Characterization of Air Force Sites using the Triad Approach

Federal Remediation Technologies Roundtable
01 December 2003

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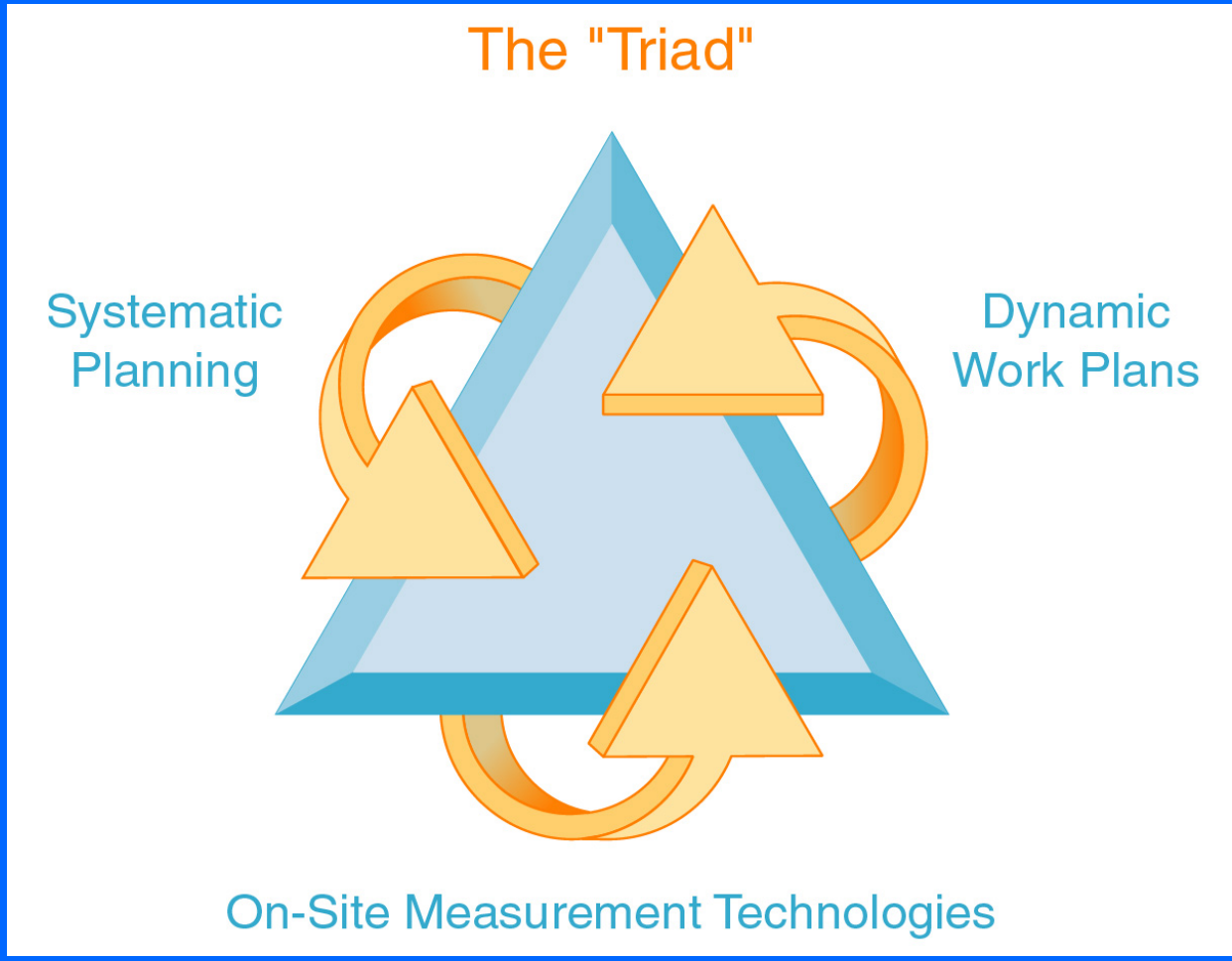
Triad Approach

DQO process ideal for Systematic Planning

Numerous field analytical methods available

Data quality adequate to support decisions

Effective data manage largest uncertainty:
Contaminant heterogeneity



Triad approach requires a tool box of site assessment tools

Saturn 2000 based DSITMS

Tri-Corders Environmental, Inc.

