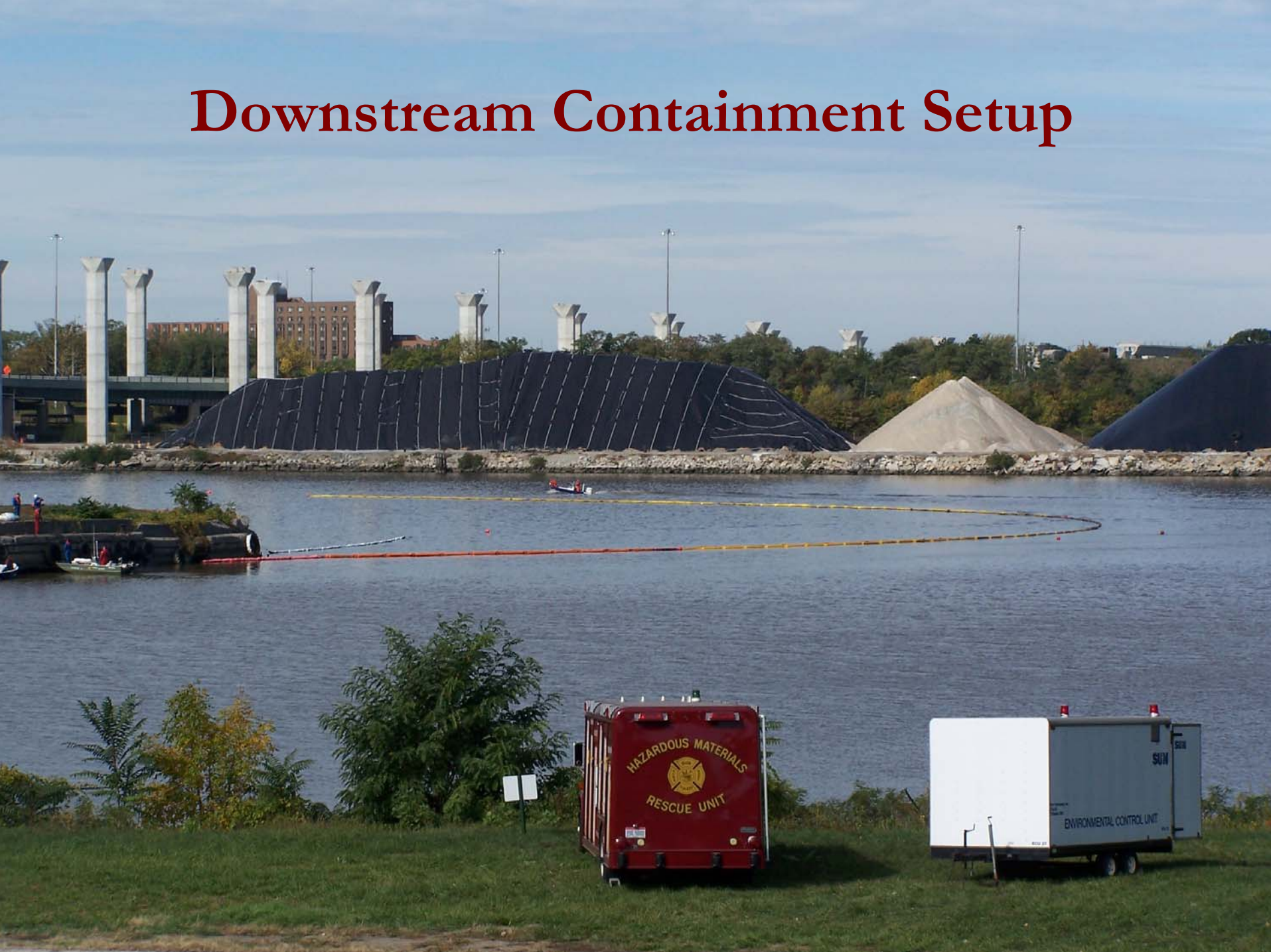
Test Area - Containment Setup

Test Area - Containment Setup

Downstream Containment Setup



Test Site 1 – Sea Wall

Test Site 1 – Sea Wall

Test Site 1 – Sea Wall


COREXIT 9580 Application

COREXIT 9580 @ Work

COREXIT 9580 Treated


Low Pressure Wash – SW 1 (WATER)


