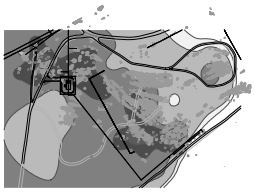
Chlorinated Solvent DNAPL Extent Characterization



East Gate Disposal Yard

Fort Lewis

Washington

US Army Corps of Engineers

1

Presentation Purpose

- Discuss Triad investigation approach.
- Explain NAPL characterization tools used at EGDY.
- Discuss CSM of EGDY DNAPL.

2

TCE in Groundwater

3

EGDY History

- Received Logistics Center wastes from 1946 – 1970's.
- Cleaning and degreasing solvents and POLs.
- Disposed in trenches in drums, free liquid or burned.

4

EGDY Characterization Methods

- Dynamic investigation approach.
- Systematic planning.
- Real time data collection.
- Qualified field personnel.

5

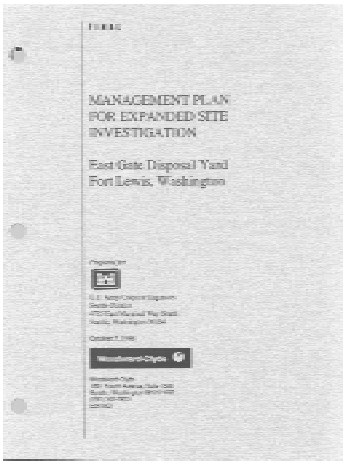
Investigation Chronology

- Two phases due to funding constraints.
- Phase I: 1998 – 1999.
- EE/CA.
- Drum Removal Action.
- Phase II: 2001 – 2002.

6

Phase I DQOs

- Evaluate if significant NAPL present beneath EGDY to provide continuing source of TCE to groundwater.
- Estimate extent of LNAPL and DNAPL if present.
- Refine hydrogeologic understanding.



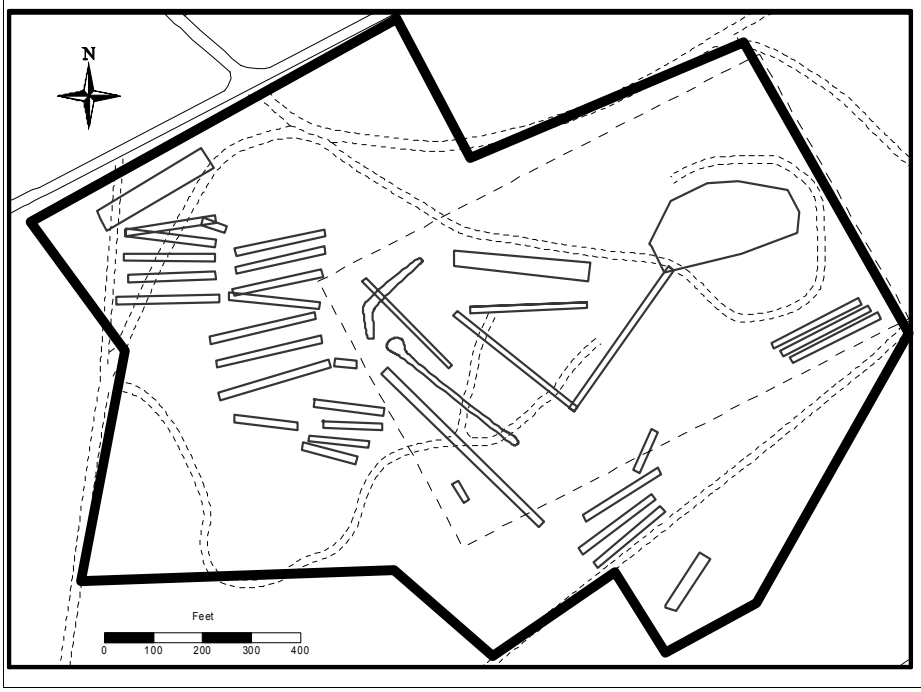
7

Phase I Toolbox

- Aerial photography.
- EM-61.
- Soil gas sampling.
- Exploratory trenches.
- Drive point groundwater sampling.
- On site GC analysis.

