Field Pilot Testing for Chemical Oxidation at the Former Nitchequon Meteorological Station

DECONTAMINATION PROJECT IN ISOLATED NORTHERN AREAS

Adriana Peisajovich\(^1\), Éric Bergeron et coll\(^2\), Mathieu Barbeau et coll\(^3\), and Ginette Lajoie\(^4\)

\(^1\)Transport Canada, Quebec Region, \(^2\)Golder Associates Ltée,
\(^3\)Golder Associates Innovative Applications (GAIA) Inc. and \(^4\)Cree Regional Authority
TABLE OF CONTENTS

• HISTORICAL
• DISMANTLING OF TANKS
• PIPELINE DISMANTLEMENT
• FULL-SCALE REMEDIATION PLAN
- 185 km from LG4
- Montréal - LG4 ≈ 1600 km
- Runway closed
- 9 buildings
- 5 large above ground tanks and one pipeline
- No electricity
- No housing facilities that meet governmental health and safety standards
- No road access
AERIAL VIEW AND CROSS SECTION

Cross section A-A
HISTORICAL

- 1942, Transport Canada (TC) installed a radio and weather station at Nitchequon Lake.
- 1985, TC relocated the station and the site Nitchequon was abandoned.
- 1986, the user rights of the site and the buildings were transferred to Indians Affairs Canada.

- 1987, the rights of use and the buildings we’re transferred to the Mistissini Band.
- 1996, the Mistissini Band has a project to develop the site into a future outfitters.
- 1997, (CRA) employed a consultant to perform a preliminary environmental verification of the site.
SOURCE OF THE PROBLEM
LOGISTICS

- Road transportation to Mirage Outfitters (1,800 Km)
- 96 hydroplane trips (2005)
- 22 helicopter trips (2005)
TEMPORARY CAMP
DISMANTLING OF TANKS

4 tank of 22 800 liters
1 tank of 91 200 liters

Cutting of metal in plate of 0,6 meter by 1,2 meter to facilitate transport
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NO MORE TANKS!
EQUIPMENTS
PIPELINE DISMANTLEMENT

- 0.075 m Pipes
- Total length of 1230 meters
- Residual products pumping
25,900 kg of metal was sent to recycling site
66 drums
HOW DO WE SOLVE THE PROBLEM?

Base on the following:

- Characterization
- Literature review
- Laboratory testing
- Field testing

Remediation design taking into account provincial and federal requirements was performed.
TECHNOLOGIES TESTED ON-SITE

1) In-situ oxidant injection

2) Oxidant natural infiltration

3) Oxidation into mixers
1. Excavate surface soils
2. Place soils into mixer
3. Add chemicals and water
4. Mix soils
5. Backfill with the treated soils
6. Cover with clean soil and revegetate
**REMEDIATION PLAN**

**Remediation goal**
- Soil volume to be treated: 1,471 m³
- Decontamination Criteria: Petroleum hydrocarbon < 1,350 ppm

**Steps performed in 2005**
- Equipment sizing and purchase
- Request for proposals: tanks decommissioning
- Environmental permitting
- Request for proposals: transportation
- Tanks and pipeline decommissioning

**Steps planned for summer 2006**
- Chemical oxidation of the soils in mixers
Process....step by step

1- Vegetation removal
2- Excavation of the first 2 feet of soil
3- Contaminated soil is transferred on HDPE lining prior treatment
Process....step by step

4- On-site analysis of the $C_{10}C_{50}$
5- Dosing based on the GC analysis : $g \text{KMnO}_4 / g C_{10}C_{50}$
Process....step by step

6- Cell construction
7- Cell lining installation
Process....step by step

8- Soils is transferred into the mixers (10)
GENERATORS AND MIXERS
Process....step by step

9- Treated soil is transferred from the mixers to the curing cells
Process....step by step

10- HDPE top cover lining is installed over the treated soil
11- 12 inch of clean soil is added over the top cover lining
COSTS DISTRIBUTION
Rehabilitation project

- Professional fees: 44%
- Transportation: 21%
- Room and board: 16%
- Equipment: 12%
- Chemical reactives: 5%
- Fuel: 2%

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DECONTAMINATION IS GREAT! DON’T YOU THINK?
AKNOWLEDGMENTS

ENTREPRENEUR GÉNÉRAL & PÉTROLIER
300, Route 117
Malartic (Québec)
Tél. : (819) 757-4060
Fax : (819) 757-6418

Environnement Canada
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Géantation of Metals

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THANKS !!!
MEEGWETCH !!

Questions?