

# Project Management of Fort Nelson Airport Environmental Remediation Project

Presented at Federal Contaminated Sites National Workshop

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# Presentation Outline

- Site History
- Contaminated Sites at Airport
- 2007 Scope of Work
- Challenges
- Target Area to Mitigate Challenges
- Future Initiatives



# Co-authors

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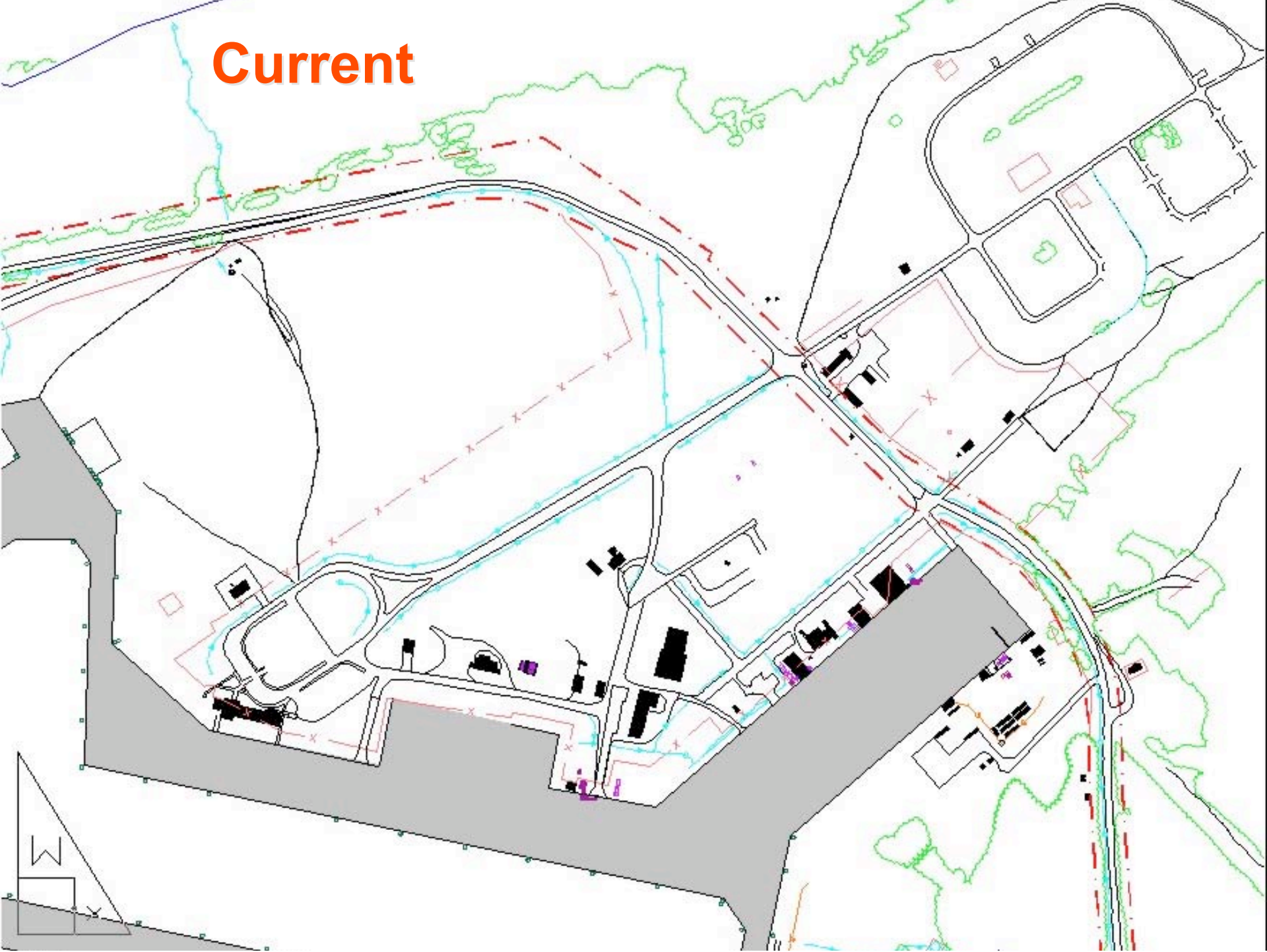