8

Aerial Photo Analysis Results

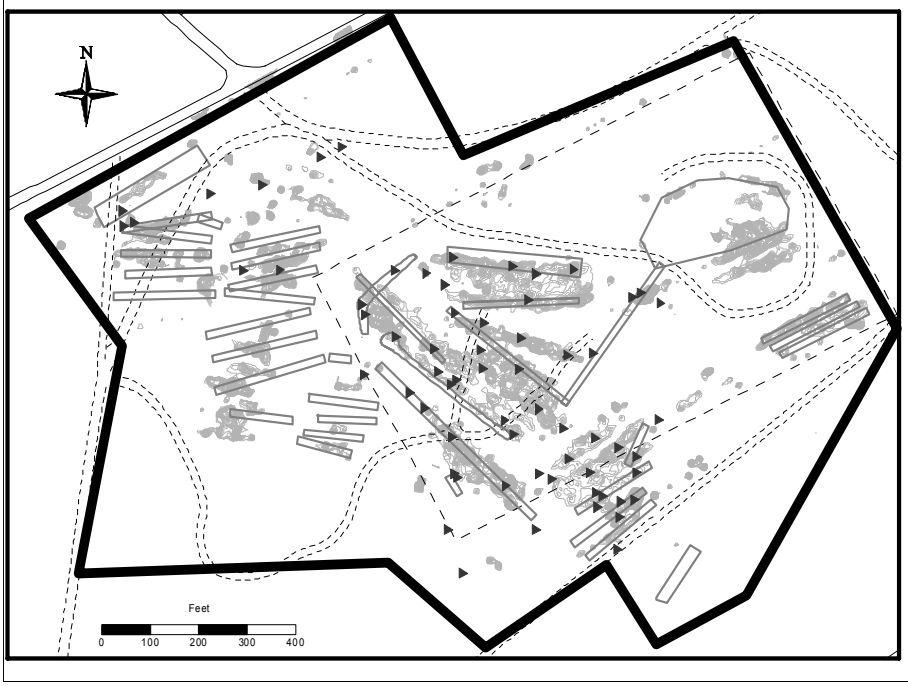


9

EM-61 Survey Results

10

Soil Gas Sampling

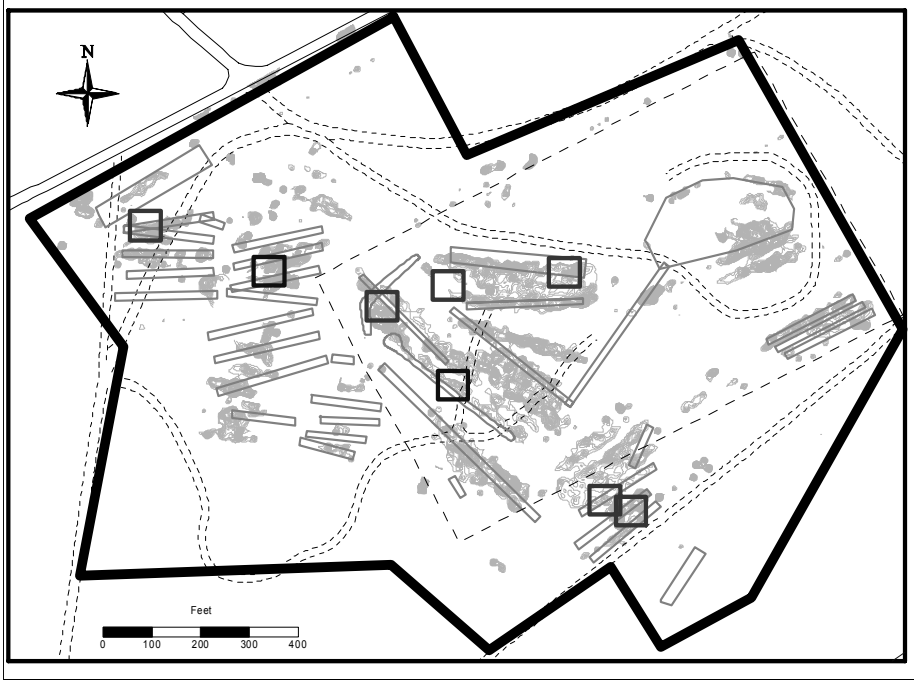


11

Exploratory Trenching

12

Exploratory Trenching Results

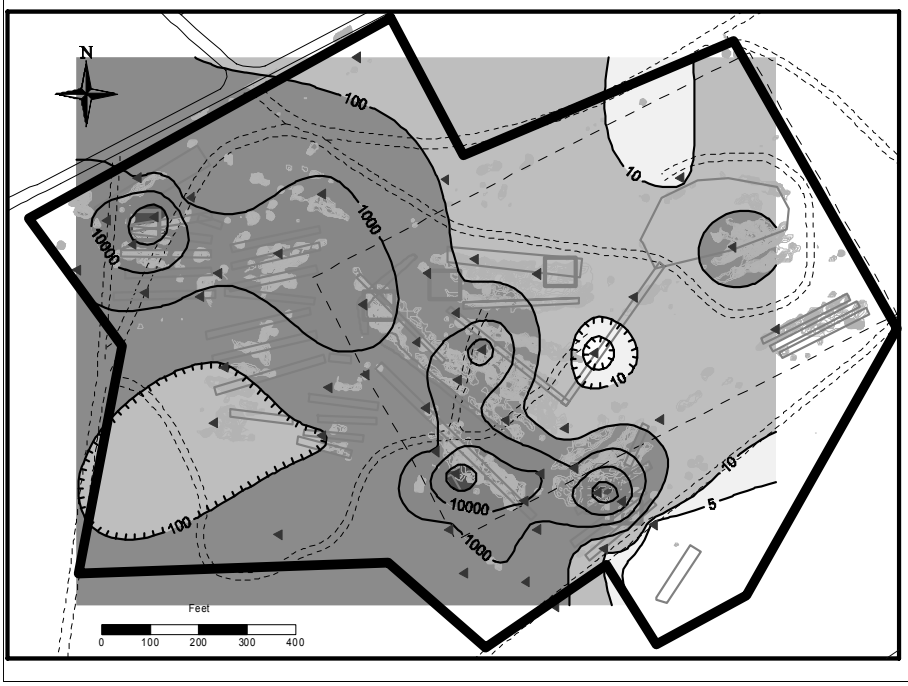


13

Direct Push Drive Point Groundwater Sampling

14

Drive Point Groundwater Results



15

EE/CA

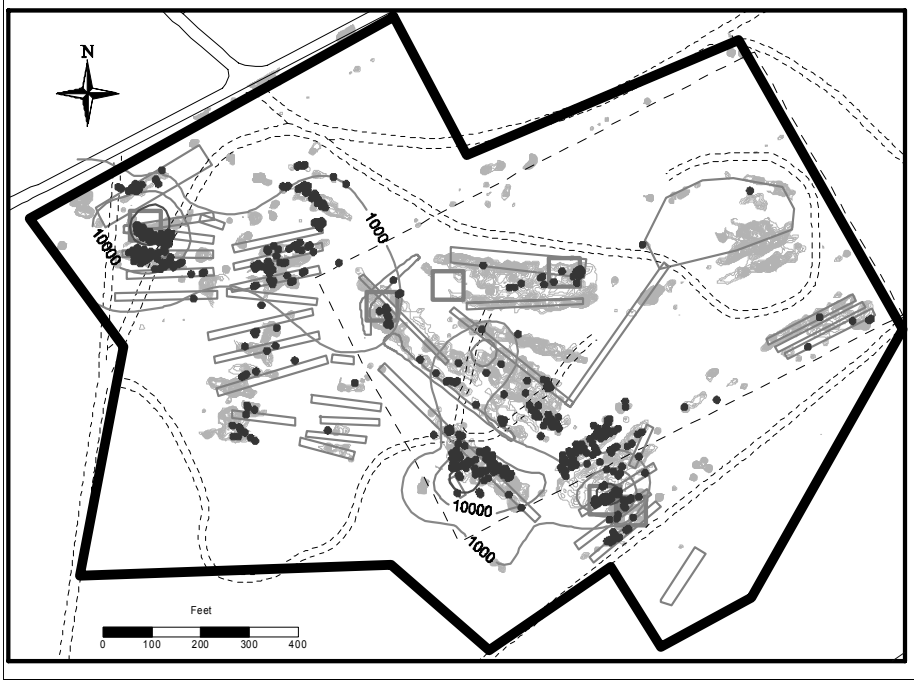
- Purpose: to evaluate remedial alternatives to accelerate cleanup and reduce overall costs.
- Preferred alternative:
  - Optimize P&T system.
  - Remove source area drums.
  - Thermal treatment of NAPL contaminated source soils and groundwater.

16

Drum Removal

17

Drum Removal Results



18

Phase II DQOs

- Obtain data for NAPL thermal treatment design.
- Obtain data for P&T optimization.
- Obtain data for reactive barrier wall options.
- Provide analytical results to segregate and classify IDW.
- Field generated data turn-around time supports real-time decision making needs.