DSITMS APROVED BY US EPA

SW 846 Method 8265

U.S. Environmental Protection Agency

TEST METHODS

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EPA Home > Wastes > Test Methods > SW-846 Manual > New Test Methods On-line

- SW-846
- Mice Service
- PBMS
- National Monitoring Conference (NEMC)
- Methods Development & Approval Process
- Related Links
- What's New

SW-846 On-Line

Test Methods for Evaluating Solid Wastes
Physical/Chemical Methods

New Test Methods On-line

Method 8265
Method 5035A
Method 4025
Method 3570
Method 3511
Method 8323
Method 8000C
Method 5030C

Method 8265: [PDF Format 158 KB]
Volatile Organic Compounds in Water, Soil, Soil Gas and Air by Direct Sampling Ion Trap Mass Spectrometry (DSITMS)

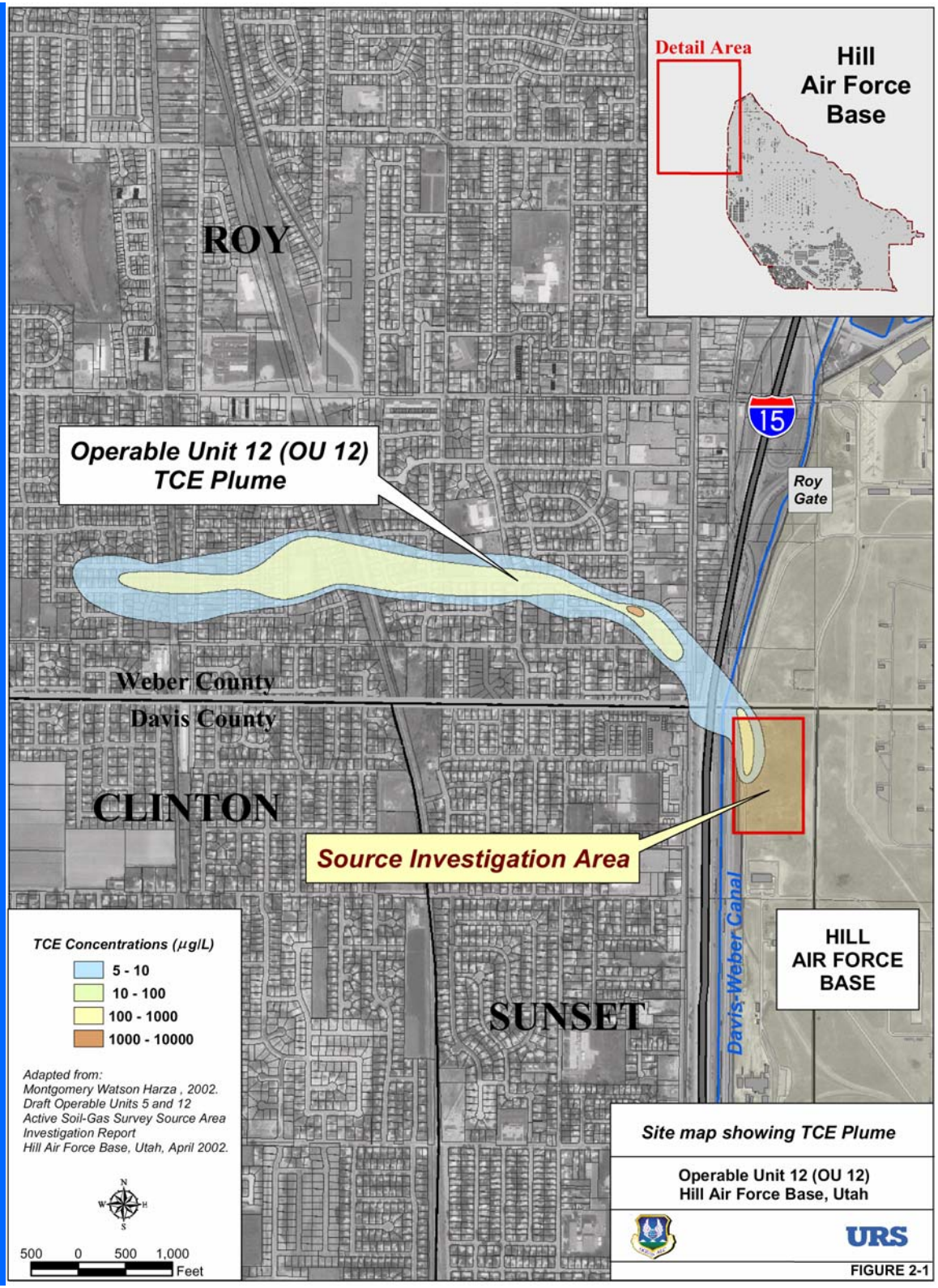
This method uses direct sampling ion trap mass spectrometry (DSITMS) for the rapid quantitative measurement, continuous real-time monitoring, and qualitative and quantitative preliminary screening of volatile organic compounds (VOCs) in water, soil, soil gas, and air. DSITMS introduces sample materials directly into an ion trap mass spectrometer by means of a simple interface (such as a capillary restrictor). There is little if any sample preparation and no chromatographic separation. The response of the instrument to analytes in a sample is nearly instantaneous. In addition, the instrument is field transportable, rugged, and relatively easy to operate and maintain.