Low Pressure Wash – SW 2 (COREXIT)


Low Pressure Wash – SW 2 (COREXIT)

Test Site 2 – Rip Rap

COREXIT 9580 Application

Low Pressure Wash

Product Removal & Surfacing


COREXIT 9580 @ Work

COREXIT 9580 @ Work

High Volume – Low Pressure Wash

Resurfacing Product

Field Test

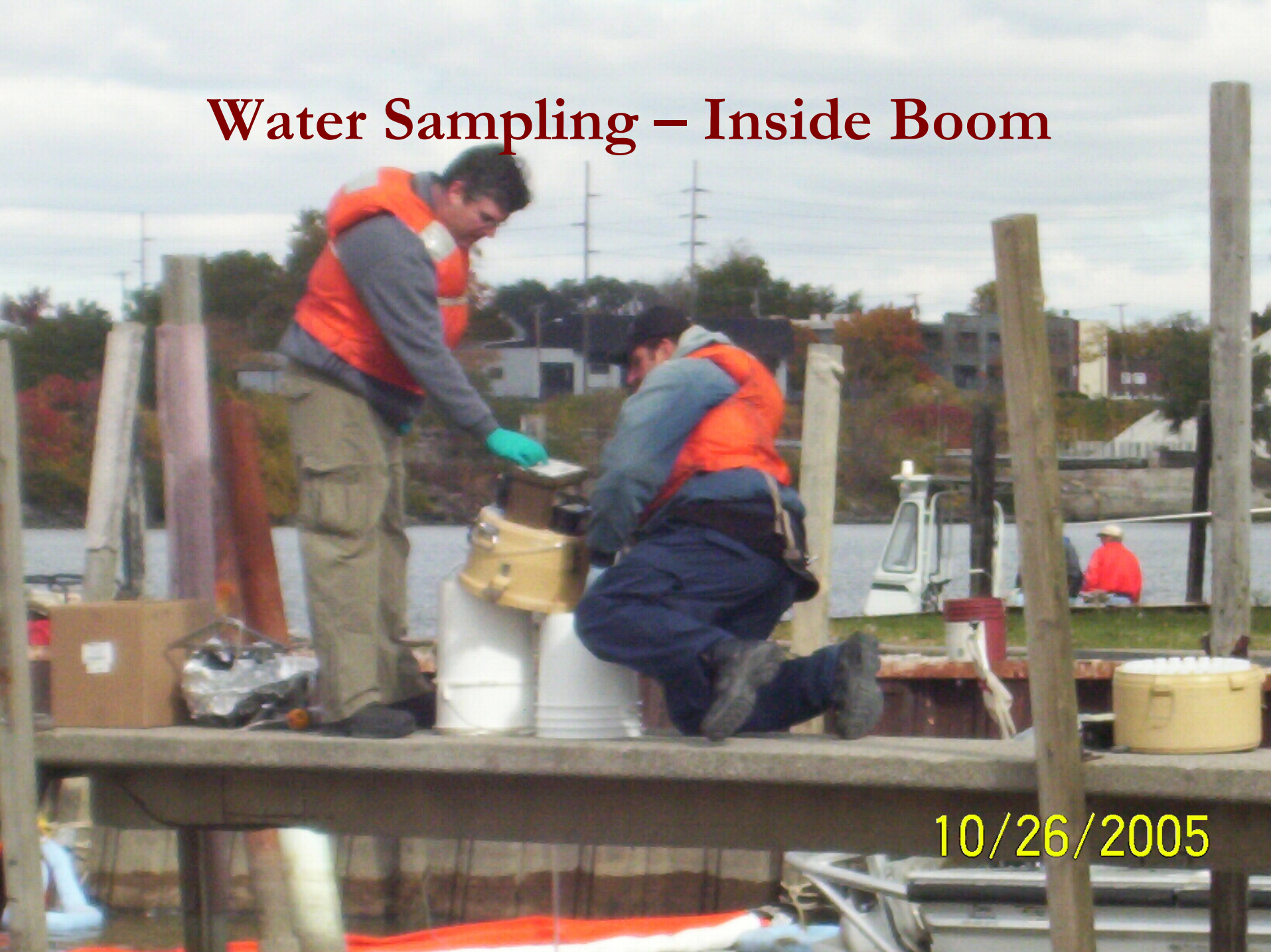
Sampling & Analytical Methods

Water Sampling – TPH Analysis

- Baseline Samples – BACKGROUND Samples (***2 sets – SW/RR 1 & 2***)
  - 1 L water sample - Upstream
  - 1 L water sample - Inside Boom – subsurface before treatment
  - 1 L water sample - Outside Boom – subsurface before treatment
  - 1 L water sample - Down gradient to boomed area
- Treatment Samples – after COREXIT treatment (30 min soak)
  - **0 mins** (as soon as flush starts) / **10 mins** & **20 mins** (after start of flushing)
    - 1 L water sample – Inside Boom – subsurface
    - 1 L water sample – Outside Boom – subsurface
    - 1 L water sample – Down gradient – subsurface
  - **30 mins** (after start of flushing) – (***2 sets – SW/RR 1 & 2***)
    - 1 L water sample – Inside Boom – subsurface
    - 1 L water sample – Outside Boom – subsurface
    - 1 L water sample – Down gradient – subsurface


Water Sampling – Upstream

Water Sampling – Inside Boom




Water Sampling – Outside Boom

Water Sampling – Downstream

Toxicity Water Sampling

- Baseline Samples – BACKGROUND Sample (collect before treatment)
  - 4 L subsurface water sample - Upstream
  - 4 L subsurface water sample - Inside Boom
  - 4 L subsurface water sample - Outside Boom – Downstream

- Treatment Samples – after COREXIT treatment (30 min soak & flush)
  - **30 mins** (after start of flushing)
    - 4 L subsurface water sample - Inside Boom
    - 4 L subsurface water sample - Outside Boom
    - 4 L subsurface water sample - Downstream

Sediment Sampling – TPH Analysis

- Baseline Samples – BACKGROUND Samples
  - 250 mL sediment sample - Upstream
  - 250 mL sediment sample - Inside Boom – before treatment
  - 250 mL sediment sample - Outside Boom – before treatment
  - 250 mL sediment sample - Down gradient to boomed area

- Treatment Samples – after COREXIT treatment (30 min soak & flush)
  - **30 mins** (after start of flushing)
    - 250 mL sediment sample – Inside Boom
    - 250 mL sediment sample – Outside Boom
    - 250 mL sediment sample – Down gradient

