Demolition of the Former Dartmouth Refinery

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RemTech 2017

Agenda

- Background
- Project Overview
- High Level Approach
- Demolition Summary
- Challenging Scope
- Lessons Learned
- Project Closure
- Questions

Background

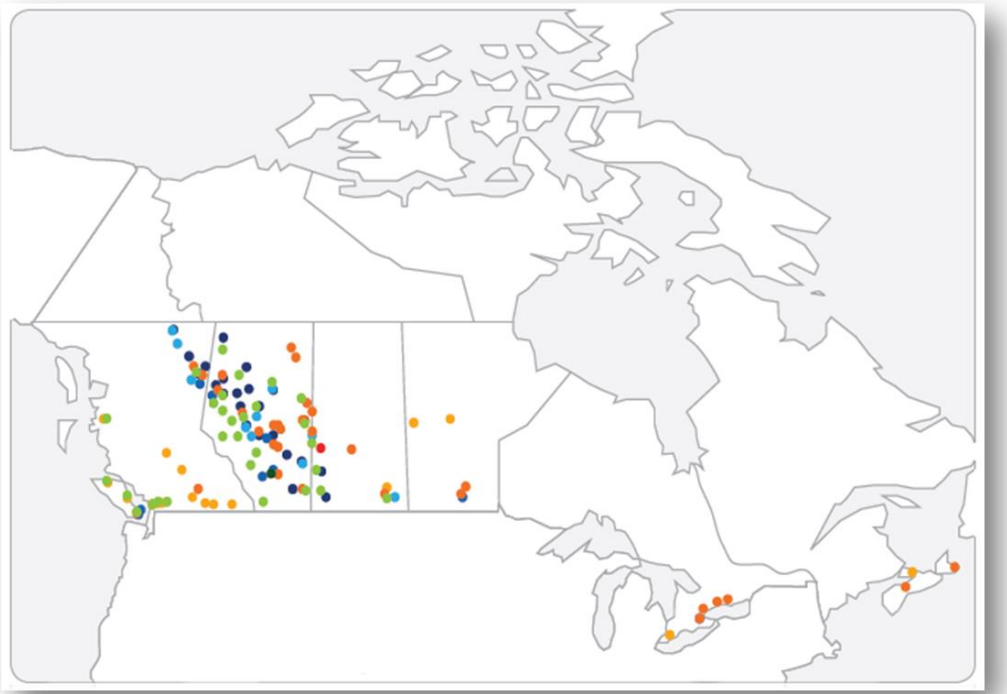
Who we are – Imperial

- Extensive global experience
- Imperial/ExxonMobil Global Demolition Centre of Excellence
- Imperial and ExxonMobil have executed many demolition projects throughout the world
  - Canada
  - United States
  - Australia
  - Germany
  - Italy
  - France

Who we are – Tervita

- Tervita Environmental Services is an industry leader in Remediation, Demolition and Environmental Construction Services leveraging the largest waste management infrastructure in Canada to service oil and gas, industrial and government clients.

- Major Demolition Projects Include
  - Mildred Lake Mine Replacement
  - Giant Mine Roaster Decontamination and Dismantlement
  - Kitimat Industrial Facility



Site Background

- Refinery overview
  - Located in Dartmouth, NS
  - Start of operations - 1918
  - Refinery shut down - 2013
  - Refining capacity – 88 KBD
  - Property area – ~700 acres
- Marine Terminal operated by Canadian Fuels Operations (CFO)
- Surplus areas transferred to ES in Q4 2014
- Neighbors/surrounding land use
  - Water bodies: marine and freshwater
  - Residential: 210 houses within 100 m
  - Commercial/Industrial
    - Superior Propane, CN Rail
    - Shearwater – military base and airstrip

