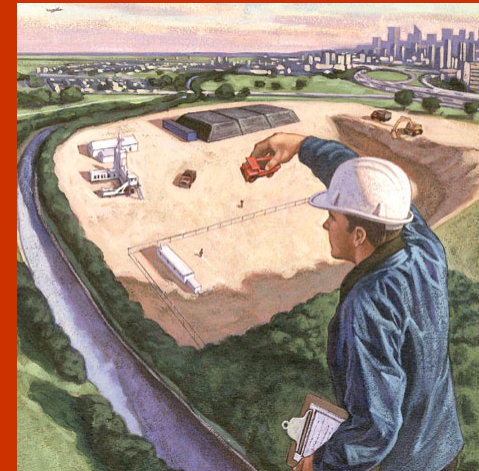


Assess

Design

Implement



Remediation Technologies Symposium – 2008 Banff, Alberta

Site Remediation Solutions



Remediation of a Former Canadian Forces Base in Chatham, NB



Presented by:

Guy Lavoie (Biogenie S.R.D.C. Inc.)

Site History

- The site is known as the former CFB Chatham
- Home of many flying squadrons
- The Base covers an area of 10 km²
- In operation from 1940 to 1995
- The Province of New Brunswick acquired the site through a transfer agreement
- They created “SkyPark Miramichi Inc.”
- The site was renamed and is now divided in 3 main areas: a retirement community, a business Park and the municipal airport





Aboveground Tank
Sub Site 4
Sub Site 2
Sub Site 152
Sub Site 10
POL Compound
Building 64

Sub Site 18
Sub Site 19

Concrete Apron
Sub Site 5
Sub Site 9

Stockpiled Material

Sub Site 13

Sub Site 12



Source: New Brunswick Services
Aerial Photographs
N° DNR 83505-77;
N° DNR 83508-104; and
N° DNR 83508-105;
Scale: 1:15 000