# Airport History

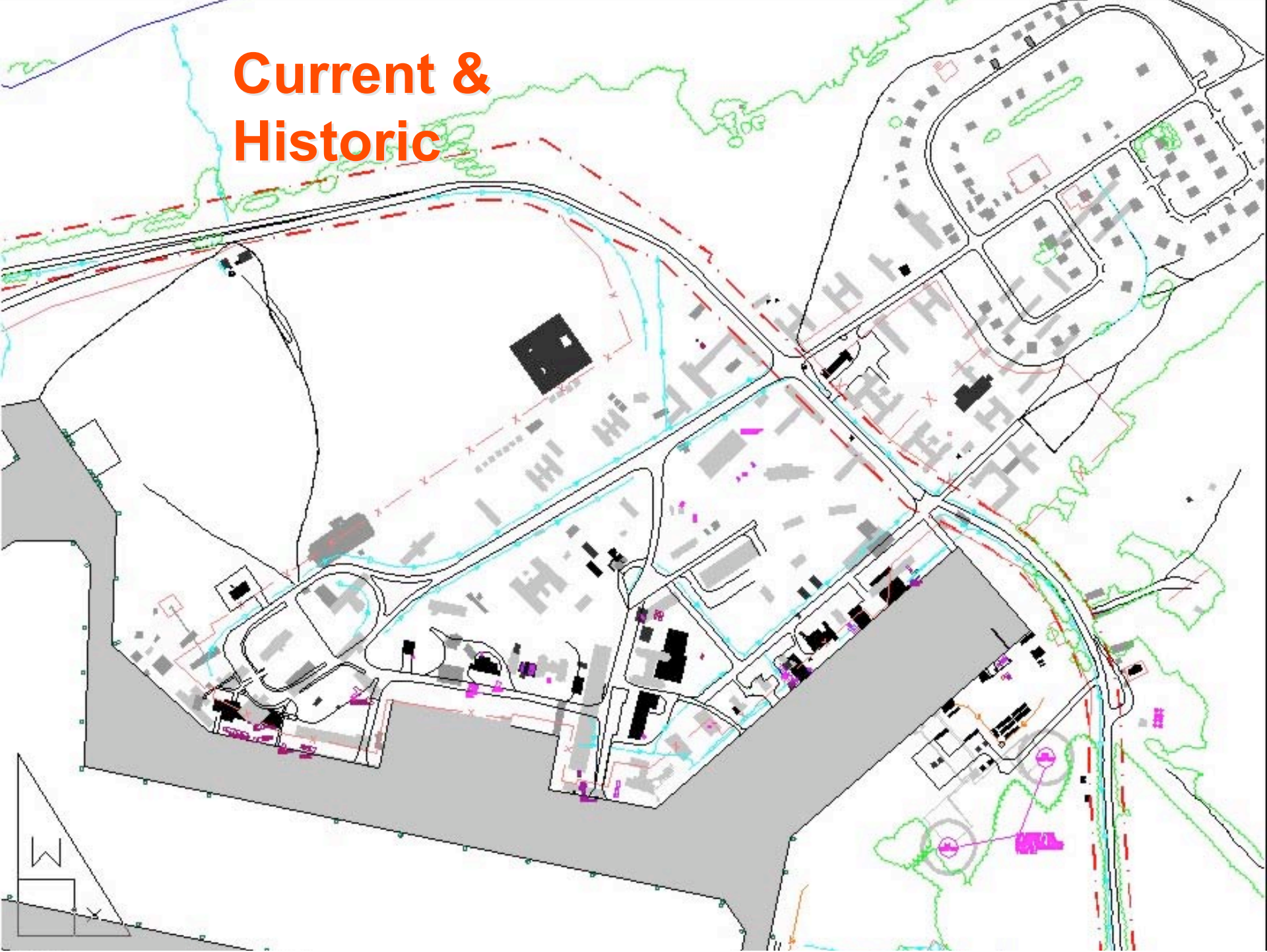
- 1941 – Airport constructed by USAF as part of NW Air Staging Route during WWII
- 1941-1947 occupied by USAF
- 1945 – 106 buildings on site
- NWASR used to ferry >8000 military aircraft between US & Russia
- 1947 – 1958 Operated by Royal Canadian Air Force
- 1952 – 151 buildings on site
- 1958 – 1999 operated by TC
- March 1999 – Transfer to NRRD
- Over 20 different tenants have operated onsite