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Project Overview

Project Scope

Project Scope

Project Objectives

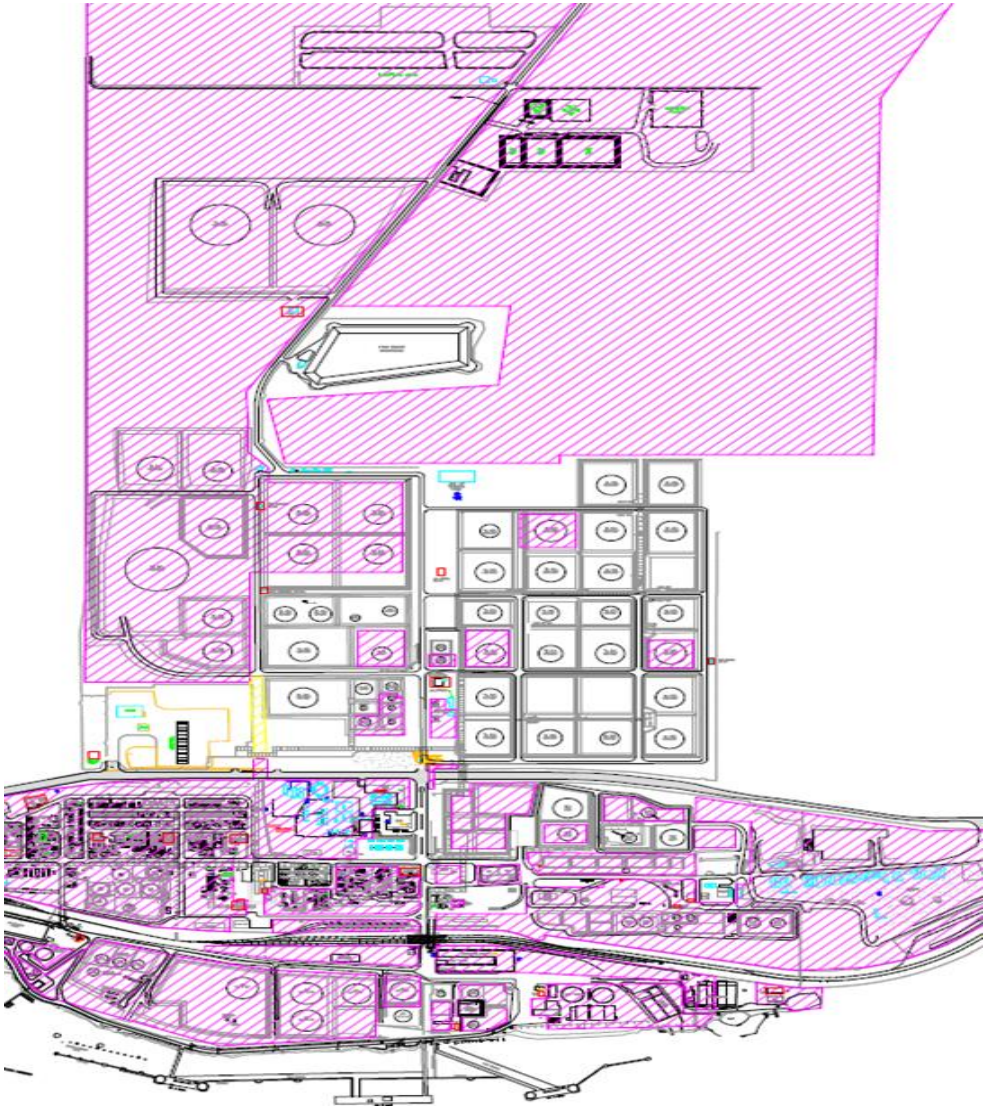
"Nobody gets hurt"

- Minimize disruption to the surrounding community
- Regulatory compliance
- Timely execution of project scope

- Project Safety Credos
  - "Machine before human"
  - "Own your zone"
  - "Clarify, Simplify, Focus"
  - "It's not mean to intervene"

Scope of Work Highlights

- Project Timeline
  - Q4 2015- Q4 2017
- Site is divided into :
  - 8 areas (Block 1 to 8)
  - ~ 85 sub-areas
- ~37,000 metric tons of steel
- ~18,000 m^3 of residual hazardous and non hazardous material
- Extensive asbestos abatement
- 73 tanks (spherical, concrete, steel, etc.)