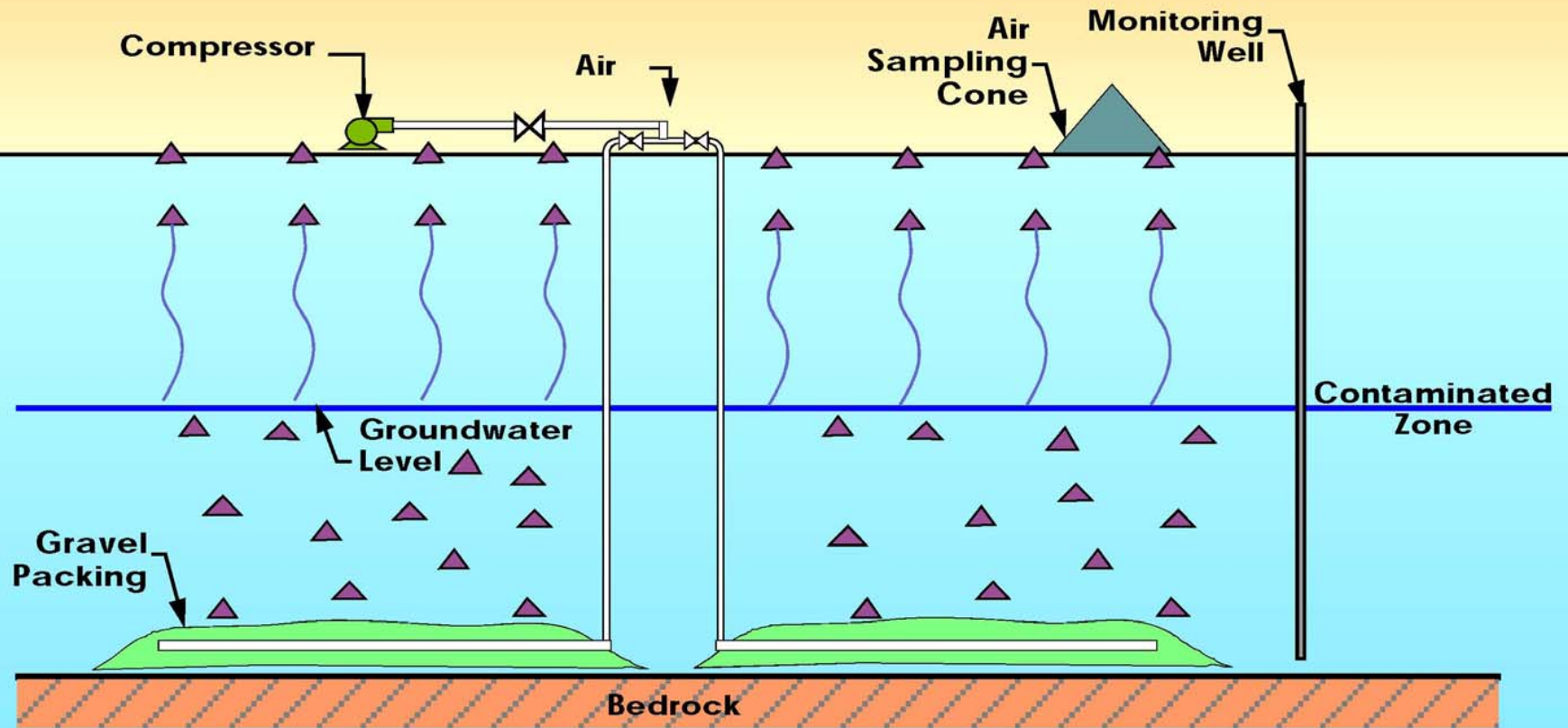
Mandate and Objectives

- **Request for Abbreviated Proposal (RFAP) in 1998**
- **Remediate soil from 11 different areas on the former Base**
- **All impacts had to be removed by September 2004**
- **DND and DCC were opened to different remediation approaches**
- **“Pay-for-Performance” type contract**
- **Obtain Record of Site Condition from the NBD OE**

Remedial Action Plan

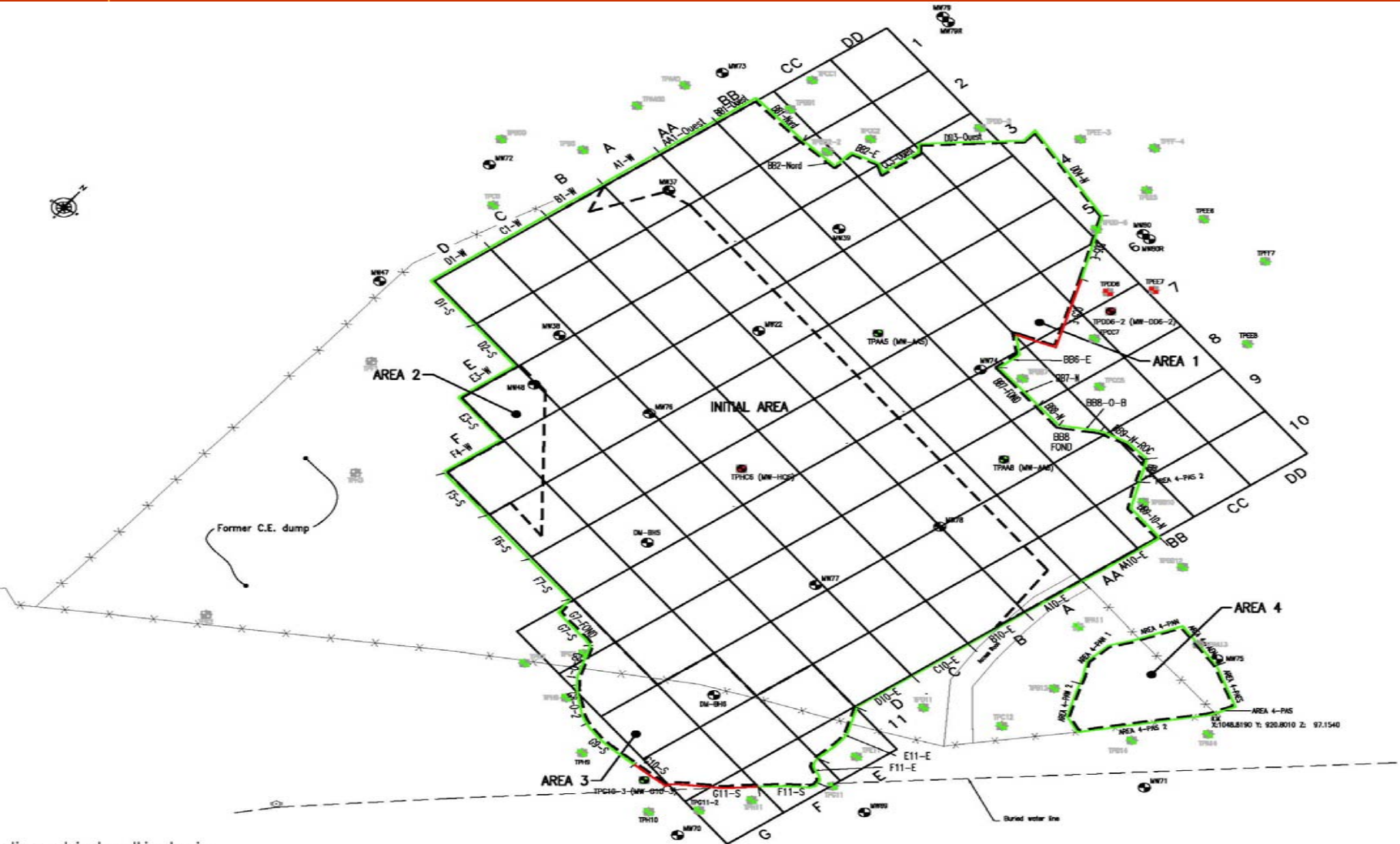
- **Transport all impacted soil on the largest impacted site (Site 18)**
- **Inverted Biopile system was utilized to biotreat impacted soil**
- **Soil was also stockpiled and treated above the ground surface to deal with the additional volume**
- **Disposed of non biotreatable soil at an approved facility**