# Current



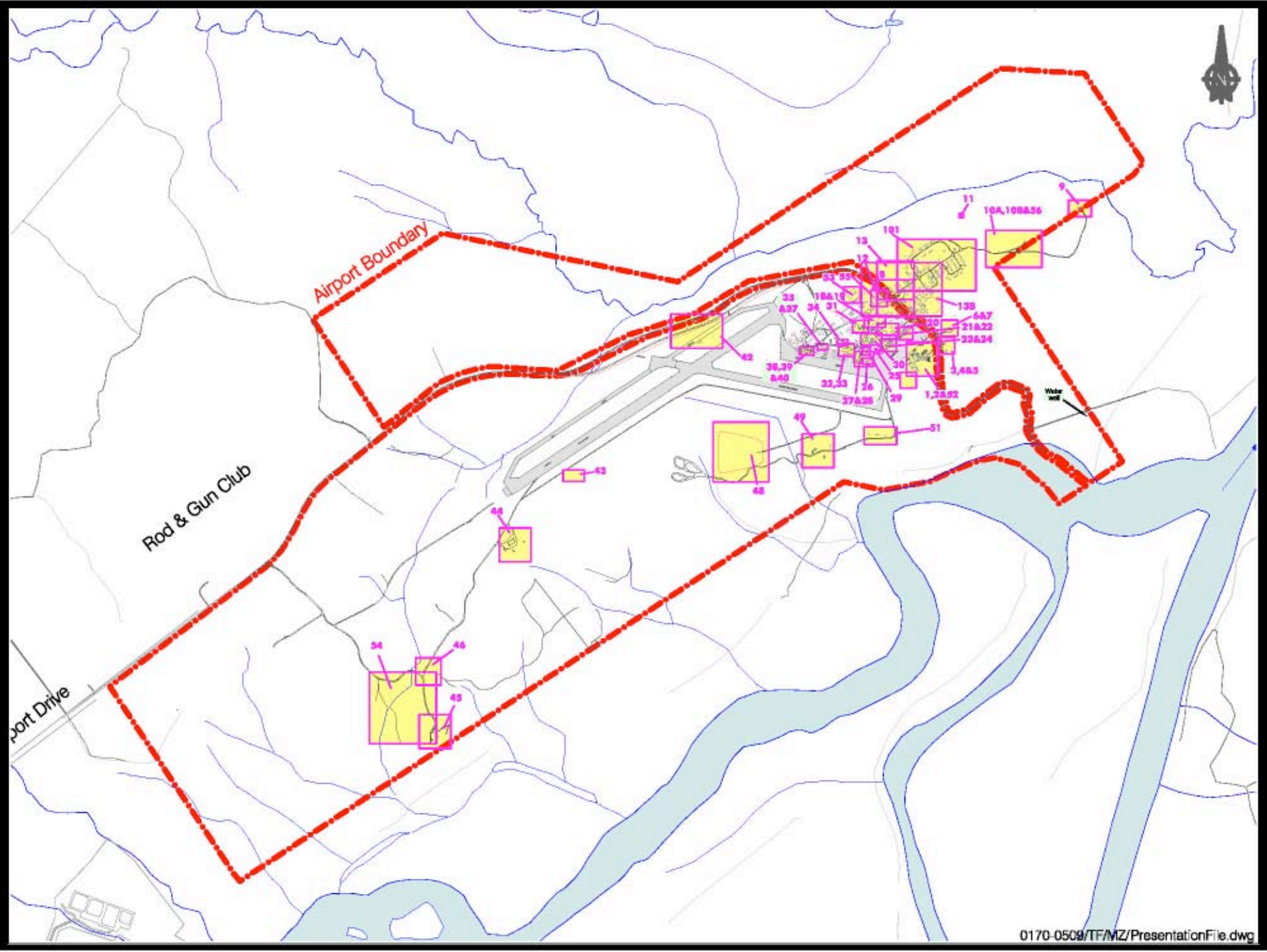
# Current & Historic



# Project History

- Environmental Baseline Study completed 1997
  - 187 test pits, 108 boreholes, 80 monitoring wells
- Supplementary Field Investigation 1998
  - 79 test pits, 49 boreholes, 31 monitoring wells
- Assessments identified 56 sites many with multiple APECs
- Remedial Action Plan developed in 1998
- Approval in Principle (AIP) obtained in 1999
- Remediation since 1999
- Groundwater Monitoring since 1999
- 2000 Constructed Soil Treatment Facility
- Since 2000, various Phase II / III investigations





# Fort Nelson Airport Environmental Remediation

## NCS Priority 1 site

- Ongoing environmental remediation since 1997
- 56 Sites with 167 Areas of Potential Environmental
- Estimated over 150,000 m<sup>3</sup> of contaminated soil
- Primarily hydrocarbon, heavy metal, and pesticides contamination



## Contaminants of Concern

- Avgas & Jet fuel
- Gasoline & diesel
- Waste oil and solvents
- DDT
- Municipal waste & debris
- PCBs
- De-icing fluids



# 2007 Scope of Work

## Project Objective 2007 - 2010

To obtain BC Certificates of Compliance for the entire Airport.

## 2007 Work

- Site assessment and investigation (May – Sept)
  - Excavate and sample 40 testpits
  - Drill and sample 316 boreholes (average depths of 4m)
  - Install and sample 213 monitoring wells
  - Create 56 interim field reports
- Operation of Soil Treatment Facility (May – August)
  - Mechanical treatment & confirmatory sampling for 14,000m<sup>3</sup> of soil
- Excavation of contaminated soil (Sept – Nov)
  - Excavate 11,000m<sup>3</sup> of soil & place in STF – hydrocarbon soil only
  - Metals & DDT soil shipped to off-site facility



# Challenges

- **Logistics**
  - Volume of sites
  - Project planning, scheduling, and contractor coordination