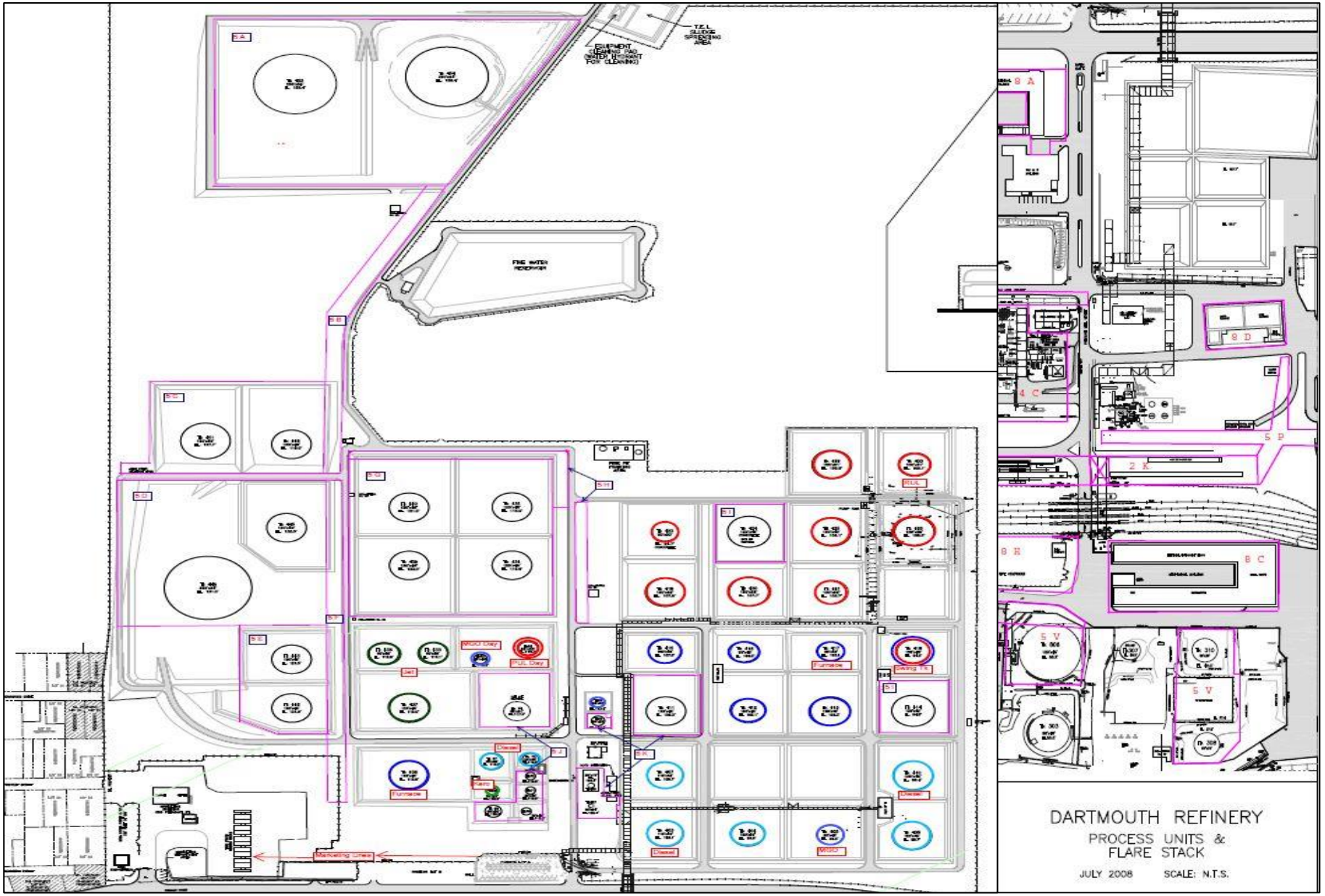


Surplus Area

High Level Approach

Where…How…do you begin?

