

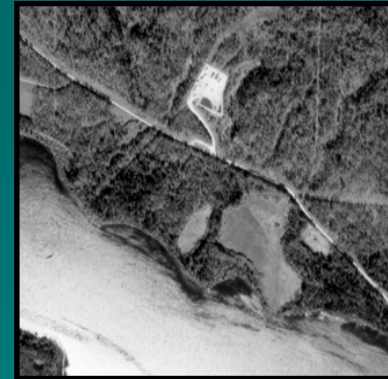


# Volatilization, Recovery and Treatment of light-end PHC as On-site Remediation Tactic

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# Outline

- ◆ Application
- ◆ Project Overview
- ◆ History
- ◆ Equipment
- ◆ Results/Discussion

# Application

- ◆ Treat VOCs
  - Condensate
    - ◆ Flare pits, Batteries, Satellites, Gas Plants, Pipelines, etc.
  - Diesel
    - ◆ Invert Diesel Sumps, etc
  - Other
    - ◆ Volatile process chemicals (DMDS)





# Project Overview

## ◆ Environmental

- Condensate impacts (6000t)
- Heterogeneous subsurface (fine)
- Challenging topography
- Environmentally sensitive area

## ◆ Project Objective

- To test on-site condensate treatment and comply with EUB Directive-58

# Site

1987



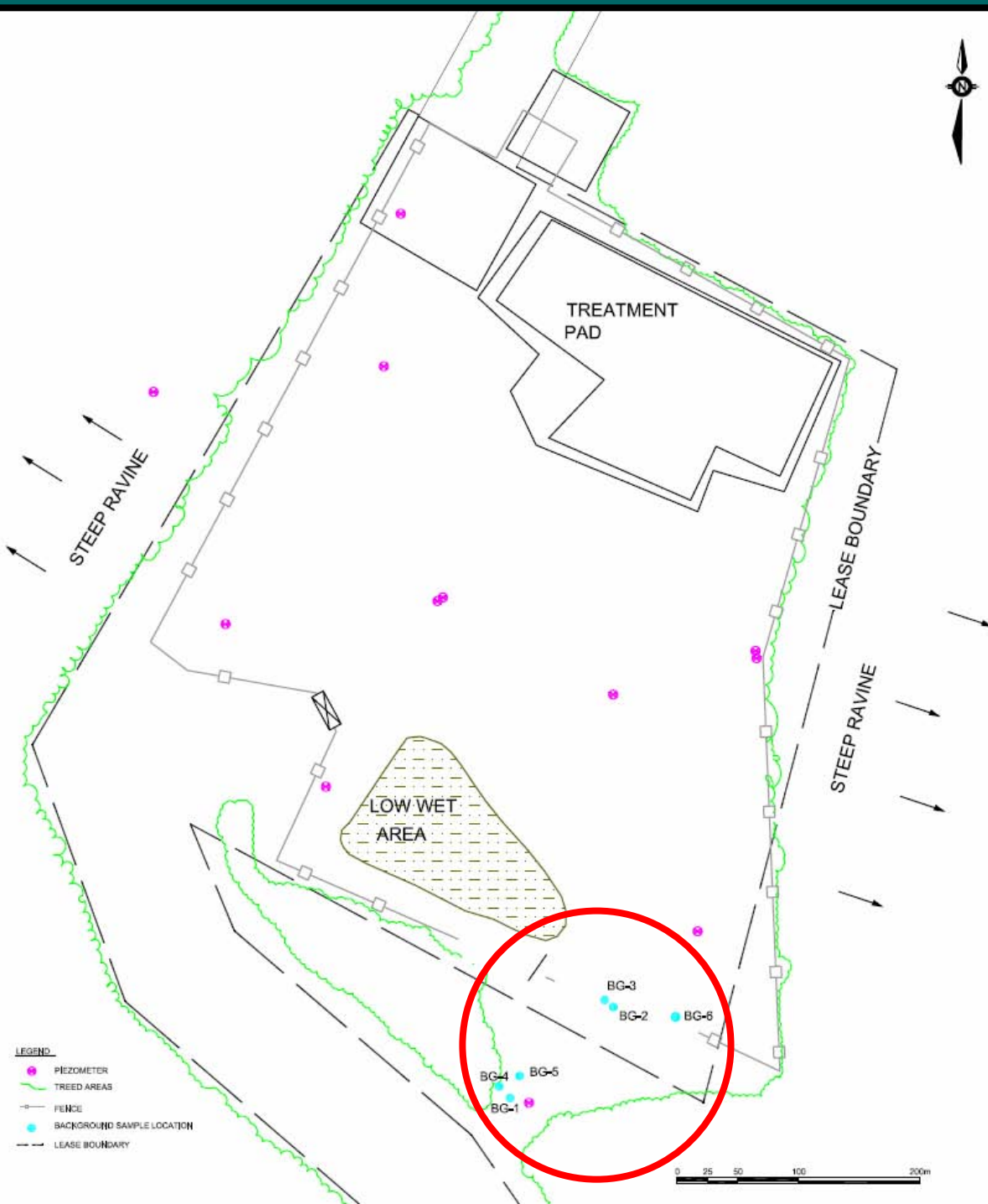
# Site Map

## Target Impacts

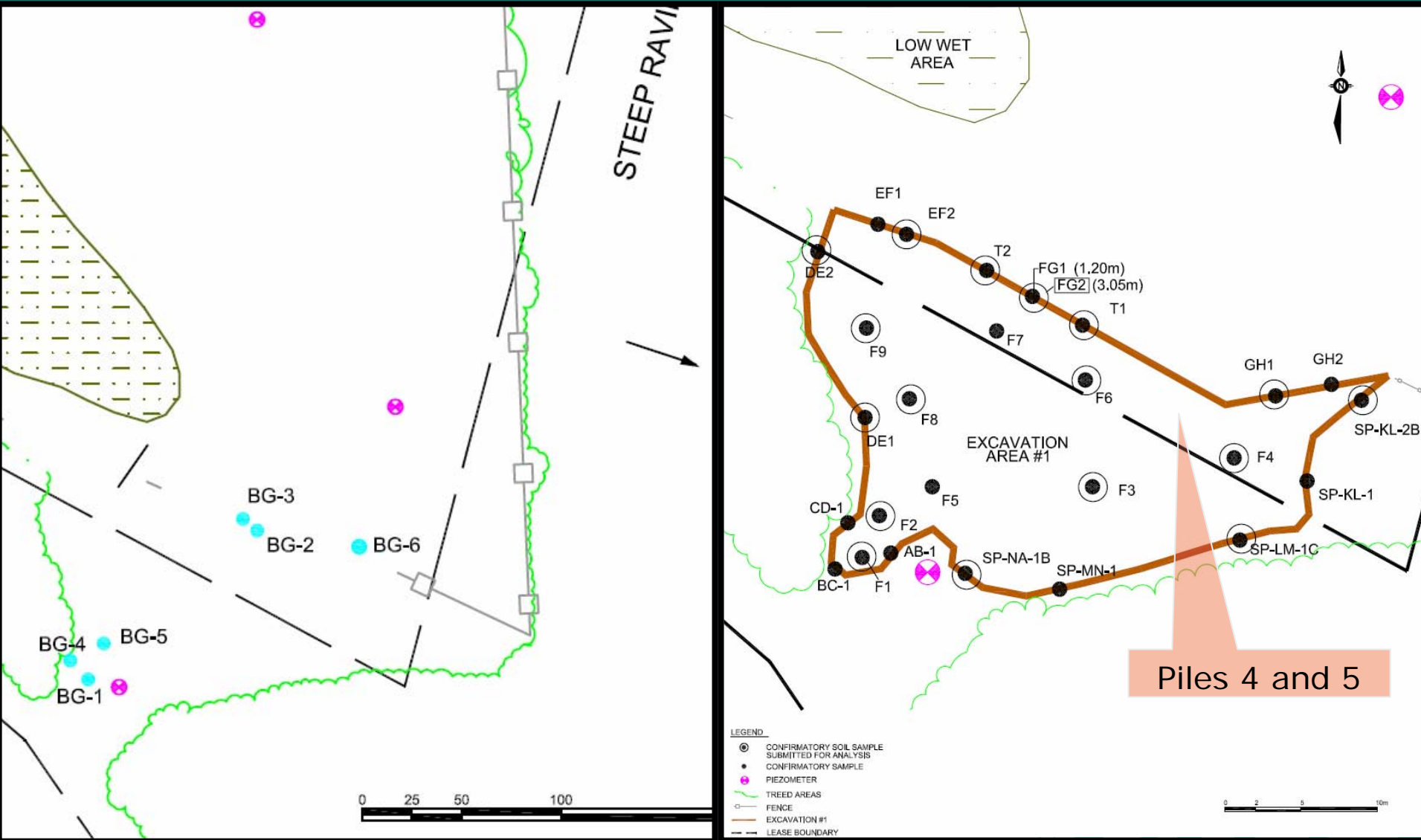
<b>BTEX</b>	<b>&lt; 11.5mg/kg (BTE)</b>
F1	< 260mg/kg
F2	< 1000mg/kg
F3*	< 2700mg/kg
F4*	< 1100mg/kg