  - Sample volume, analysis, data management
    - 1,600 investigation locations -- ~10,000 unique samples analyzed
- **Airport History**
  - 65+ years of historical uses & tenants to consider in the environmental assessment
- **Environmental assessment history**
  - Changing regulations
  - Changing remedial targets
- **Assessing an operational airport**
  - Safety
  - Potential for new environmental impacts



# Target Areas to Mitigate Challenges

- Project management processes
- Fulltime onsite management
- Innovative use of technology
- Sample collection best practices
- Onsite learning
- Communication and collaboration



# Solution - Project Management Processes

## Initiating

### Project Management Mandate

Create an efficient and effective working environment capable of quickly adapting to changes in project conditions (e.g. weather, schedules, breakdowns) supported by a framework of best practices, innovative technologies wedded with mechanisms for communication and learning.



# Solution - Project Management Processes

## Planning

Duration February – May

What it involved

- Detailed work plans including:
  - 10 Year Historical Data gap analysis for each site and APEC
  - Review of applicable regulatory standards
  - Station locations (lat/long), IDs
  - Identification of utilities
  - Analytical plans and figures
  - Field team shift and task scheduling
  - Interim report formats and requirements
  - Standardized sample nomenclature
- Resource Requirement Estimate
- Identifying requirements, methods, innovative technologies for data collection, management, and reporting:
  - Upgrading data management methods to meet volume of data and information
  - Acquisition & training with data collection / storage methods (e.g. GPS, GIS, MS Access, pocket PC)