Site Division, Block Definition

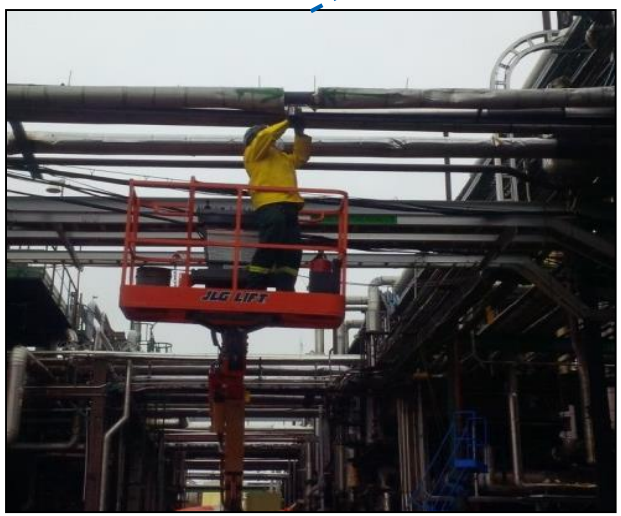


High Level Approach

3 phase approach: Verification and Validation, Asbestos Abatement, Demolition

V&V Team	Abatement Team	Demolition Team

Verification of **zeros**	Asbestos Abatement	Demolition of structures



Demolition Summary

High Level Timeline

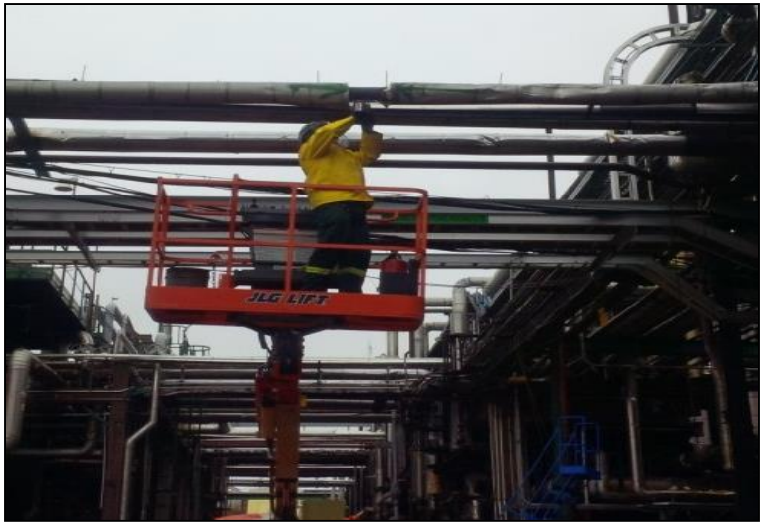
Sept 2015
Contract awarded to Tervita

Sept-Nov 2015
Pre-planning activities

Nov 2015
Mobilization and start of demolition activities

Nov 2015 - Present
Progressive demolition of in-scope areas and debris removal

Dec 2017
Demolition completion and demobilization



A day on-site…

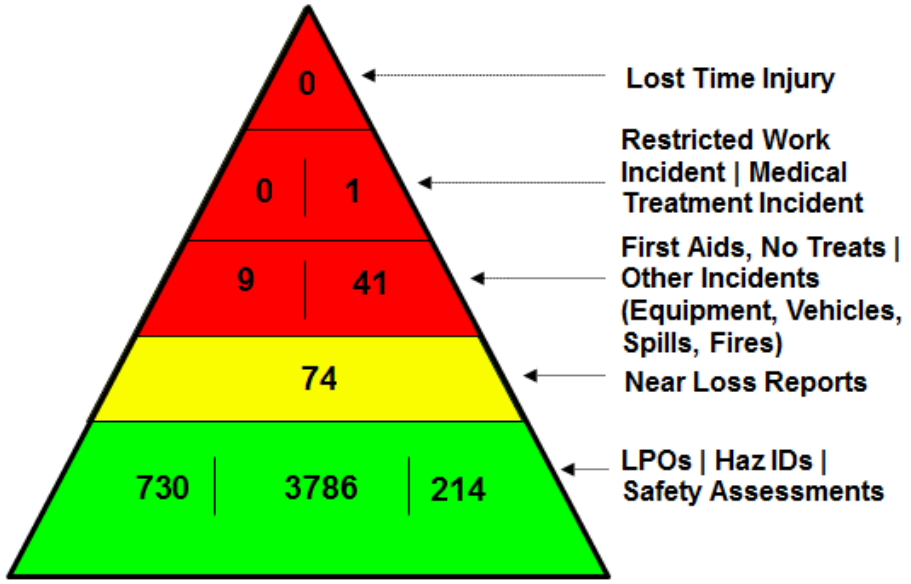
- Workforce consists of 70-80 workers
- 80% of the workforce is local
- Workforce consists of five major contracting organizations
- Extensive safety planning, documentation, and engagement

