TC Energy Peace River Mainline Abandonment Project

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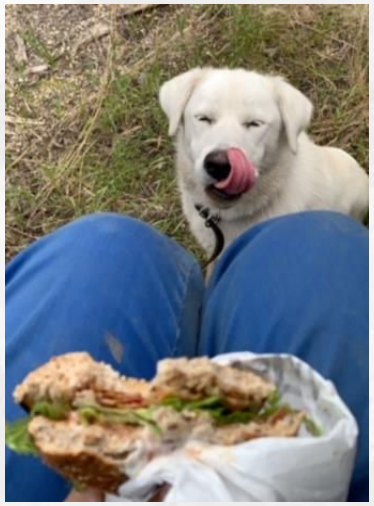
TRACE™ ASSOCIATES

TC Energy

Introductions: Jenna Rode – A Bit About Me



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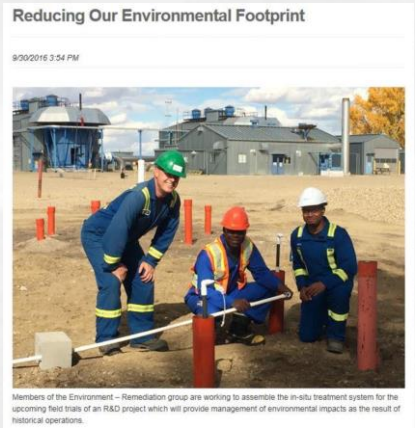
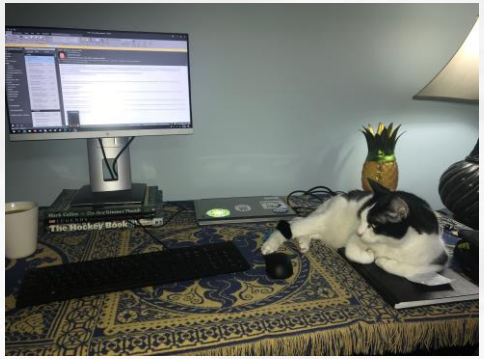
Introductions: Darcy Bye - A Bit About Me





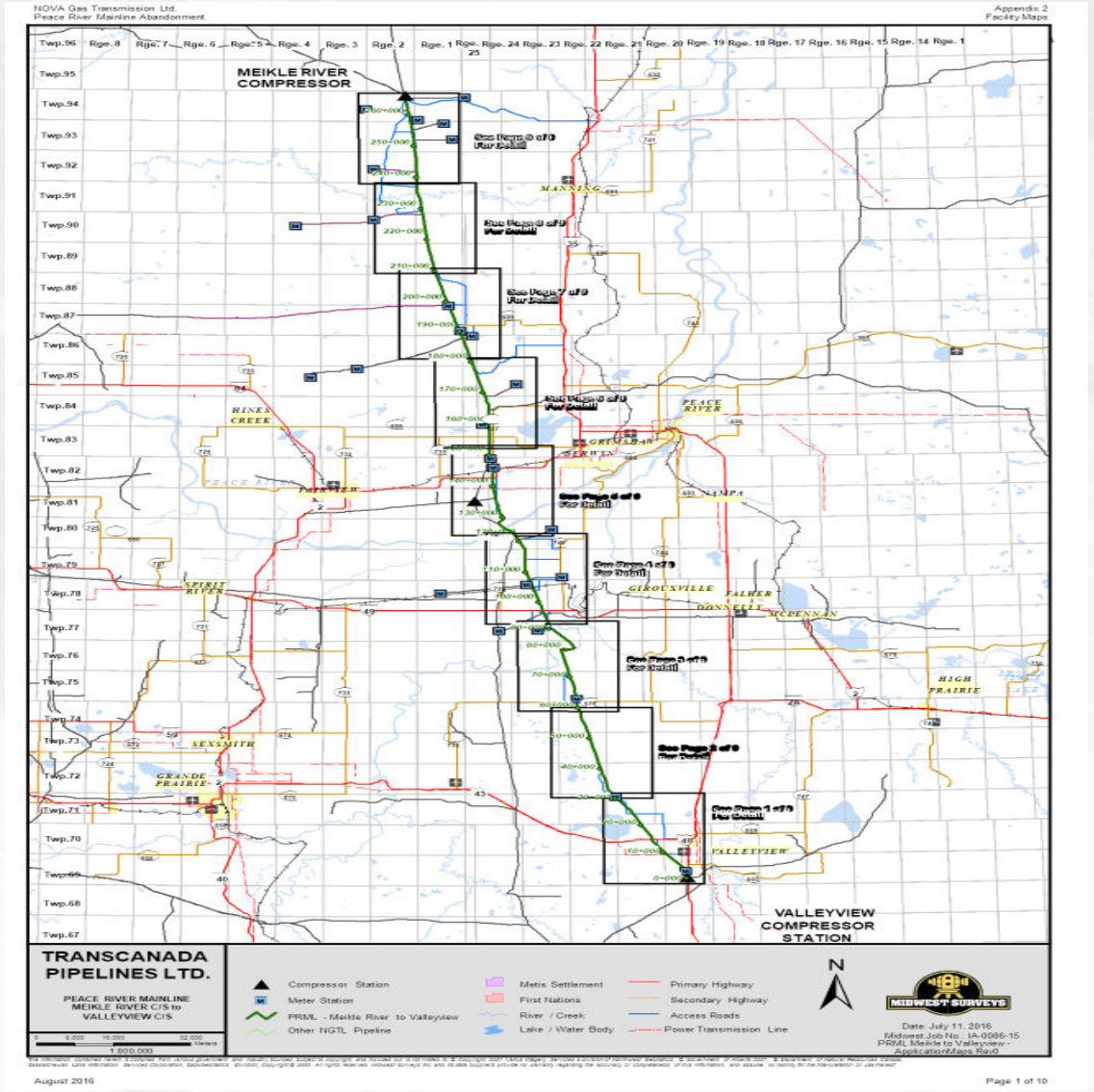
UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA

MOUNT ROYAL COLLEGE

MOUNT ROYAL UNIVERSITY 1910

PRML Abandonment Project - Overview

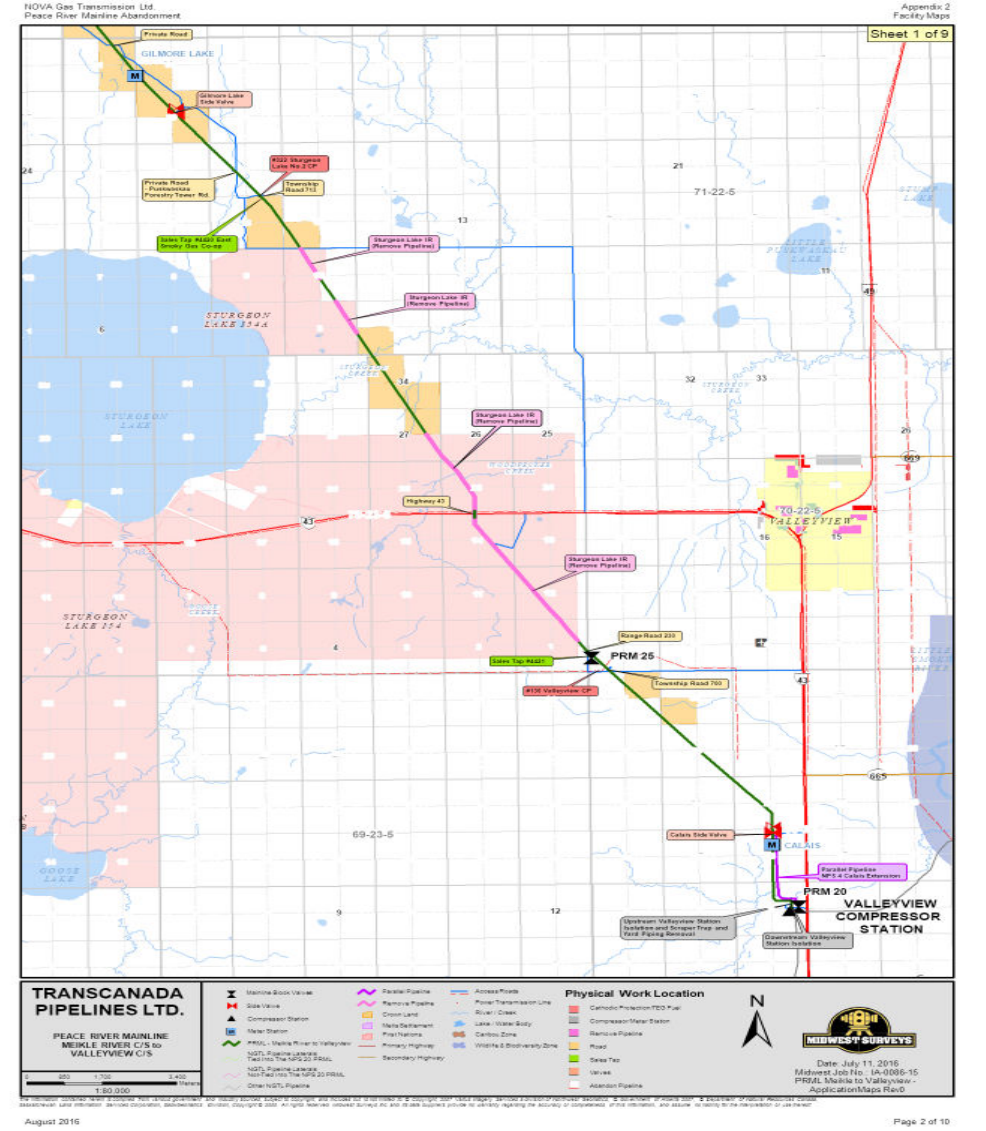
- Line built in 1968 to transport crude oil and converted to transport natural gas in 1972
- Abandonment Scope:
  - 266 km section of NPS 20 Nova Gas Transmission Ltd. (NGTL) Peace River Mainline
  - 2.34 km of NPS 4 Watino Lateral
  - 0.80 km of NPS 4 Hotchkiss North Lateral
  - Decommissioning of the Valleyview Compressor Station
  - All above-ground facilities to be removed
- Scope includes full removal of above **and** below ground facilities on the 9 km which passes through the Sturgeon Lake Cree Nation (SLCN)