# Solution - Project Management Processes Executing

- Onsite Management
  - Full time site supervisor and site office
  - Time dedicated to next-day planning
  - Delegation of responsibility and tasks to most appropriate level
  - Transfer of knowledge between rotating field teams

## Outcome

*Efficiency, Continuity, & Adaptability*



# Solution – Innovative Use of Technology: GIS Enabled - Data Management Tools

Involved:

- Collaborating with project labs (present and past) to develop custom data formats and requirements.
- Development of field data collection methods and QAQC processes to ensure data format integrity.
- Development of automation methods for data evaluation and reporting in MS Office suite and AutoCAD.

	Site	Station ID	Regulatory Standard Source	Analysis Parameter	Numerical Standard	Result		
	A	B	O	P	Q	R	S	T
	Site	StationID	STD_SOURCE	MATRIX_STD	EX_SEQDESC	STD_RESN	EX_RESN	EX_UNITS
2	site 01	1-B-TP02	CSR		EPH (C10-C19)	2000	3100	mg/kg
3	site 01	1-07BH-01M	HAZWASTE		Benzo(a)pyrene	0.02	0.31	mg/kg
4	site 01	1-07BH-01M	HAZWASTE		Benzo(a)pyrene	0.02	0.49	mg/kg
5	site 01	1-07BH-02M	HAZWASTE		Benzo(a)pyrene	0.02	0.36	mg/kg
6	site 01	1-07BH-03M	HAZWASTE		Benzo(a)pyrene	0.02	0.66	mg/kg
7	site 01	1-07BH-04M	HAZWASTE		Benzo(a)pyrene	0.02	0.63	mg/kg
8	site 01	1-07BH-04M	HAZWASTE		Benzo(a)pyrene	0.02	0.6	mg/kg
9	site 01	1-BH19	CSR		VPH (VH6 to 10 - BTEX)	200	4700	mg/kg
10	site 01	1-BH202	CSR		VPH (VH6 to 10 - BTEX)	200	567	mg/kg
22	site 01	1-BH211	CSR		VPH (VH6 to 10 - BTEX)	200	1340	mg/kg
23	site 01	1-BH211	CSR	GWTOFW	Benzene	10	10.1	mg/kg
24	site 01	1-BH211	HAZWASTE		Benzene	10	10.1	mg/kg
25	site 01	1-BH211	CSR		VPH (VH6 to 10 - BTEX)	200	960	ma/ka



# Solution – Innovative Use of Technology: GIS Enabled - Data Management Tools

The image displays a Microsoft Access 2000 interface with three main windows:

- Relationships:** Shows a database schema with tables like FHLData, FHLStation, FHLStations, FHLPrmAdjst, and FHLPrmAdj. Relationships are indicated by lines connecting fields between tables.
- Objects:** A list of database objects including Tables, Queries, Forms, Reports, Pages, Macros, Modules, Groups, and Favorites. The 'Queries' folder is expanded.
- tbl\_Soil\_BTEX\_Table - Crosstab Query:** A data table showing concentrations of various chemicals across different sites.
- tbl\_Soil\_PAH\_Table - Crosstab Query:** A data table showing concentrations of Polycyclic Aromatic Hydrocarbons (PAHs) across different sites.

**tbl\_Soil\_BTEX\_Table - Crosstab Query**

Disp_SEQDESC	Place	F36469-01	F36472-01	F36474-01	F36475-01	F36478-01	F36480-01	F36484-01
VPH (VH6 to 10 - BTEX)	1	<10	<10	14	<10	<10	<10	<10
Benzene	2	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ethylbenzene	3	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Styrene	4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methyl-tert-butylether (MTBE)	7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