http://www.epa.gov/epaoswer/hazwaste/test/index.htm

OU12 Hill AFB, UT

The problem:

- Large TCE plume, off base
- Vapor appearing in homes
- Five years investigation including soil gas survey
- Source still unknown



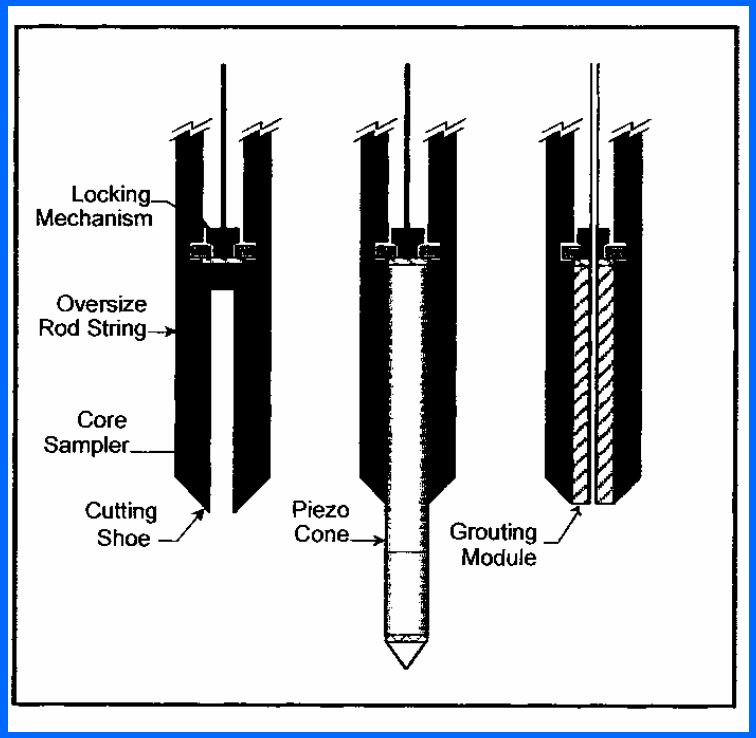
OU12 Hill AFB, UT

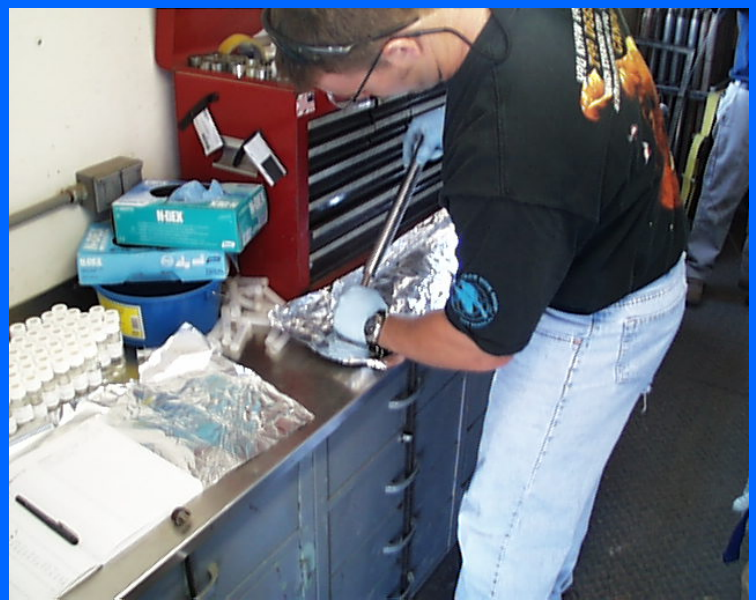
The Approach:

- Use Triad approach to attempt to locate TCE Source

  DQO process used to plan project
  Core technical team:
    US Air Force
    URS
    ARA
    Tri-Corders
- Technology
  ARA Wire line CPT soil sampling tool
  Tri-Corders direct sampling ion trap mass spectrometer
  Groundwater Modeling System for data management

OU12 Hill AFB, UT





Vertek Wireline soil sampling tool

- Multiple soil samples in a single penetration
- Very rapid, high resolution sampling

Used at OU12 HAF to collect over 600 discrete samples in 9.5 days

Sampled between 20 and 70 ft BGS

Often sampled at 1 ft intervals

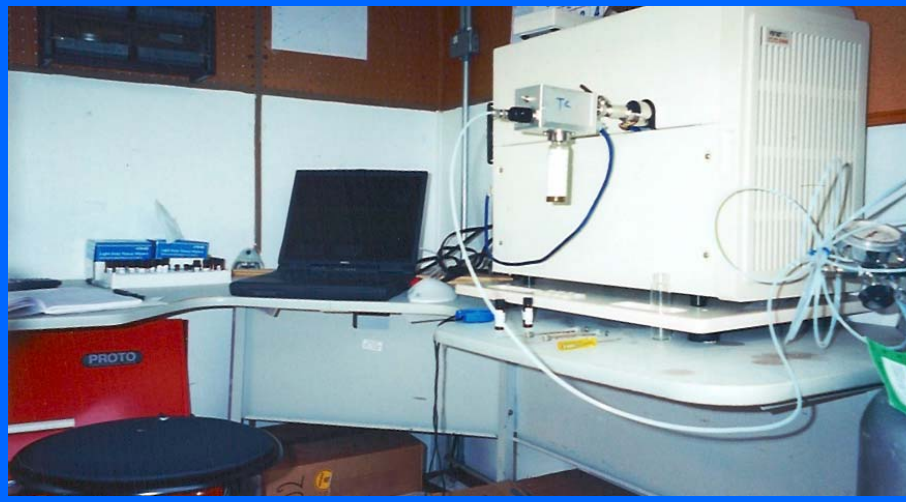
OU12 Hill AFB, UT

Tri-Corders DSITMS

- US EPA Method 8265 for VOC in soil and water
- Three minute VOC analysis
- High data quality: Adaptive QC
- Supports real-time decisions