PRML Abandonment Project - Overview

KEY MILESTONES	
Aug. 18, 2012	NGTL filed Notice of Decommissioning with former National Energy Board (NEB), now Canada Energy Regulator (CER)
	Application reviewed and in consideration of the nature and scope of the project, the determination was leave to abandon the operation of the pipeline.
Aug. 18, 2016	NGTL submitted abandonment application
Jan. 27, 2017	NEB issues Hearing Order
Feb. 23 – Mar. 16, 2017	Apply to Participate Process
Aug. 22, 2017	Oral Traditional Evidence Hearing
Mar. 14, 2018	NEB approves NGTL application to abandon parts of the Peace River Mainline

PRML Abandonment Project - Overview



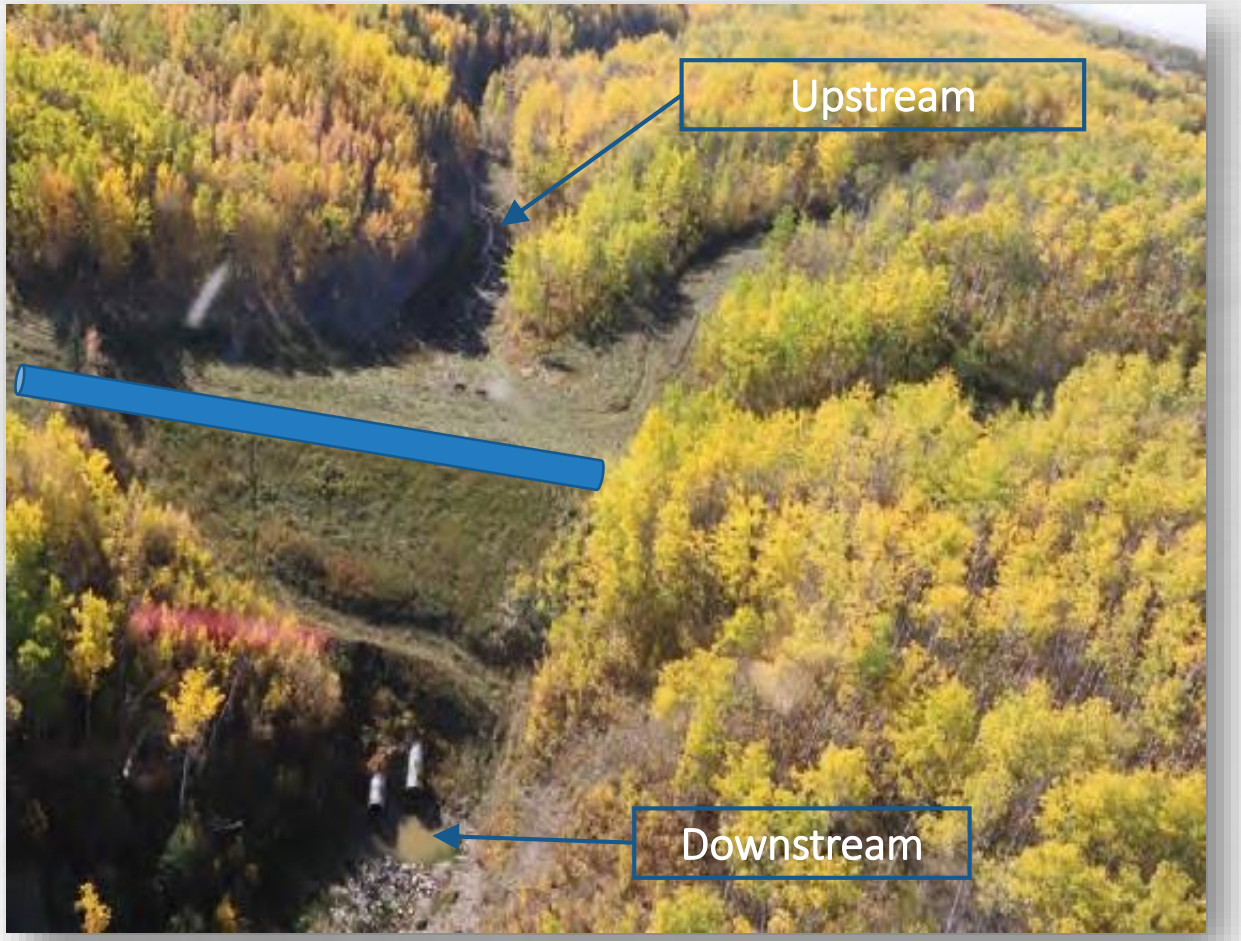
- Project Facilities cross 70 km of private freehold land (26%), 189 km of Crown land (70%), 9 km of SLCN Reserve land (4%) - 79 landowners and 37 land users directly affected
- SLCN – Changes in Chief and Council and the Prime Contractor selection required continuous negotiations.
- In-depth NEB hearings included written/oral evidence with five groups and individuals granted participation rights; NEB provided almost $160,000 in funding to support meaningful participation.
- Petroleum Technology Alliance Canada (PTAC) Studies directly linked to PRML Abandonment:
  - PARSC 07 – Recommended Practice for Cleaning of Pipelines for Abandonment
  - PARSC 16 – PRML Abandoned Pipeline Segment Field Study