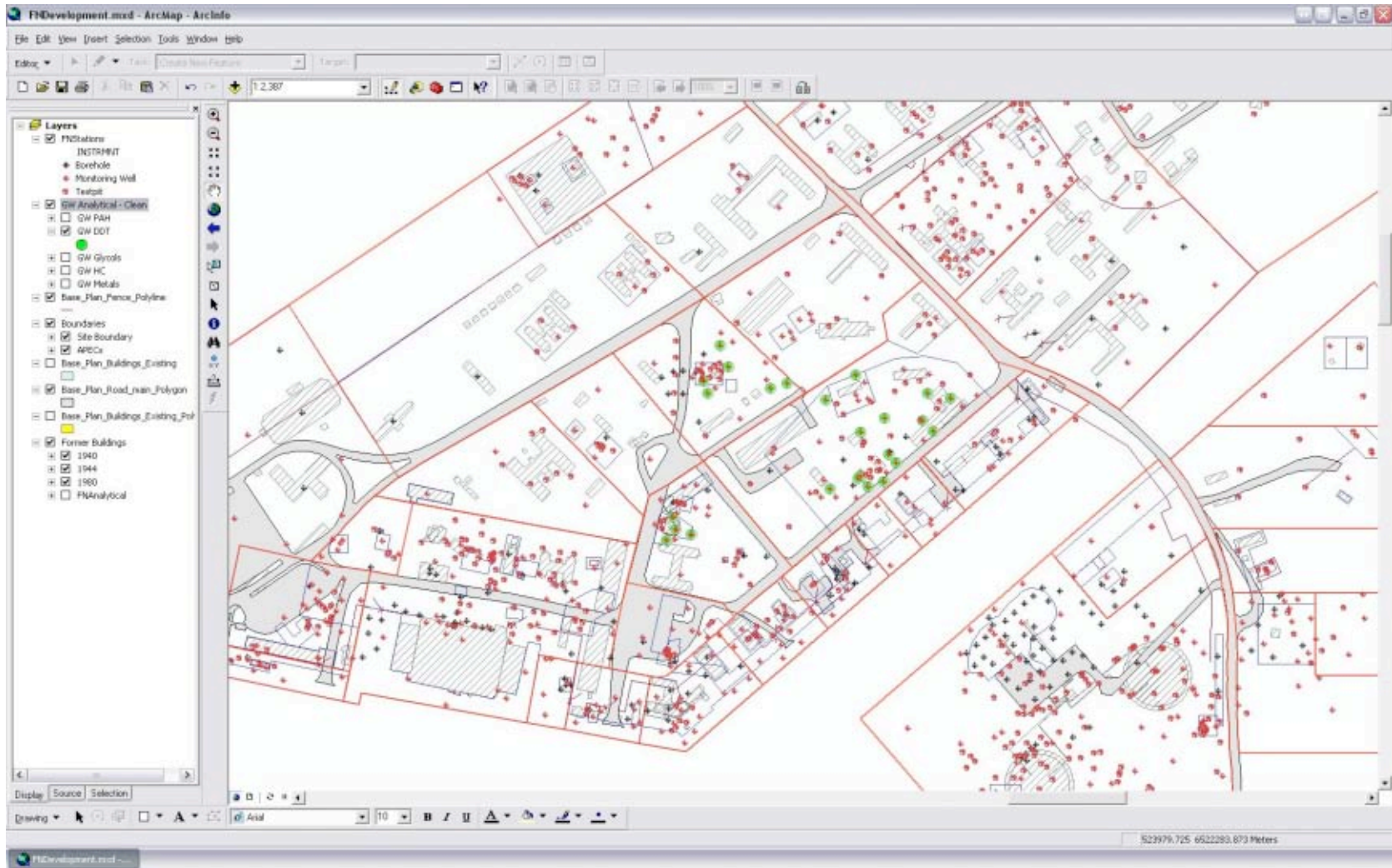
Record: 1 of 7

**tbl\_Soil\_PAH\_Table - Crosstab Query**

Disp_SEQDESC	Place	F36471-01	F36473-01	F36474-01	F36476-01	F36478-01	F36480-01	F36484-01	F36486-01
Naphthalene	1	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	2	<0.01	0.01	0.06	0.02	<0.01	<0.01	<0.01	<0.01
Pyrene	3	<0.01	0.02	0.47	0.02	<0.01	<0.01	<0.01	<0.01
Benzo(a)anthracene	4	<0.01	<0.01	0.11	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b&j)fluoranthene	5	<0.01	0.03	0.25	0.03	0.01	<0.01	0.01	0.01
Benzo(k)fluoranthene	6	<0.01	<0.01	0.06	0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	7	<0.01	<0.01	0.42	0.02	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	8	<0.02	<0.02	0.22	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenz(a,h)anthracene	9	<0.02	<0.02	0.14	<0.02	<0.02	<0.02	<0.02	<0.02
Total PAHs TEQ (calculated)	10								



