Presentation Overview

- Project History and Background
- Stage 1 Construction Update
- Stage 1 Environmental Management Activities

Randle Reef Sediment Remediation Project

- One of the largest contaminated sediment sites in the Great Lakes.
- Largest Polycyclic Aromatic Hydrocarbon (PAH) contaminated sediment site in Canada.
- Long history precludes the ‘Polluter Pay’ principle.
- Proponents adopted a Shared Responsibility model.
- Proponents are Canada (ECCC), Ontario (MOECC), Hamilton Port Authority, City of Hamilton, Stelco, City of Burlington, Halton Region
- PSPC provides technical and construction management, and procurement services.

Randle Reef Site Specifics

- Impacted by historic operation of coal gasification plant and steel operations;
- Approximately 675,000 m$^3$ of contaminated sediment (PAHs & metals);
- Average total PAH concentration 10-20 ppm (variable peaks over 73,000 ppm);
- Site Area: ~60 ha (148 acres)
- Depth of Water: Ranges from ~4 to 12 m
- Sediment Depth: Ranges from ~0.1 m to >3 m

Randle Reef PAH Contouring

Randle Reef Procurement Strategy

- Stage 1 – ECF Construction
- Stage 2 – Dredging and Thin Layer Capping
- Stage 3 – ECF Capping

Randle Reef Sediment Remediation Project

- Contract Award - June 2015, $29M
- Contractor – McNally Construction Inc.
- Consultant – Riggs Engineering Ltd.
- 2015 – Steel sheet pile (SSP) fabrication
- 2016 – SSP delivery, Cell 1 construction
- 2017 – Cell 2 construction
- Completion – December 2017

Stage 1 – ECF Construction

- Construction of a 7.5 hectare Engineered Containment Facility (ECF).
- The ECF is sited over 130,000 m$^3$ of the contaminated sediment.
- Most highly contaminated sediments will not be disturbed.
- ECF isolation structure will be constructed with double steel sheet pile walls.
- Outer wall will satisfy structural requirements.
- Inner wall will provide environmental isolation.
- Water and Air Quality Monitoring will be undertaken by Consultants.
Steel Fabrication and Transport

Fabricated steel sheet pile for the ECF face wall was produced in Iuka, Mississippi and shipped via river barge to Chicago, then by lake barge to Hamilton.

Stage 1 – ECF Construction

2016 Work Season

2017 Work Season

Isolation Structure

A double-steel sheetpile wall with sealed interlocks along the interior wall.

Isolated interior wall

Outer structural wall

Start of Sheet Pile Wall Installation (May 4, 2016)

Progression of Sheet Pile Installation (June 3, 2016)

Sheet Pile Installation Complete for 2016 (August 4, 2016)

Dredging Between the Walls

Quarry Rock Fill

Dredging & Backfill Between the Walls

Installing Temporary Bracing and Tie Rods

Quarry Rock Fill

Dredging
Next Steps

- Stage 1 - ECF Construction
  - Completion December 2017
- Stage 2 - Dredging
  - Currently out for Bids
  - Site work 2018 and 2019
- Stage 3 - ECF Capping
  - Site Work 2020 to 2022

Environmental Monitoring Plan – Stage 1 Construction

3 Types:
1. Water Quality
   - Background
   - Total suspended solids (TSS) / Turbidity
   - Chemistry
2. Air Quality
   - Background
   - Health & Safety
   - Naphthalene & Benzene
   - Odour
3. Sediment Verification
   - Trace/AHS

Environmental Monitoring - Water Quality

Site Specific Criteria

TSS is required to be no more than 25 mg/L above background levels, 100 m from in-water work.

- Site specific TSS-Turbidity relationship indicates 2 mg/L TSS is equivalent to 1 NTU

∴ Site specific criteria is equivalent to:

Turbidity is required to be no more than 12 NTUs above background levels, 100 m from in-water work.

Daily Background Criterion

- Turbidity is required to be no more than 12 NTUs above background levels, 100 m from in-water work.
- In rare case where background TSS exceeds 40 mg/L (30 NTUs), the maximum allowable cumulative TSS will be 85 mg/L (42 NTUs)
- Average background turbidity in harbour ranges between 1 and 8 NTUs

Maximum Allowable Turbidity

- Turbidity Measurements Above Background Levels

Daily Background Criterion

- Criterion provided daily by site engineer
- Typically established during non-working hours at each monitoring location
- Can be re-established during the day in cases where the weather conditions change such that the previously established background criteria becomes invalid.
Water Quality - Turbidity

• Typical setup during dredging and backfilling between the walls
• Permanently moored monitoring buoys
• TI & T2 are 50m - 100m from dredging and rock fill operations
• T2 is live - takes readings in 15 minutes

Example of turbidity reporting:
- Exceedance, outside of working hours, on September 27 at 11:56pm and September 28th at 1:56am
- 28.77 & 55.27 NTU
- Daily criteria was 22.33 & 23.56 NTU
- NOT RELATED TO PROJECT WORK

Conclusion: No corrective action required.

Environmental Monitoring - Air Quality

Randle Reef Air Monitoring Programs
- Background Air monitoring - This has been conducted since 2014 by ECCC to establish an accurate account of air quality conditions around the Randle Reef site. Background air monitoring will continue through implementation of the project.
- Project Air monitoring - This takes place during project activities. Both constant real time monitoring and periodic grab samples are included.
- Contractor Health and Safety Monitoring - The construction contractor monitors air quality within the confines of the work area to ensure the safety of workers on the site.
- Odour Monitoring - This is conducted by the project air specialist. Baseline odours have been established. Complaints will trigger odour and corresponding air quality sampling.

Air Quality - Real Time Monitoring (All VOCs)
- 5 real time air monitoring locations set up along the project boundary.
- The fifth mobile PID P5, shifts based on wind direction.
- The trigger level for action is 60 ppb for an hourly average. The PID analyzers alarm the consultant if a 15 minute concentration exceeds 60 ppb, to provide early warning.

Air Quality - Triggered Grab Samples
- Tedlar bag sample results: All samples were below applicable criteria. No corrective action required.
- nd - none detected
- Benzene criteria: 2.3 ug/m^3
- Naphthalene criteria 22.5 ug/m^3
**Mitigation Measures**

Mechanical dredging during Stage 1 is limited to a 12 hour shift. Further mitigation measures will be implemented if required, these could include:

- altered work activities such as changing locations, changing tasks or slowing work until conditions change;
- odour/emission suppressors, such as foams, if required; and/or
- stopping work until conditions change.

**Air Quality- Weekly Sampling**

- Weekly air samplings are conducted to provide a reference between the PG readings and the actual chemical concentrations at the site.
- This is not triggered by any previous results but is a completion exercise.
- Sample analysis is conducted for a wide range of VOC parameters.

**Odour Monitoring**

- No odour complaints received in 2016.
- If an odour complaint is received, both odour samples and NV samples (for chemical analysis) would be collected at three locations.

**Sediment Sampling- Dredge Verification**

- Sampling is conducted in order to verify dredging activities and the back-up criteria.
- Sediment samples are collected from between the three locations.
- Samples which did not meet the cleanup criteria or were rejected.
- When samples pass, rock placement between the walls proceeds.

**Questions?**