Criteria: Fine Surface (R)

\* Material landfilled



# Target





# Processing

- ◆ Temperatures 2005, Winfield, AB
  - Mean T (Nov) +0.6°C
  - Range +19.5°C – -14.0°C
- ◆ Processing rate
  - ~70t/h

# Regulatory Issues

## ◆ EUB

- Directive-58: Transfer of contaminants from one medium (soil) to another (air)
- Directive-38: 40db night time, 65db incl. adjustments

## ◆ AENV

- Condensate - none

# Noise Control

- ◆ Landowner concerns
- ◆ Environmentally sensitive area
- ◆ Gain understanding for the full scale project



# Cost and Schedule

- ◆ Unit cost: ~40% more efficient
  - Compared to traditional aeration process
- ◆ Duration: ~3 weeks (5-23 Nov)
  - Improved processing rates

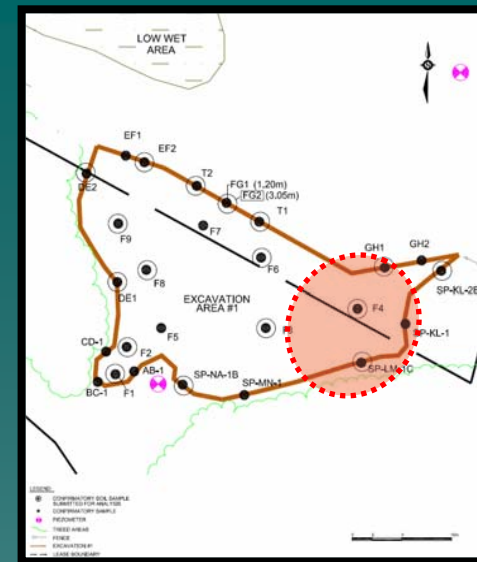
# Results - Comments

- ◆ Very heterogeneous geology
- ◆ Discrete samples vs composite samples
- ◆ OVM (vapour readings)
- ◆ Comparing 31 OVM readings
  - 7 readings  $>100\text{ppm}$ 
    - ◆ analyzed soil samples above criteria
  - 24 readings  $<100\text{ppm}$ 
    - ◆ analyzed soil samples below criteria