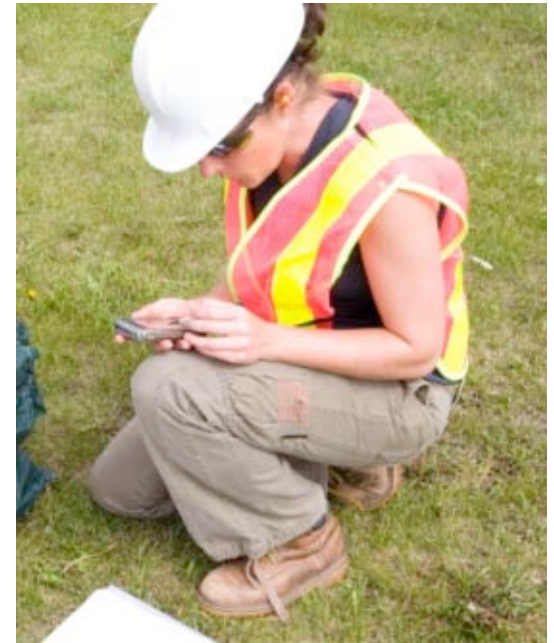
# Solution – Innovative Use of Technology: GIS Enabled - Data Management Tools





## Solution – Innovative Use of Technology: GIS Enabled - Data Management Tools

- Data management & automation made use of **readily available** technologies:
  - MS Access, Excel combined with Visual Basic and SQL programming language
  - ArcGIS and Digital Total Station (GPS)
  - AutoCAD
  - Pocket PC with Winlog (borehole logging program)
  - EM Survey
- Result in cost savings through efficiency



# Solutions – Sample Collection Best Practices

## Sample Bottle Prep

- Pre-labeling and preparation of all sample containers prior to sampling
- Pre-cooled sample coolers

## Sample Collection, Logging

- Standard nomenclature
- Standard sample logging sheets
- Standard sampling intervals and methods



## Sample Organization

- Grouping of station specific samples for shipping
- Electronic Chain of Custody forms using a project specific template to distinguish mobile lab samples from samples the required shipping.



# Solution – Sample Management

## Sample Storage & Shipping

- Buddy system for comparing Chain of Custody to shipment contents
- Durable packaging and icing using a standardized method
- Standard process for sample shipping (e.g. pre-arranged couriers, standard shipping labels with shipping instructions).

## Sample Tracking

- Use of spreadsheets to track whereabouts of sample, outstanding analyses, etc.
- Daily notifications from mobile lab and fixed lab (Vancouver) regarding sample receipt and condition (temperature).