❖ PARSC = Pipeline Abandonment Research Steering Committee

PRML Abandonment Project - Four Mile Creek

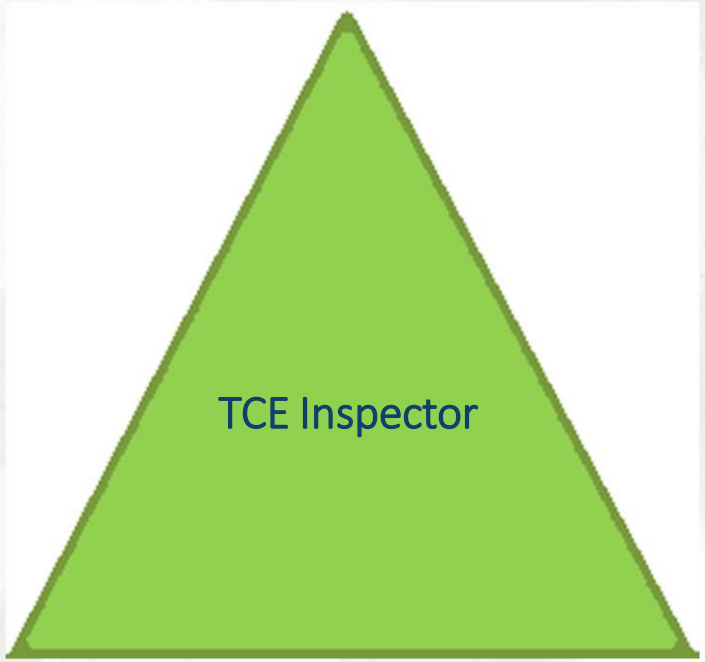
Background

- Historical pipeline river crossing diverted Four Mile creek through two culverts.
- PRML installed on top of a soil embankment and covered with additional soil
- Long-term effects of embankment includes deposition of sediments upstream and scour and channel degradation downstream.



PRML Abandonment Project – Management Strategy

Environmental Consultant –
Trace Associates Inc.



Waste Management
Contractor

Construction
Contractor

PRML Abandonment Project – Characterizing Materials and Sampling

- Materials
  - Piping
  - Gaskets
  - Vessels
  - Valves
- Waste Generated
  - Slurry
  - Soil

PRML Abandonment Project – Initial Sampling

Benchmark Soil Sampling

- Pre-disturbance sampling

Site Characterization Sampling

- Soil and/or Slurry generated through facility exposure characterized to determine potential contaminates of concern (COCs)

Infrastructure Sampling

- Removed facilities sampled on site or at laydown yard.

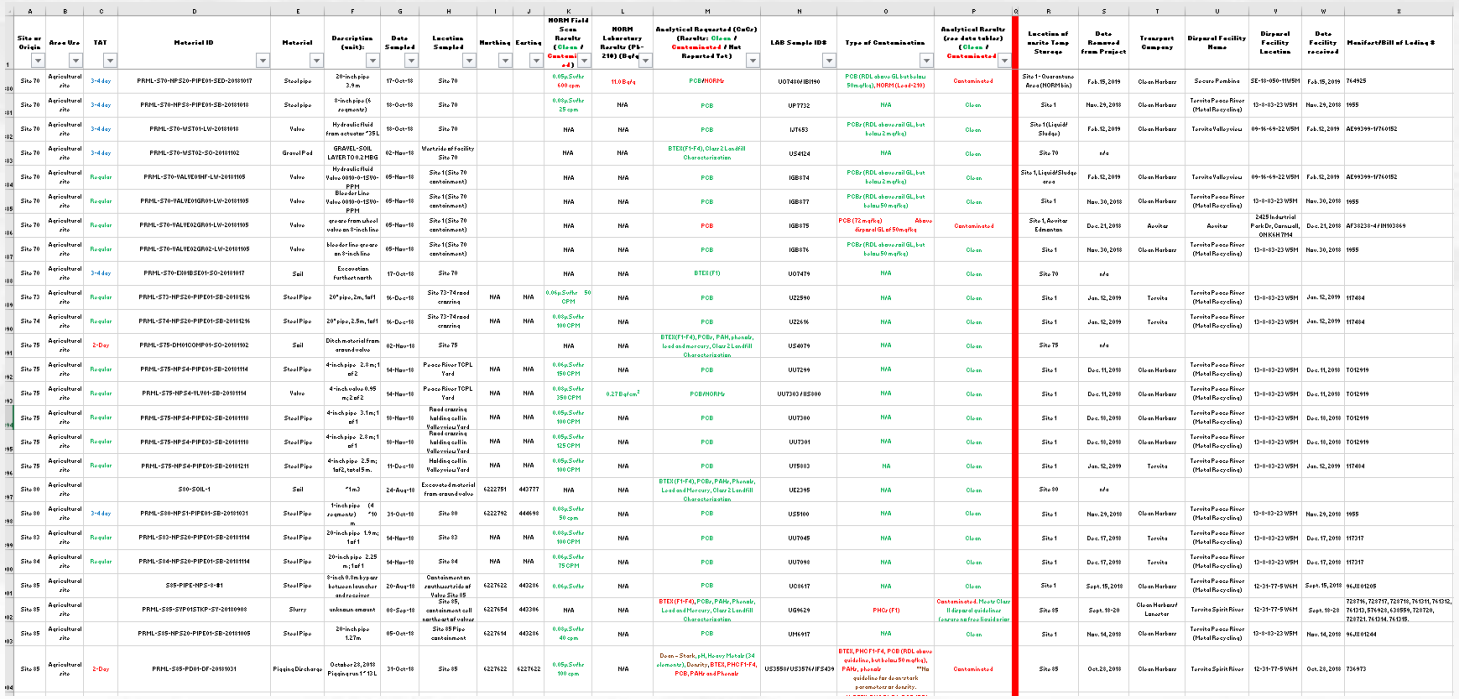
PRML Abandonment Project – Data Management and Sample Tracking