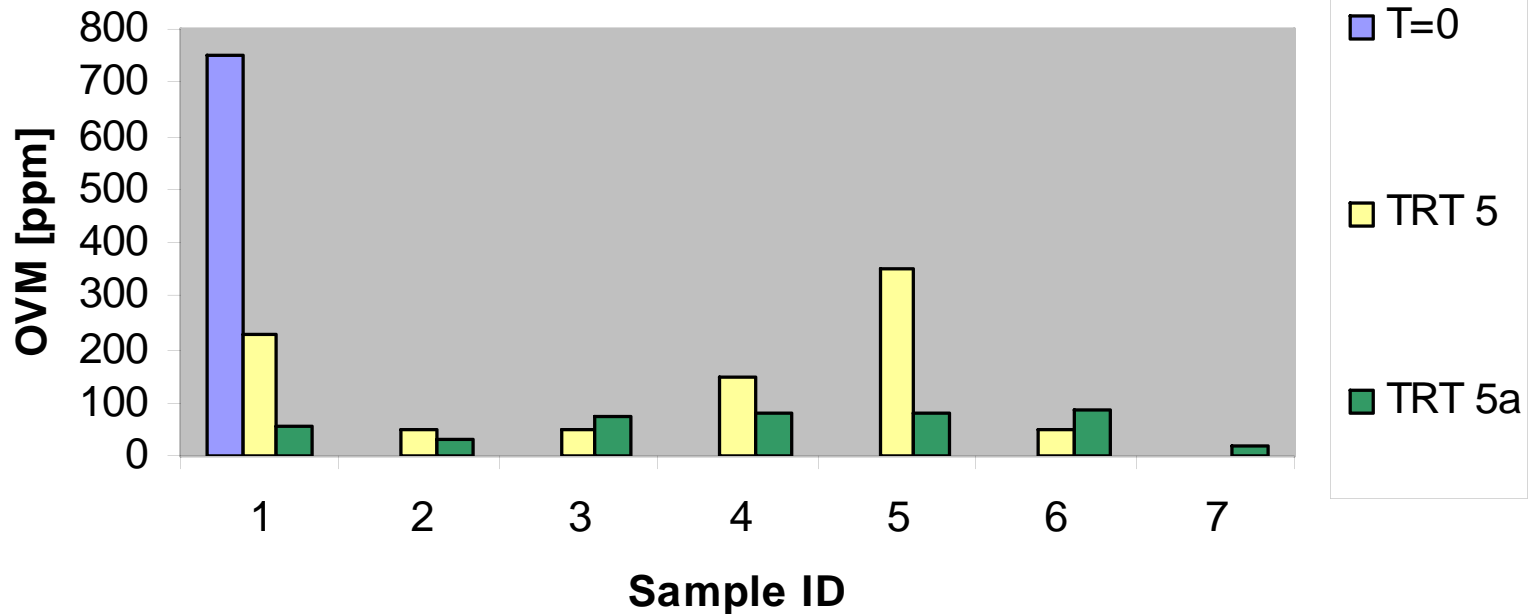


# Treatments 1 & 2

## Pile 4 material

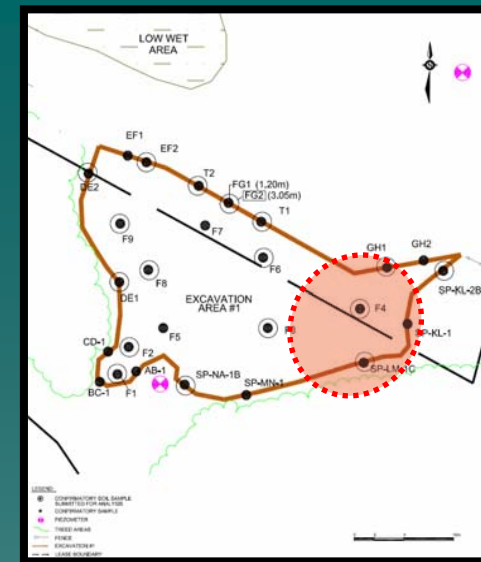


### HC vapours, Pile 4

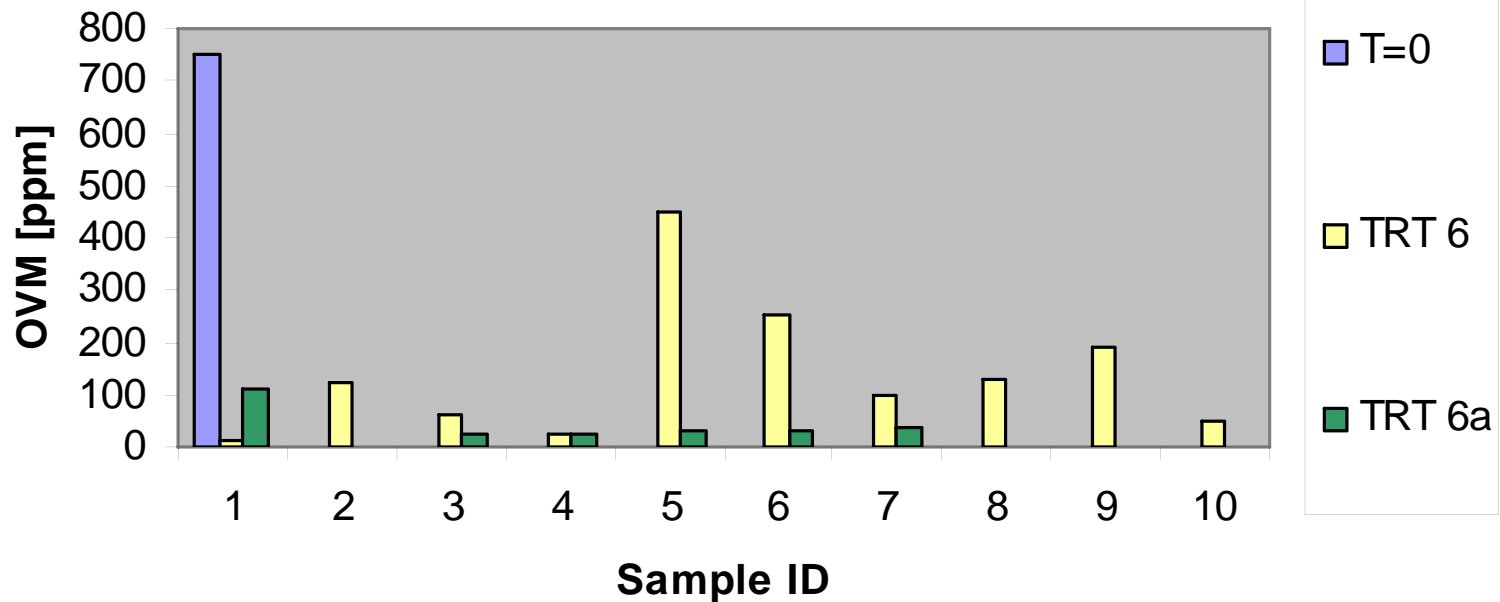


# Treatments 1 & 2

## Pile 5 material



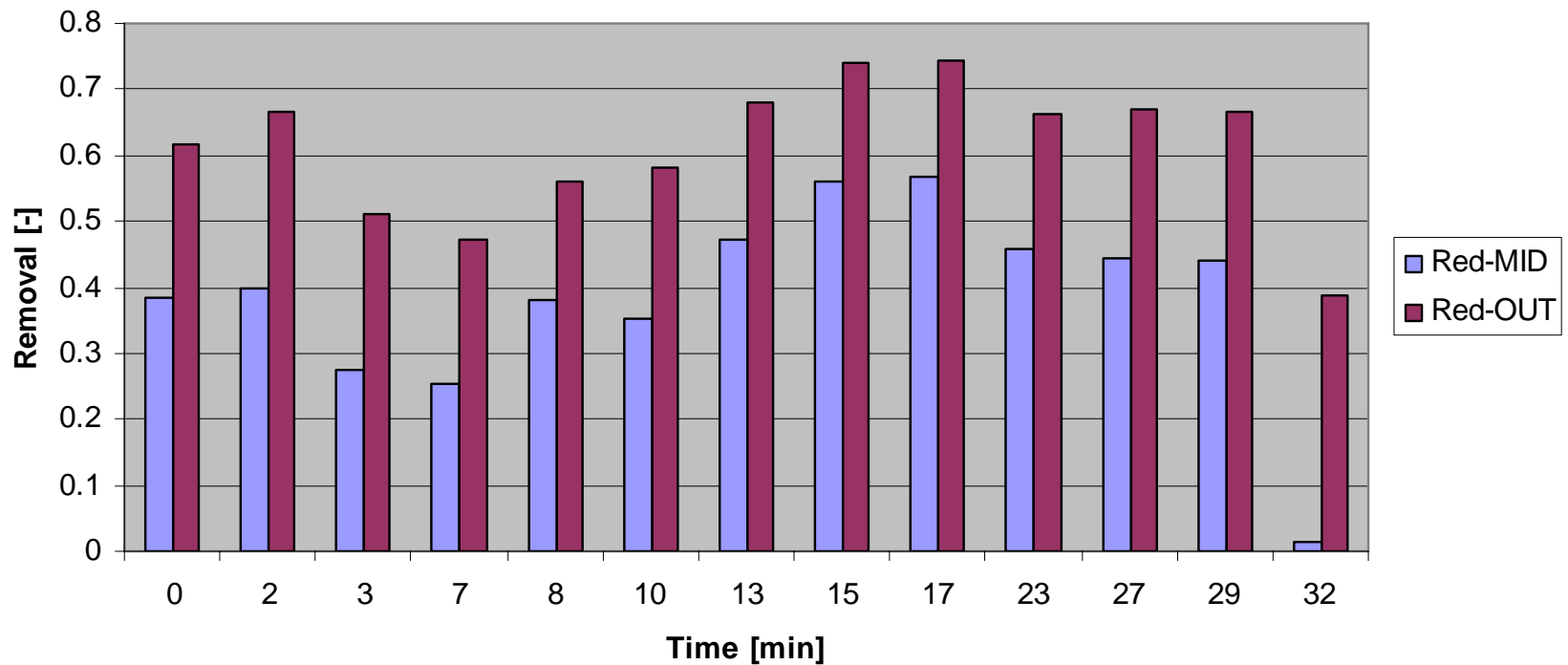
### HC vapours, Pile 5





# Removal

BIOFILTER 10.11.2005



Average Removal (OUT): 61% +/- 11%

# Conclusions

- ◆ All treated soils meet applicable criteria
- ◆ Successful release, capture and treatment of light-end PHC
- ◆ Fast and economic onsite treatment option
- ◆ Successful full scale implementation at other sites

# Next Steps

- ◆ Improve processing system
  - Process wet clays
  - Pre-condition biofilter and increase efficiency
- ◆ Improve vapour reading field protocol/tools
  - Standardize method, prepare protocol
  - Improve calibration (type and concentration)
- ◆ Increase process rates
  - Pre-treatments

# Acknowledgements

- ◆ Layton Bros. Construction Co. Ltd.
- ◆ TR<sup>3</sup> Energy Inc.
- ◆ PHH ARC Environmental