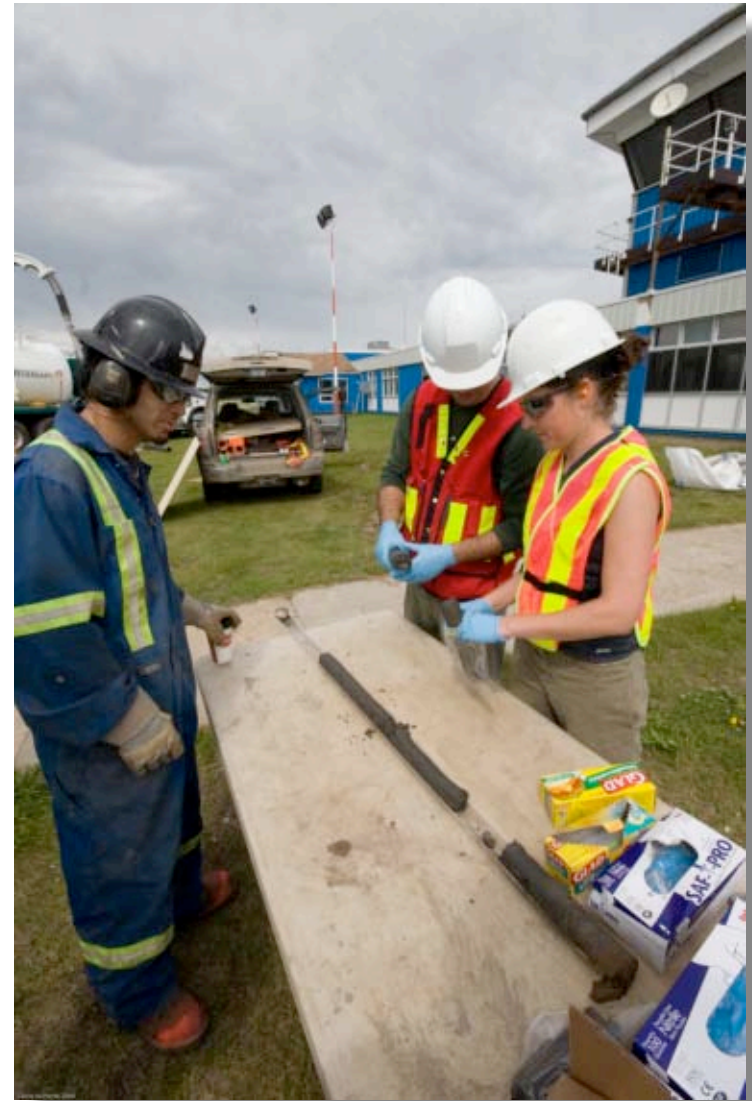


# Solution – Onsite Learning

- Fort Nelson Orientation Package
- Feedback to foster teamwork and encourage improvement
- Instilling a sense of ownership in project personnel

## Outcome

*Adaptability & Efficiency*



# Solution - Project Management Processes

## Monitoring & Controlling

- Key to success was communication amongst all parties:
  - Transport Canada
  - Public Works and Government Services Canada
  - Northern Rockies Regional District (airport owner & operator)
  - Project consultants, contractors and labs
  - Airport tenants



# Solution – Monitoring & Controlling

- Consultant provided daily field reports
- Weekly teleconference with TC, PWGSC, consultant PM & field coordinator, & contractor during remediation
  - Reviewed project scope, costs, schedule, quality & risks
  - Record of meeting & actions issued within 24 hours
- Site visits
- Progress tracking systems developed



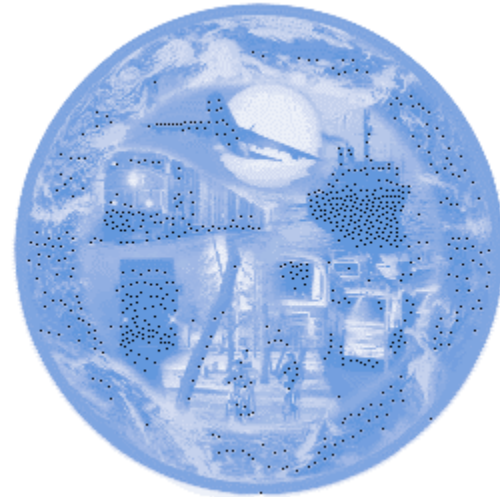
# Solution - Project Management Processes Closing

- Since project ongoing only certain aspects technically closed
- Record lessons learned
- Strive for improvement, efficiencies and lower costs
- Challenges to obtain Certificate of Compliance remain significant



# New project initiatives for 2008

- Evaluate GHG footprint of remediation work
- Promote sustainability & green procurement
- Investigate ways to green project
  - Reduce waste (field equipment, field office, lab)
  - No idling policy
  - Car pool to site



**thank you / merci**

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