Data Management

- Samples processed through combination of data management software and manual processing.
- Easy to follow naming convention for rapid identification

Sample Tracking

- Universal tracking spreadsheet updated daily



PRML-S103-EX01NWLL02-SO-20190307
VALEY-S1-NPS20PIPE03-SB-20180907
VALEY-S1-NPS20PIPE05-SED-20180907

PRML Abandonment Project – Waste Characterization & Final Sampling

Prescence/Absence Investigation

- If characterization samples identified COCs, presence/absence investigations were conducted
- Disposal
- Tracking sheet distributed and infrastructure sorted for recycle or disposal

Benchmark Confirmatory Sampling

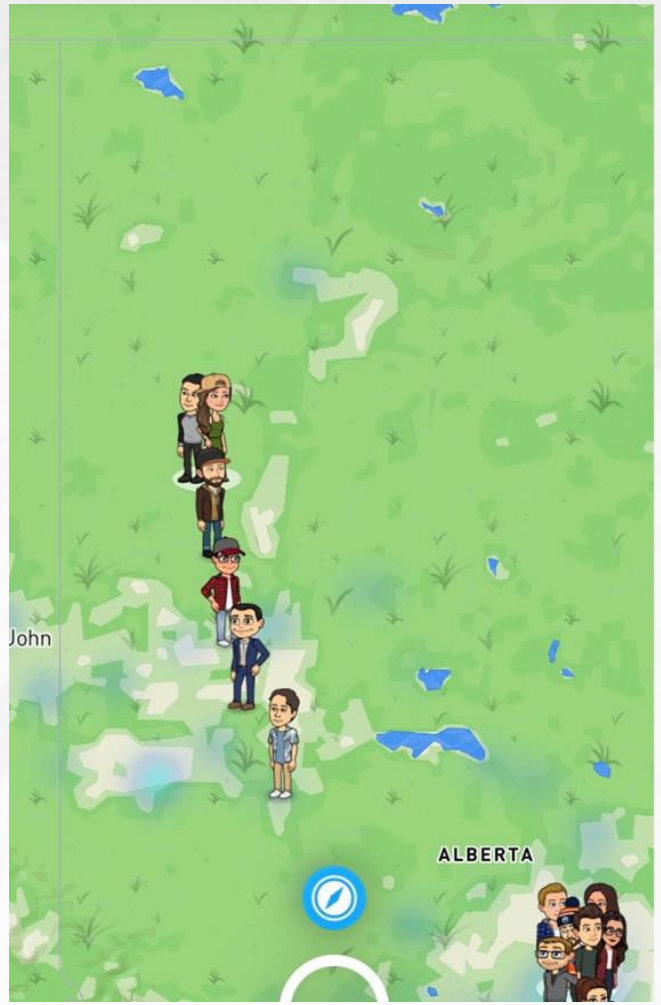
- Post-disturbance soil samples

PRML Abandonment Project – Overall Success

- Collected and processed 1,197 samples
- Completed the handling and appropriate disposal
  - 8,300 tonnes of soil
  - ~ 5,000 cubes of slurry and wastewater
  - ~ 1,250 tonnes of metal was recycled
- 31 presence/absence investigations completed and met the applicable guidelines

PRML Abandonment Project – General Challenges

- Site logistics fostering adaptability
- Rapid data management and communication
- Changing guidelines AEP 2016 to 2019
- Remote locations affecting sample delivery
- Mother Nature
- Project is first of its kind