Used at OU12 HAF to analyze
> 600 discrete samples in 9.5 days

Over 230 QC analyses



OU12 Hill AFB, UT

Triad approach TCE source investigation results

Sampled at 18 locations

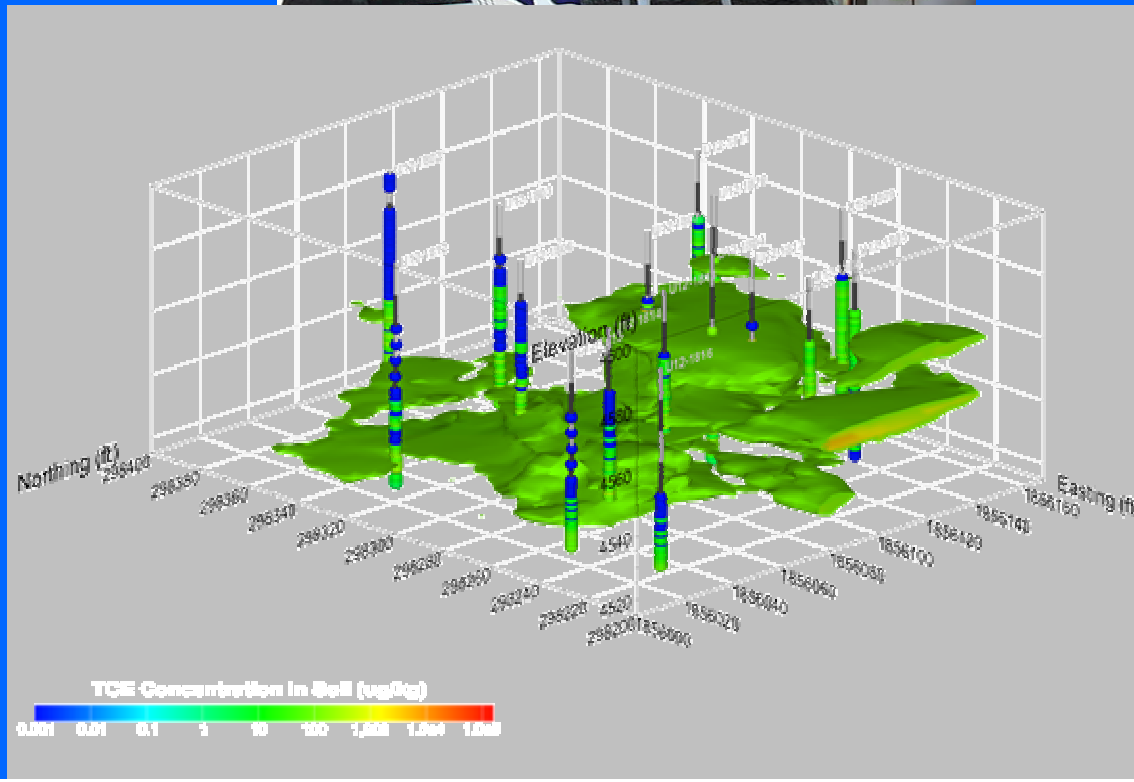
Often sampled at one ft intervals

Averaged > 60 samples/day

Located and completely mapped source zone

Provided data for pilot SVE

Pilot scale SVE optimization during single deployment



McGuire AFB, NJ C17 Hanger Site Investigation

The problem:

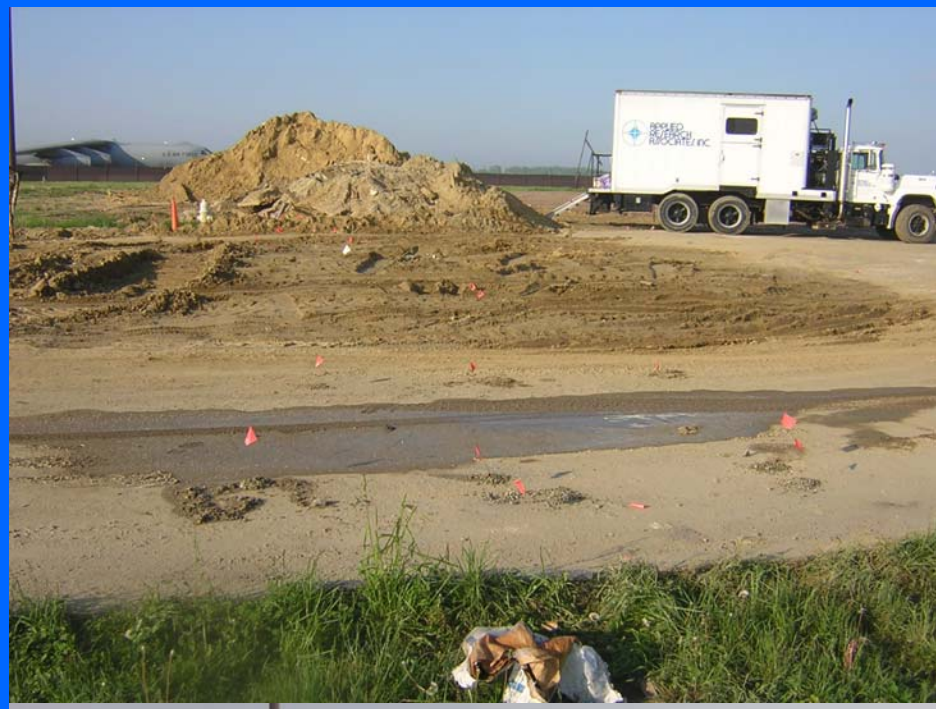
Construction of a new hanger for C17 aircraft delayed by recently discovered potential Cl solvent source.