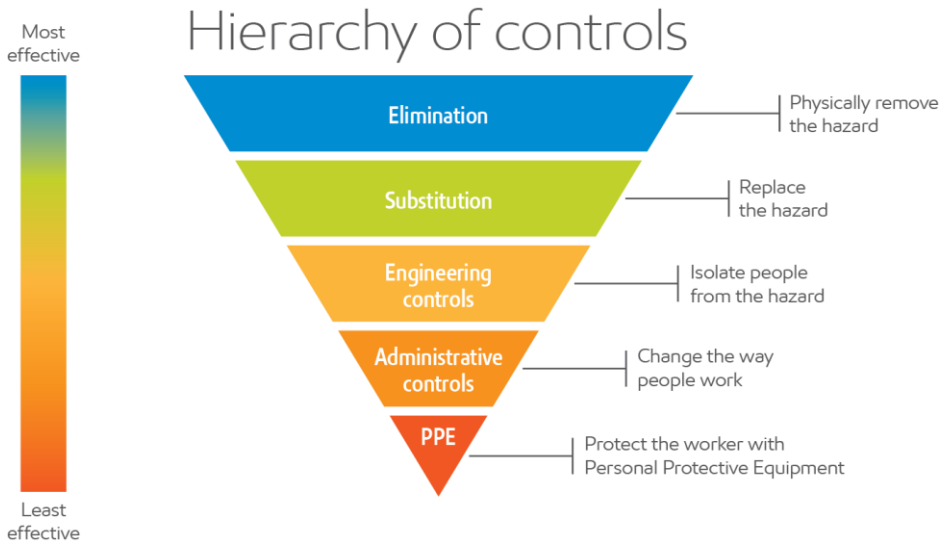
Heavy Machinery

- Up to 15 excavators/skid steers/rock trucks
- Up to 3-5 vacuum trucks
- Water trucks and other dust suppression activities executed daily
- Specialty demolition excavator attachments
- Extensive controls that restrict access to

Safety Summary

- Work Hours: ~300,000 LTD
- 80-90 people on-site daily at peak
- Zero recordable spills/regulatory violations
- Strong focus on machine/human interface (HEEZ/ADZ), zone control, hand protection and JSAs
- 74 Work Execution Plans
- [20]65 JSAs





Milestones Achieved

- Cleaning and removal of > **70** Tanks
  - Higher complexity
  - Steel EFR, Spherical, and concrete tanks
- Successful execution of **72** controlled drops
- ~37,000T of steel processed and shipped
  - ~400 railcars
- ~ 18,000m^3 of liquid waste disposed
- ~23,000T of construction debris
- ~1,500T of asbestos abated

Critical Lift – Stack Removal

Preparation of Steel – Processing

Challenging Scope

Tanks…73 Removed

- All types
  - IFRs, EFRs, Hard shell
  - Spherical Tanks
  - Concrete Tanks
- All sizes and contents
  - 10,000 to 900,000 bbl
  - Diameters of 5 – 250 feet
  - Contained crude, sludge, refined
- Different methodologies:
  - Shearing
  - Torching

Tanks 453-454

- [illegible]
- [illegible]
- Drive excavator in
- Collect remaining sludge
- Clean tank
- Torch walls