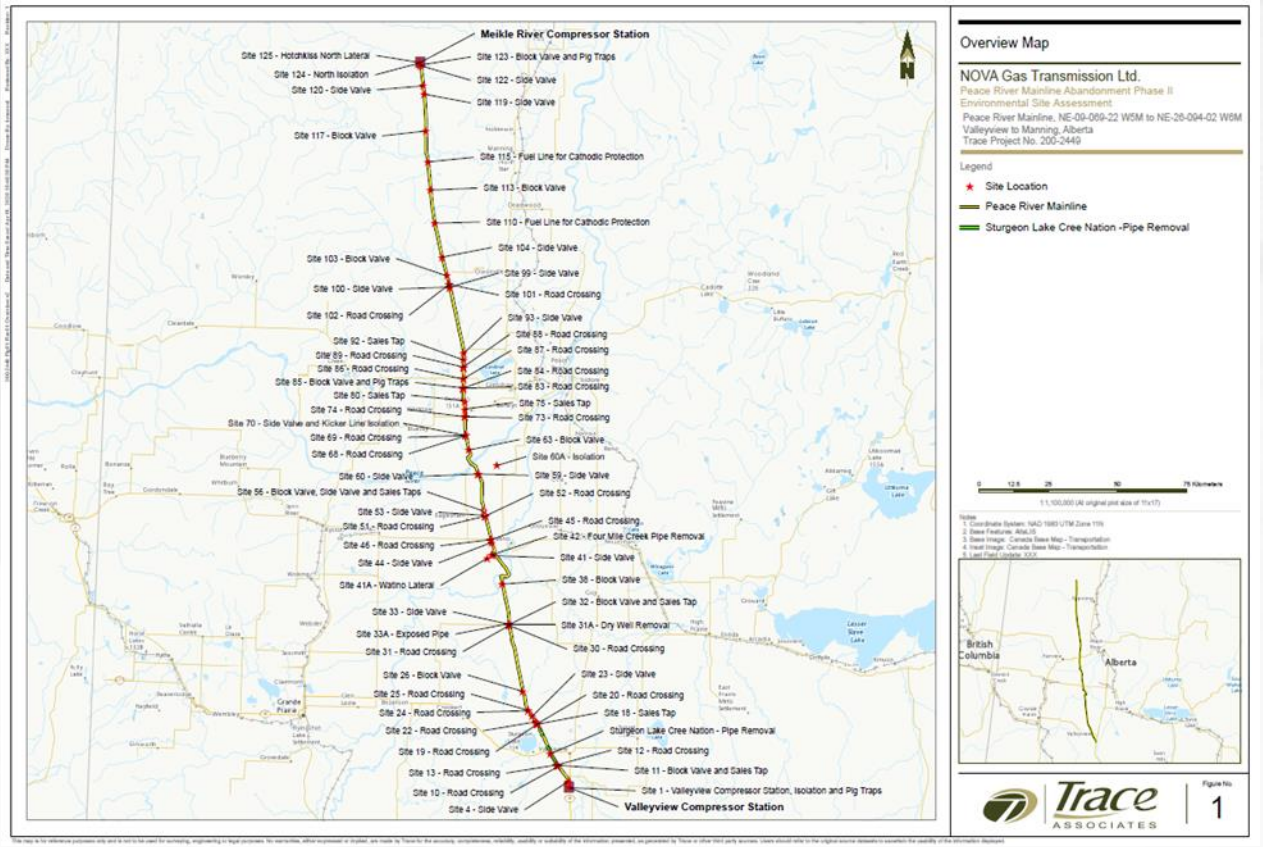
PRML Abandonment Project – Learnings

Be proactive!

- Collect every available sample
- Collect every possible matrix of sample
- Collect background samples to confirm suspected natural exceedances
- Hydrovac crews removed additional soil if impacts were suspected

PRML Abandonment Project – What Went Well

- Safety - The belief in safety for everyone!
- Bureau Veritas Canada (2019) Inc. Labs Portal
- Naming convention / tracking sheet
- The Report
- The Project
  - Collaboration
  - Innovation
  - Sustainability
  - General Attitudes



PRML Abandonment Project – Duration

National Energy Board / Office national de l'énergie — Canada → Canada Energy Regulator

TransCanada — In business to deliver → TC Energy

Maxxam → Bureau Veritas

Trace Associates → TRACE™ ASSOCIATES