### Field Pilot Testing for Chemical Oxidation at the Former Nitchequon Meteorological Station DECONTAMINATION PROJECT IN ISOLATED NORTHERN AREAS



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- 185 km from LG4
- Montréal LG4 ≈ 1600 km
- Runway closed
- 9 buildings
- 5 large above ground tanks and one pipeline

James Bay

- No electricity
- No housing facilities that meet governmental health and safety standards
- No road access



# SITE LOCATION (

### **AERIAL VIEW AND CROSS SECTION**



### 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.







# SITE CONDITION



GAIA

5 September 2000



# SOURCE OF THE PROBLEM



#### IST OF FACILITIES:

- Q-2 Whart 1 Garage
- Q-3 Water Pump House
- Q-4 Visitor Domitory
- Q-8 Power House / Diesel Generator Building

Main Residence and Kitche Radio / Meteo Building

- LOCATION OF CONTAMINATED SOILS
- Q-13 Hydrogen Generator / Balloon and Helium Building
- Q-16 E.P.U. Building

Q-10 Ma

- Q-18 Bulk Oil Storage Tanks
- Q-21 Emitter NBB Telecommunication Building
- Q-24 Warehouse / Trades Maintenance Building
- Q-25 Circular Roof Garage

4 000 m<sup>2</sup>

Q-26 Boat House (demolished)

Lake Nichicun

Road to C

d)

Former

dump

Cemetery

Lake Nichicun

ef ne

LAGOON #3

Q-24 Q-13

Lake Nichicun

Wharf 2

Q-25

Q-10

Wharf 1

Q-4

Q-2

±220 m

CONFIDENTIAL

### LOGISTICS



FNTRFPRFNF



- Road transportation to Mirage Outfitters (1800 Km)
- > 96 hydroplane trips (2005)
- 22 helicopter trips (2005)



'un monde meilleur



### **TEMPORARY CAMP**









### **DISMANTLING OF TANKS**







Cutting of metal in plate of 0,6 meter by 1,2 meter to facilitate transport





nonde meilleur







### NO MORE TANKS !



### EQUIPMENTS



### **PIPELINE DISMANTLEMENT**





- > 0,075 m Pipes
- Total length of 1 230 meters
- Residual products pumping



### RESIDUS



25,900 kg of metal was sent to recycling site 66 drums

م مقتلين مش في معالية غلار





un monde meilleur





### **METHODOLOGY**









### 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





### **FULL-SCALE REMEDIATION PLAN**







# **REMEDIATION PLAN**

#### Remediation goal

- Soil volume to be treated : 1 471 m<sup>3</sup>
- Decontamination Criteria : Petroleum hydrocarbon < 1,350 ppn</li>

#### **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





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







- 4- On-site analysis of the C<sub>10</sub>C<sub>50</sub>
- 5- Dosing based on the GC analysis : g KMnO<sub>4</sub> / g  $C_{10}C_{50}$



le meilleur



#### 6- Cell construction









#### 7- Cell lining installation





# **CURING CELL**



8- Soils is transferred into the mixers (10)







### GENERATORS AND MIXERS







9- Treated soil is transferred from the mixers to the curing cells









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







### DECONTAMINATION IS GREAT! DON'T YOU THINK?



# **AKNOWLEDGMENTS**







# THANKS!!!MEEGWETCH!!

# **Questions?**