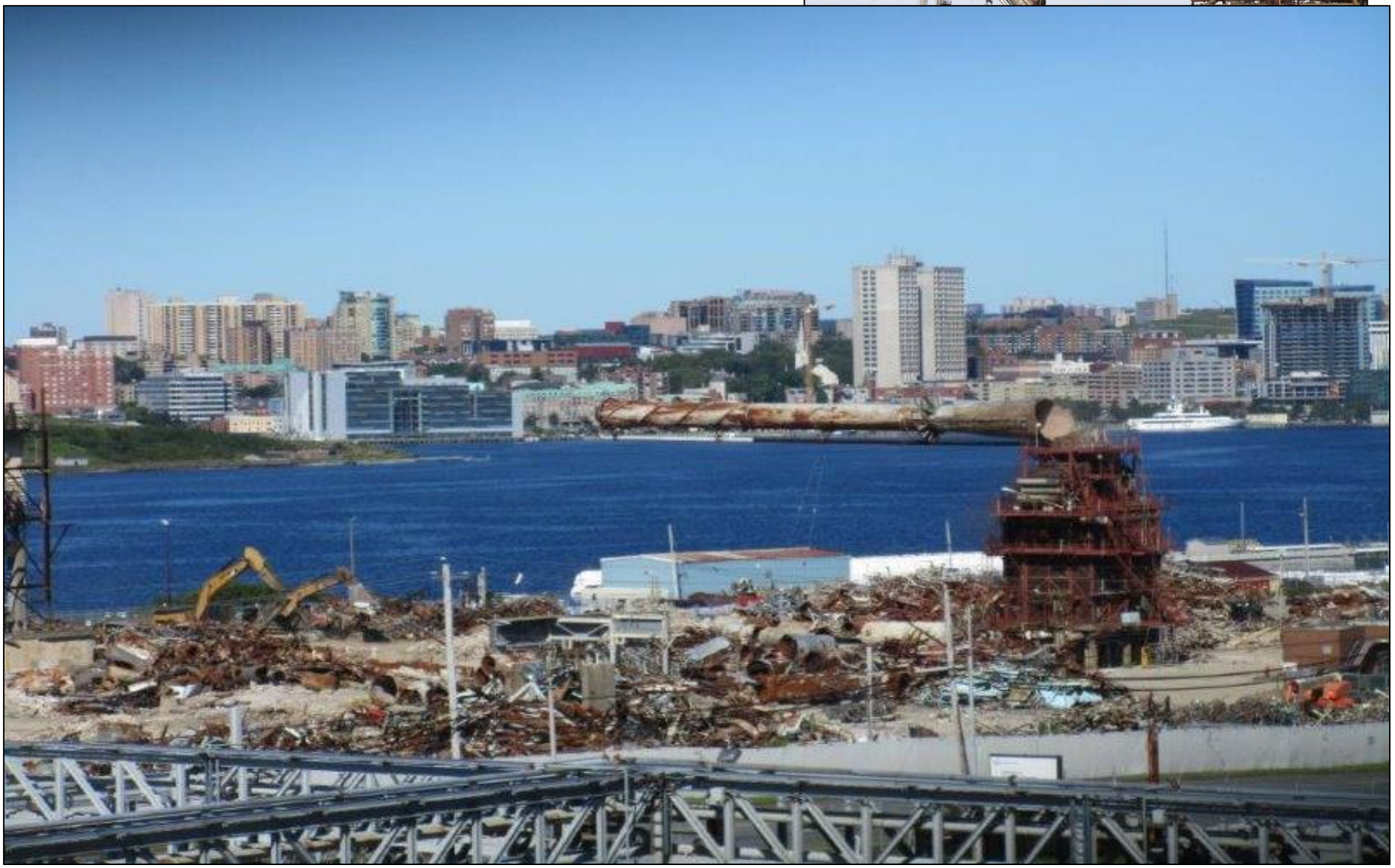
Concrete Tanks

Brick Stack

- 150 feet, structurally compromised
- Methodologies considered
  - Engineered drop via blasting
  - Top down mechanical via cricket unit
  - Top down mechanical via crane
  - Ultra-high reach excavator
  - Engineered drop via cable pull

Drops…72

- 72 drops: towers, furnaces, stacks



Process Plant

- Extensive netw
- Major fo
- Multiple

Process Plant Demolition

Engineered Drops – D202

Engineered Drops – T102

Processing Steel

Lessons Learned

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- Lesson
- ➢ Recommendation

- Regulatory approval received <1 month before execution
- ➢ Ensure **all regulatory approvals** and demolition permits are received ahead of time to avoid potential delays and large financial implications

- Major ACM equipment vulnerable to deteriorate
- ➢ **Abate deteriorating ACM** during decommissioning stages

- Many different color systems between business units
- ➢ Have a **color code system** for the different states of remaining surplus equipment. Implement within site orientation.

- Third party expert consultant conducting QA/QC confirming abatement completion allowed for a transparent removal and straightforward process
- ➢ Have the consultant who conducted the HAZMAT assessment on-site for **QA/QC** purposes ➔ Full circle

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Lessons Learned

- Lesson
- ➢ Recommendation

- Leaks can occur from improperly decommissioned lines
- ➢ Identify every line, cross reference P&IDs, drill all low points, and use a level when uncertain. Implement **spill mitigation** control measures

- Residual product easier to pump out during warmer weather
- ➢ Recover product during summer months to **reduce waste** removal costs in both tanks and lines

- ACM <u>suspect</u> materials encountered during demolition were at times treated as ACM and shipped to expedite process
- ➢ Be prepared to abate during short duration jobs when **ACM suspect** materials are unexpectedly encountered.

- Successful relationship with community resulted in smooth execution
- ➢ Ensure to have a pre-established schedule for **community meetings**, and plans to deal with any **inquiries** in ely and effective manner.

Project Completion

Post Demolition

- Active terminal
- Continued terminal optimization
- Environmental site assessment activities
- No plans for future development
- Annual community meetings
- Continue to play an active role in the community

Post Demolition

Process Plant – Before and After

Marine Area – Before and After

East Tankfield – Before and After

New Tenants


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