Inverted Biopile Process



▲ Air

Site 18



Challenges

- **A part of the soil located on Site 18 was partly remediated using Low Thermal Desorption**
- **Schedule had to be adapted to the Sky Park Miramichi economic development**
- **Changes in provincial regulations**
- **Presence of a lot of construction debris at the main site**

Segregation of Concrete



Construction Debris



Specific Objectives

**Table I : Soil Clean-Up Criteria for Sub Site 18
According to the Atlantic PIRI – Tier I Look-Up Table**

| Compound of Concern | Concentration (ppm) | |
|---------------------|--|---------------------------------------|
| | Surface Soil (<1.0 m from the surface) | Sub-Surface (>1.0 m from the surface) |
| Benzene | 120 | 1.4 |
| Toluene | 4,800 | 34 |
| Ethylbenzene | 2,400 | 20 |
| Xylenes | 3,200 | 25 |
| Modified TPH | 1,740 | 360 |

**Table II : Groundwater Clean-Up Criteria for Sub Site 18
According to the Atlantic PIRI – Tier I Look-Up Table**

| Compound of Concern | Concentration (µg/L) |
|---------------------|----------------------|
| Benzene | 4,700 |
| Toluene | 20,000 |
| Ethylbenzene | 20,000 |
| Xylenes | 20,000 |
| Modified TPH | 20,000 |



Summary of Findings

- Hydrogeology and geology
- Soil was mainly impacted with TPH (C₆-C₃₂) (start. concentration.: approx. 800 mg/kg)
- Groundwater was also impacted with TPH (C₆-C₃₂) in some areas (up to 23,000 ppb on Site 18)
- Bunker was identified in 2 areas (Sites 13 and 18)

Installation of Piping Network



Stockpiling of soil



Site 18 (Fire-Fighting Training Area)