Sediment Sampling

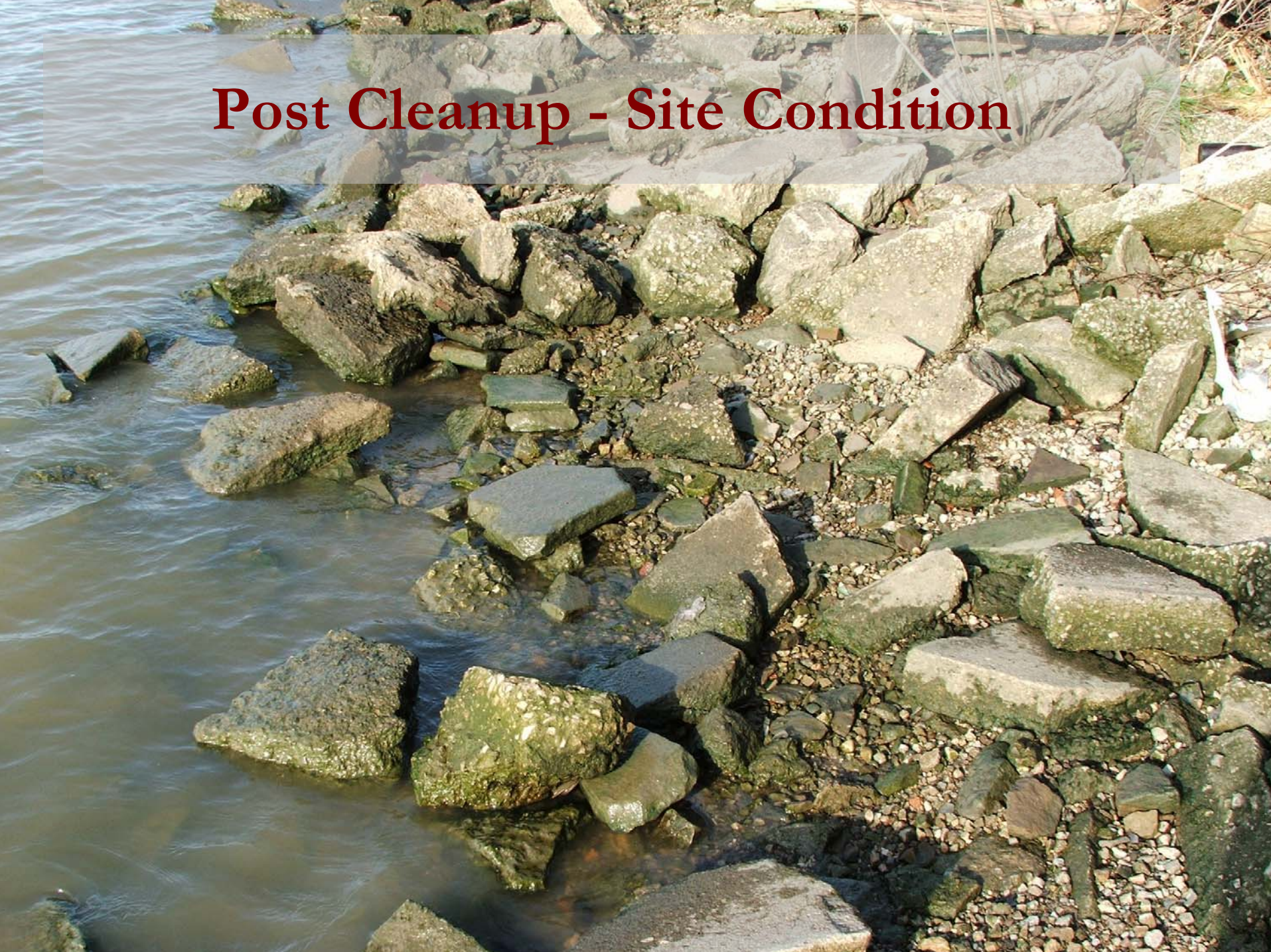
Sample Processing

Sample Analysis

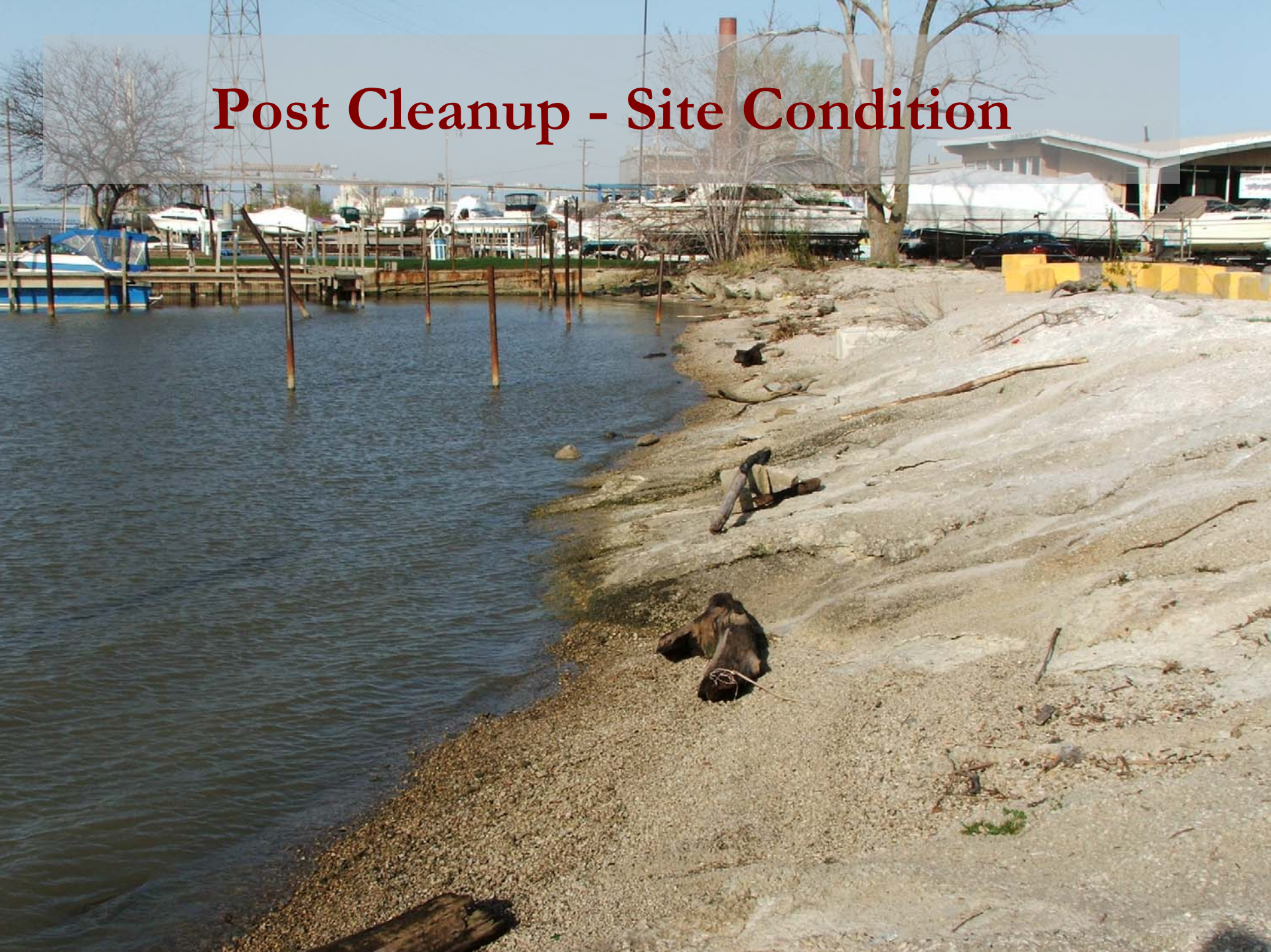
- TPH in water samples analyzed by City of Toledo – Division of Environmental Services (TDOES) and TPH in sediment samples analyzed by Severn-Trent Labs (STL).
- Samples were analyzed using Method 1664: N-Hexane Extractable Material (HEM) and Silica Gel Treated N-Hexane Extractable Material (SGT-HEM) by Extraction and Gravimetry.
- Toxicity testing was conducted by EnviroScience Inc., as 48-h EC50/LC 50 acute toxicity tests and 7-d chronic toxicity tests using *Ceriodaphnia dubia* in accordance with the ASTM guidelines.

Analytical Results

- Eighty water samples were analyzed at the City of Toledo Central Laboratory for Total Petroleum Hydrocarbons (TPH).
- One sample (Rip Rap Background Water Treatment—Inside Boom) result was reported at the detection limit of 4.0 mg/L. All remaining water samples for TPH were non detect.
- None of the toxicity test samples were positive.
- All twenty-seven sediment samples for TPH analysis were non detect.


Post Cleanup - Site Condition

Post Cleanup - Site Condition



Field Test – Results & Interpretation

- COREXIT 9580 was efficient in product removal in both rip rap and sea wall shoreline types.
- All of the washed-off product resurfaced within the boomed area (before the absorbent booms) and were contained and collected.
- Shoreline Surface Washing Agent Test and Evaluation Protocol Validation was successfully completed.
- COREXIT 9580 is an efficient shoreline cleaner for the tested shoreline types and specific (weathered) product.

Questions, Comments…..

Sankaran KrishnaRaj, Ph.D.
Environmental Protection Operations – Ontario
Environment Canada
4905 Dufferin Street, Toronto, Ontario – M3H 5T4
Phone: (416) 739-5911 / (416) 988-9161
E-mail: sankaran.krishnaraj@ec.gc.ca