





Adapting Our Knowledge to Empower Change PP9CLΔ·σασ` CoPL<sup>v</sup>bΔ·<bΔ·Lb<sup>2</sup> P9·P5CL/Δ·σα<sup>2</sup>

#### Northern Ontario First Nations Environment Conference October 4-6, 2016 Best Western PLUS Nor'Wester Hotel & Conference Centre

Best Western PLUS Nor'Wester Hotel & Conference Centre Thunder Bay, ON

# CONTAMINATED SITES



## WHAT IS A CONTAMINATED SITE?

- CANADIAN DEFINITION a contaminated site is "one at which substances occur at concentrations (1) above background (normally occurring) levels and pose or are likely to pose an immediate or long term hazard to human health or the environment, or (2) exceeding levels specified in policies and regulations"
- Meaning that there is a concentration of a substance in the soil or water (usually a petroleum product or a metal) that is higher than expected for that region of Canada. There must also be some evidence that this concentration poses a risk to human health or the environment.



### SOME SITES ARE OBVIOUS ...







































### FEDERAL CONTAMINATED SITES INVENTORY www.tbs-sct.gc.ca/fcsi-rscf/home-accueil-eng.aspx

- The Federal Contaminated Sites Inventory includes information on all known federal contaminated sites under the custodianship of departments, agencies and consolidated Crown corporations as well as those that are being or have been investigated to determine whether they have contamination arising from past use that could pose a risk to human health or the environment.
- ► Note that it does not include all contaminated sites.



- ► Ontario Wide –
- ► Northwest Ontario –



- Ontario Wide 3,735 Sites
- ► Northwest Ontario –



- ► Ontario Wide **3,735** Sites
- ► Northwest Ontario **913** Sites
- ► For these 913 You can examine Site Status



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  - ► 36 Suspected; 174 Active; 713 Closed

#### Suspected

Suspected Phase	Sites
Historical review planned.	26
Historical review completed. Initial testing underway.	10

#### Active

Assessment Phase	Sites
Initial testing completed. Detailed testing underway.	<u>61</u>
Detailed testing completed. Remediation / risk management planned.	<u>33</u>
Detailed testing completed. Remedial action plan under development.	30

Remediation/Risk Management Phase		
Remedial action plan completed. Remediation / risk management underway.		
Remediation / risk management completed. Confirmatory sampling underway.		4
Long-Term Monitoring Phase	Sites	
Confirmatory sampling completed. Long term monitoring underway.	1	



#### Closed

Suspected Phase		
Historical review not required.	325	
Historical review completed. No further action required.	<u>71</u>	

Assessment Phase	
Initial testing completed. No further action required.	99
Detailed testing completed. No further action required.	42

Remediation/Risk Management Phase	Sites
Detailed testing completed. No further action required.	<u>38</u>
Remediation / risk management completed. No further action required.	25
Confirmatory sampling completed. No further action required.	83

Long-Term Monitoring Phase		
Long term monitoring completed. No further action required.	<u>30</u>	

The following are the definitions for the three site status types for contaminated sites:

#### Suspected

Further assessment work is required to confirm whether the site is considered a "contaminated site." Active

Active sites are confirmed contaminated sites where remedial action is or may be required. Closed

No further action is required.



#### **DFRP/FCSI - Map Navigator**

Area: Ontario, Manitoba Content: 603 Federal Contaminated Sites,



#### 0 Info Search Control layers and labels visibility with the checkb select list. Actions will automatically update the m Contaminated Sites from active query Federal Properties 🛨 🔲 Federal Buildings Federal Contaminated Sites - Economic Region Census Divisions Census Subdivisions Metropolitan Areas - Federal Electoral Districts Treaty Areas Base map: Standard

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<sup>1</sup> This layer is visible only when the map scale is
 <sup>2</sup> Google base maps are only available when the



## QUERY FOR "FIRST NATIONS" IN NWO

- Keyword Search for First Nations reveals 56 Sites
- Each Site has a unique 8 digit identification number
- You can other specific details about the Site
  - For example the type of contaminants
  - ► Let's look at the contaminants listed for the **56** First Nation Sites



#### Departmental Activities Policy and Oversight Federal Public Service

Other

Home > FCSI > Contaminants and Media

nventory	Sites
Official Contacts	
Search All Sites By	
Classification	
Contaminants or Media	
OFRP Property Number	
ederal Site Identifier	
Highest Step Completed	
nternal Identifier	
Keyword	
ocation	
Reason For Federal Involve	ement
Reporting Organization	
Site Status	
1ap Navigator	
Reports	
inancial Summaries	
Open Data	

Contamin	ants and Media						
	Search Results Summary						
Criteria:	Criteria:  Contains the keyword(s): first Economic Region: Northwest Select Additional Criteria						
Sites Found:	Sites Found: 56						
Contaminant				м	edia		
		<u>Not</u> <u>Available</u>	<u>Surface</u> water	Groundwater	Sediment	<u>Surface</u> <u>soil</u>	Soil
PHCs (petrole	PHCs (petroleum hydrocarbons)		0	<u>16</u>	<u>1</u>	4	26
BTEXs (benzene, toluene, ethylbenzene, and xylene)		0	0	1	0	1	1
PAHs (polycyclic aromatic hydrocarbon)		0	0	4	1	0	12
Metal, metalloid, and organometallic		0	0	1	0	0	Z
Other organics	1	0	0	0	0	1	0

/

Air

Other medium



## MOST COMMON CONTAMINANT – PETROLEUM HYDROCARBONS (PHCS)

- Source generally from fuel leaks and/or spillage.
- Fuel could be introduced to the environment at surface or subsurface from lines or tanks.
- Some Contaminated Sites present more challenges to the investigator than others



















### SOME SITES ARE NOT SO OBVIOUS

- No surface staining visible as evidence of fuel loss
- A contaminated soil area has been cleaned up across the surface only and possibly covered with non-impacted material
- Contamination has moved a significant distance away from the original source area in the subsurface



#### INVESTIGATE THE SUSPECT AREA WITH TEST HOLES OR PITS













## PHOTOIONIZATION DETECTOR (PID)

- A type of field screening tool that can help the investigator assess media impacts by fuels. Portable survey PID detectors provide broad awareness of any harmful volatile organic compounds (VOCs) and toxic industrial chemicals that may be present.
- A PID uses an ultraviolet (UV) light source to break down VOCs in the air into positive and negative ions. The PID then detects or measures the charge of the ionized gas, with the charge being a function of the concentration of VOCs in the air.
- Let's see how this instrument works for spiked soil samples with the help from some volunteers!







### RESULTS DEMONSTRATE ...

- PID can be an effective screening tool for detecting volatile organic compounds in soils (such as fuels)
- We can use this tool to help us find where the fuel contamination has moved. This allows the Site investigator to select specific samples for laboratory quantitative analyses (which are costly).

#### IF WE SUSPECT GROUNDWATER CONTAMINATION – WE MAY INSTALL A MONITORING WELL

 Usually these are constructed with commercially available threaded PVC piping.













### PHCS IN GROUNDWATER



#### LNAPL – Light Non-Aqueous Phase Liquid or Free Product



### ANOTHER FIELD TOOL – INTERFACE METER









### SUMMARY NOTES ...

- Interface meter allows you to identify the free product phase of a contaminant which could exist as an LNAPL or DNAPL.
- Note that the position of the screened portion of the monitoring well in relation to the LNAPL or DNAPL is critical for detection.
- In addition, expect that free phase product thickness will vary with time and may even be absent during some monitoring events due to groundwater conditions.





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