19

Phase II Toolbox

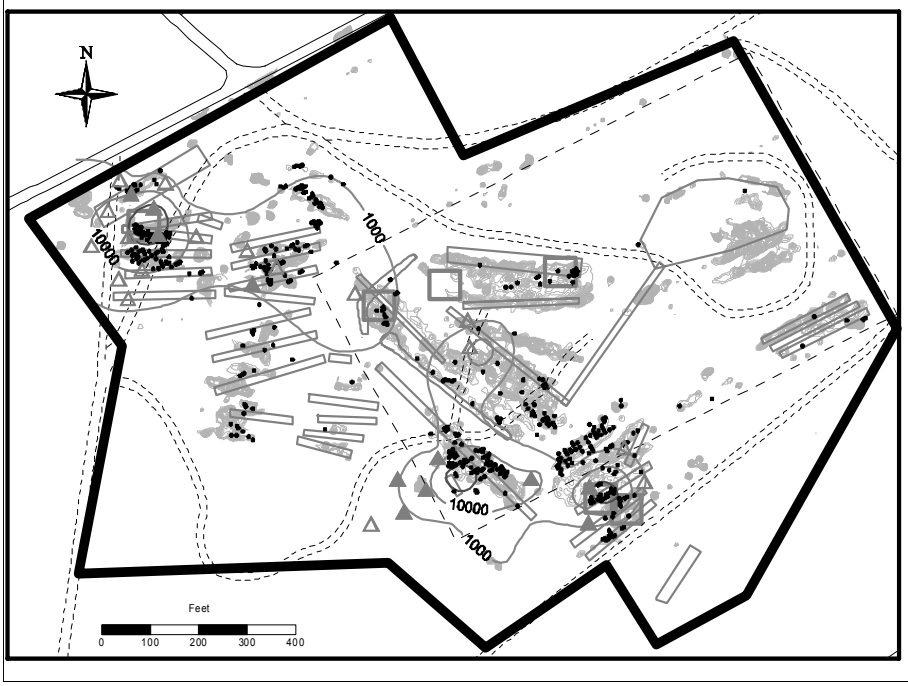
- SCAPS LIF.
- Geoprobe MIP.
- Resistivity and GPR.
- Sonic Coring.
  - UV fluorescence.
  - Sheen tests.
  - Hydrophobic dye tests.
  - PID.
- Soil physical analyses.
- Multi-port wells.