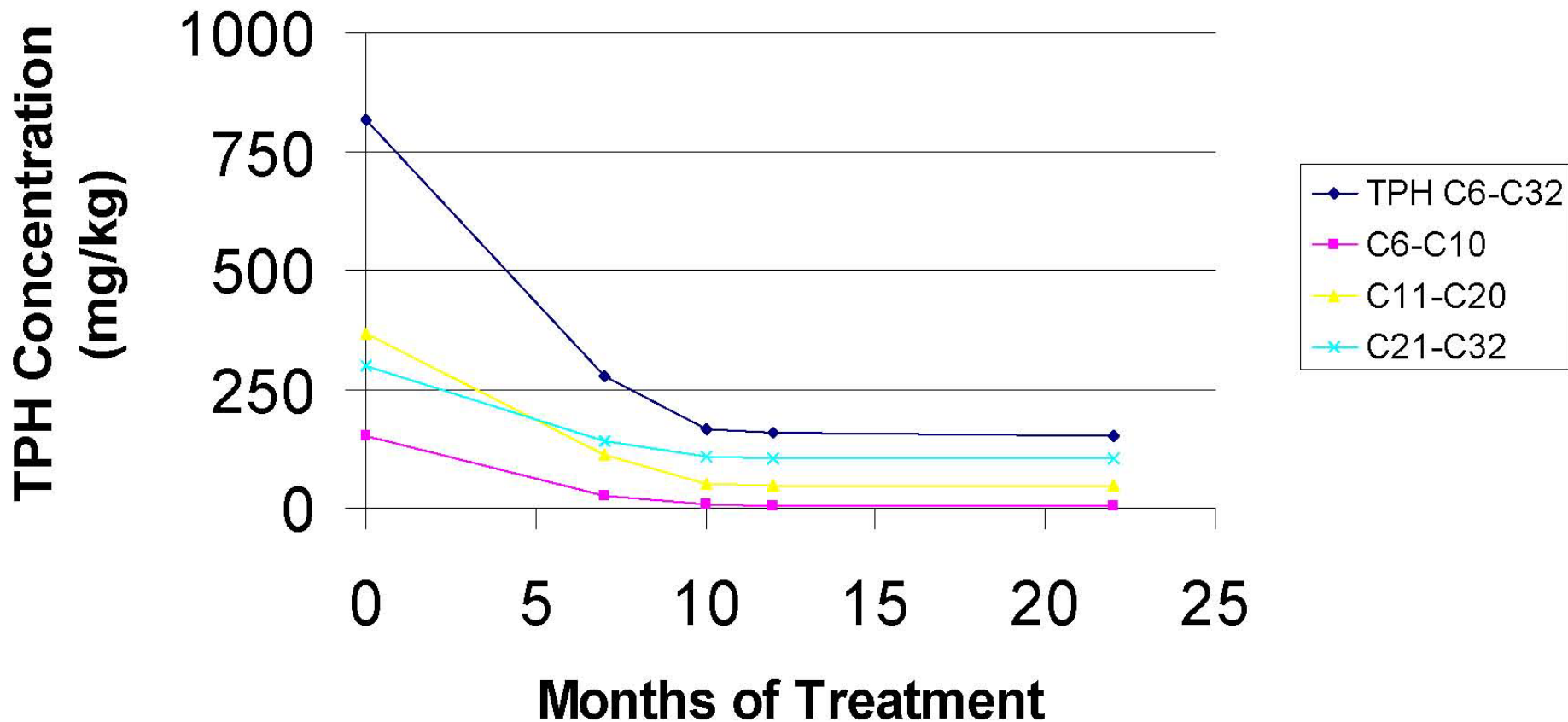
Volume Summary

| Origin (Sub Site) | Date of Receipt | Quantity (metric tons) |
|---|--|--|
| 18 (Initial and Area 2) | In place | 52,920 m.t. (33,075 m ³) |
| 2 (Former Scrap Yard) | Jan. 20 and 21, 1999 Nov. 17 and 18, 1999 | 496 m.t. (300 m ³) 1,124 m.t. |
| 4 (Former Coal Storage Area), 9 (Sewage Treatment Plant), POL Compound, and Building 66 | Oct. 26, 2000 to Feb. 8, 2001 | 24,796 m.t. |
| 5 (Former Building 11) | Dec. 9, 1999 | 374 m.t. (234 m ³) |
| 12 (Fire Fighting Training Area) | Dec. 9 to 11, 1999 | 1,328 m.t. (830 m ³) |
| 13 (Sludge Disposal Area) | Jan. 22 and Dec. 9, 1999 | 224 m.t. (140 m ³) |
| 18 (Areas 1 and 3) | May and June 2000 | 14,000 m.t. |
| 18 (Area 4) | June, Oct., Nov. 2001 | 2,080 m.t. |
| 19 (Old Engine Test Cell Site) | Oct. 1 to Nov. 3, 2001 and June 25, 2002 | 5,461 m.t. |
| Stockpiled Material | Nov. 4 and 5, 1999 | 960 m.t. (600 m ³) |
| Concrete Apron | Nov. 4 and 5, 1999 | 480 m.t. (300 m ³) |
| TOTAL | | 104,243 metric tons |



Biotreatment Results

Evolution of Average TPH (C₆-C₃₂) Concentrations



Soil undergoing treatment



POL Dismantling



'98 12 3

Tank Dismantling



Decommissioning

- **113 monitoring wells were decommissioned in 2004**



Decommissioning



Project Results

- Remediation objectives were met for more than 99% of the soil undergoing treatment
- Groundwater showed final TPH concentrations below the applicable criteria and near the detection limits
- Air emissions showed concentrations below the NBDOE Atmospheric Emission Standard
- A risk assessment and closure report prepared by a third party and accepted by the Province
- No incident

Acknowledgements

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- **Alain Dufresne from DCC**
- **Michel Pouliot from Biogenie**