20

Geoprobe MIP

21

MIP Results

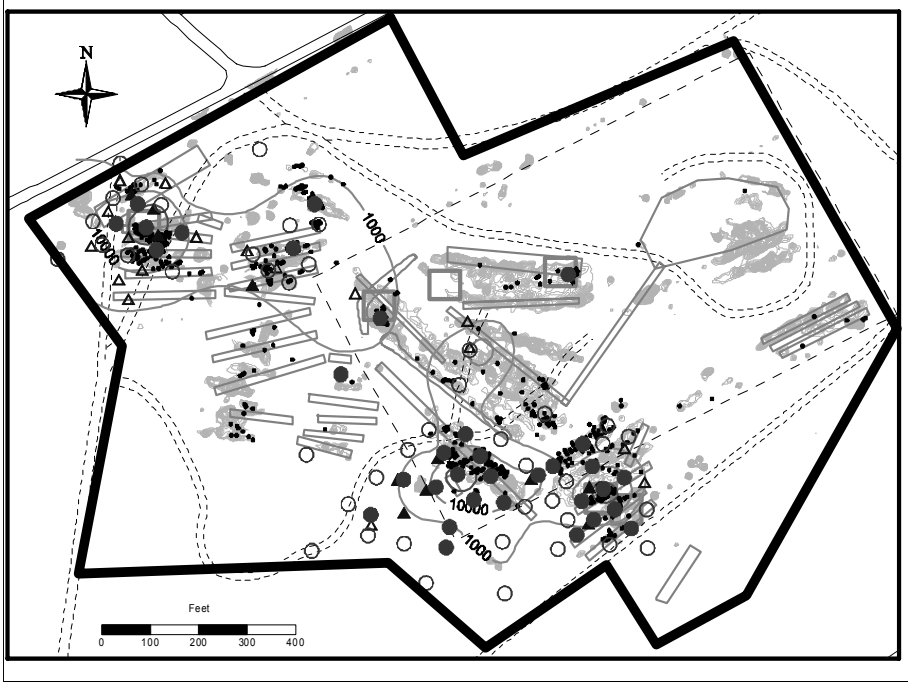


22

Sonic Drilling

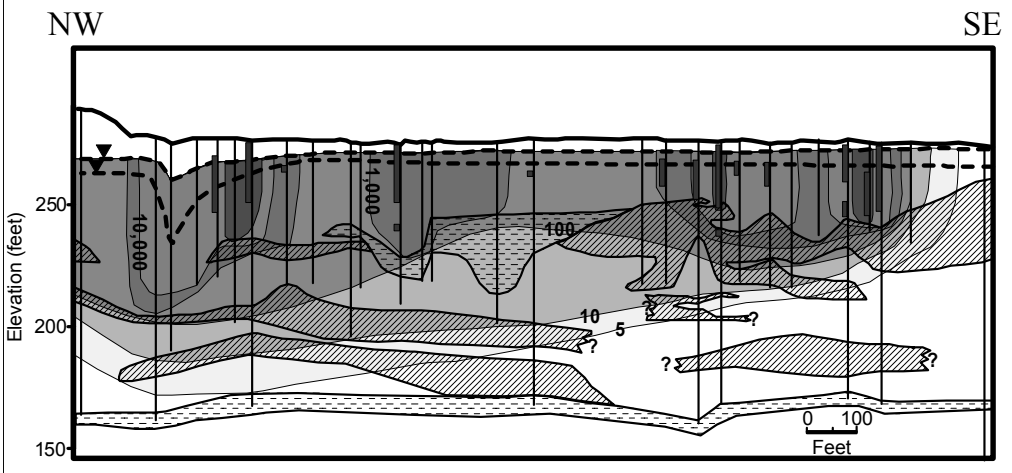
23

Sonic Drilling Results



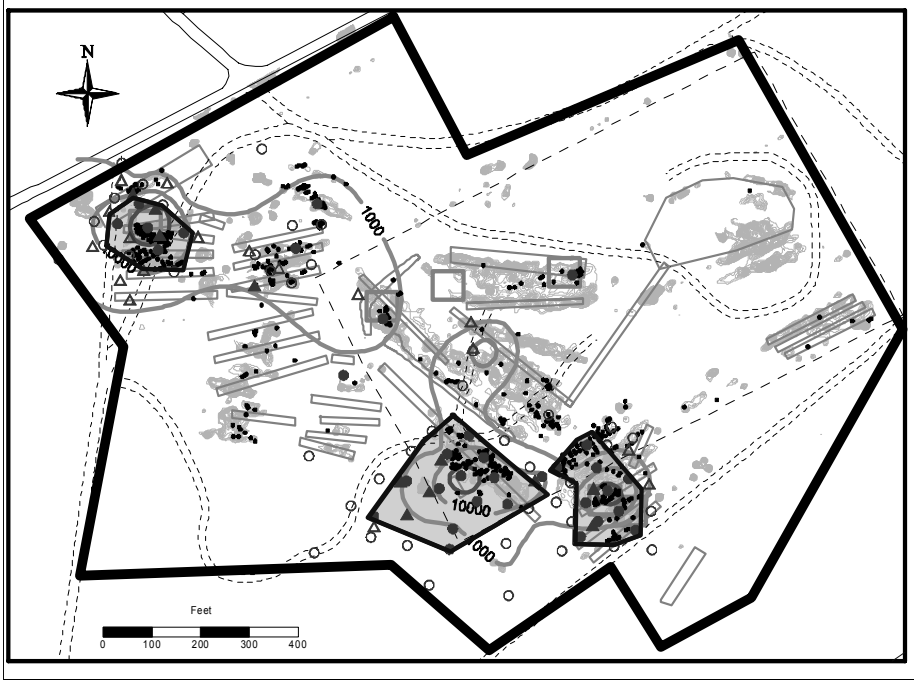
24

NW – SE Cross Section



25

Selection of Treatment Volumes



26

TCE Mass Estimate

	TCE	
Description	Mass (lbs)	Volume (gal)
Drum Removal	50,000	4,000
Remaining NAPL	100,000	10,000
Dissolved Plume	10,000	1,000

27

TPH Mass Estimate

	TPH	
Description	Mass (lbs)	Volume (gal)
Drum Removal	100,000	20,000
Remaining NAPL	600,000	80,000
Dissolved Plume	--	--

28

Conclusions

- Triad investigation method:
  - Insured adequate data for thermal design.
  - Reduced investigation time.
- Contract for thermal remediation awarded September 2002.
- Thermal treatment to begin late 2003.

29