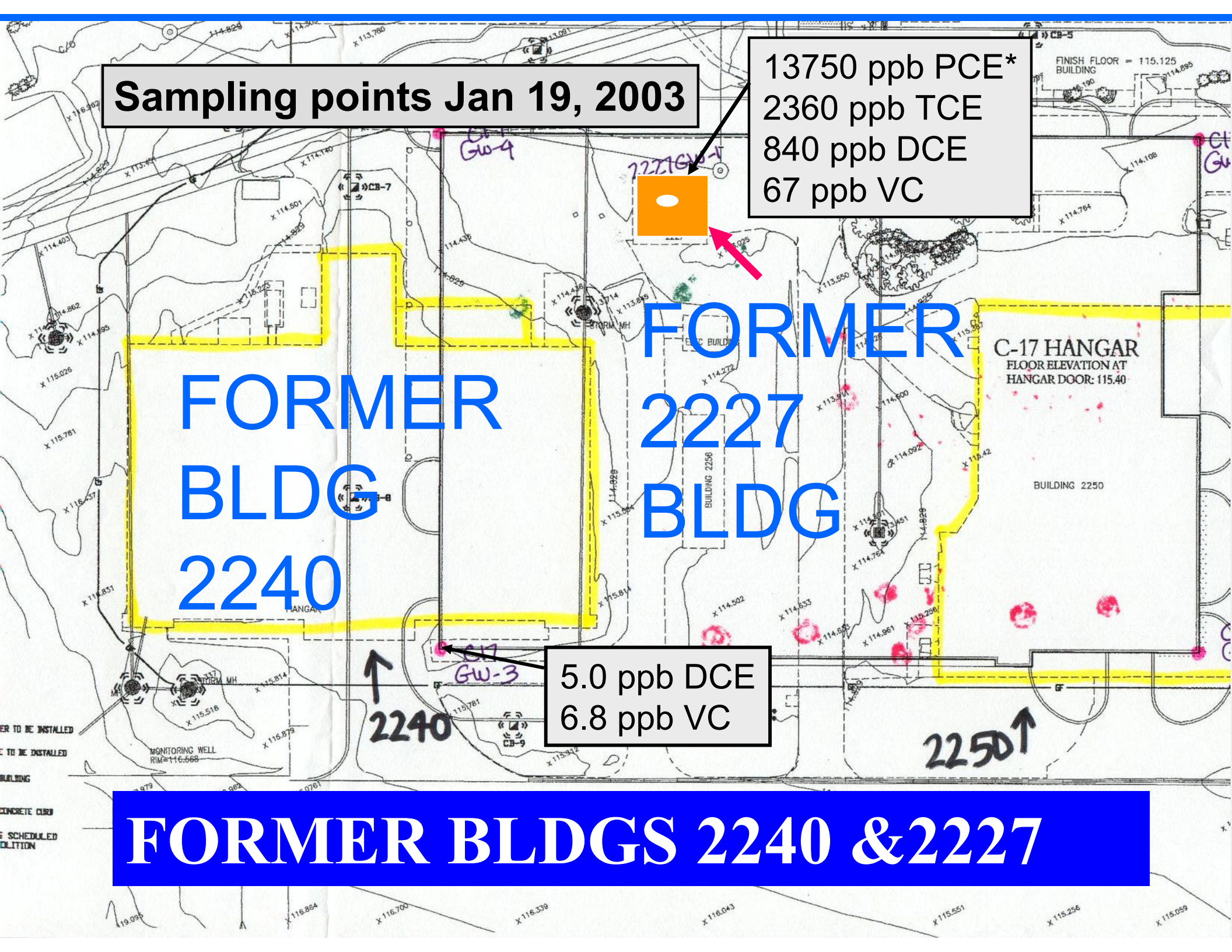
Very limited GW sampling indicated up to 1% of solubility limit PCE

Same data indicated limited distribution of shallow dissolved phase

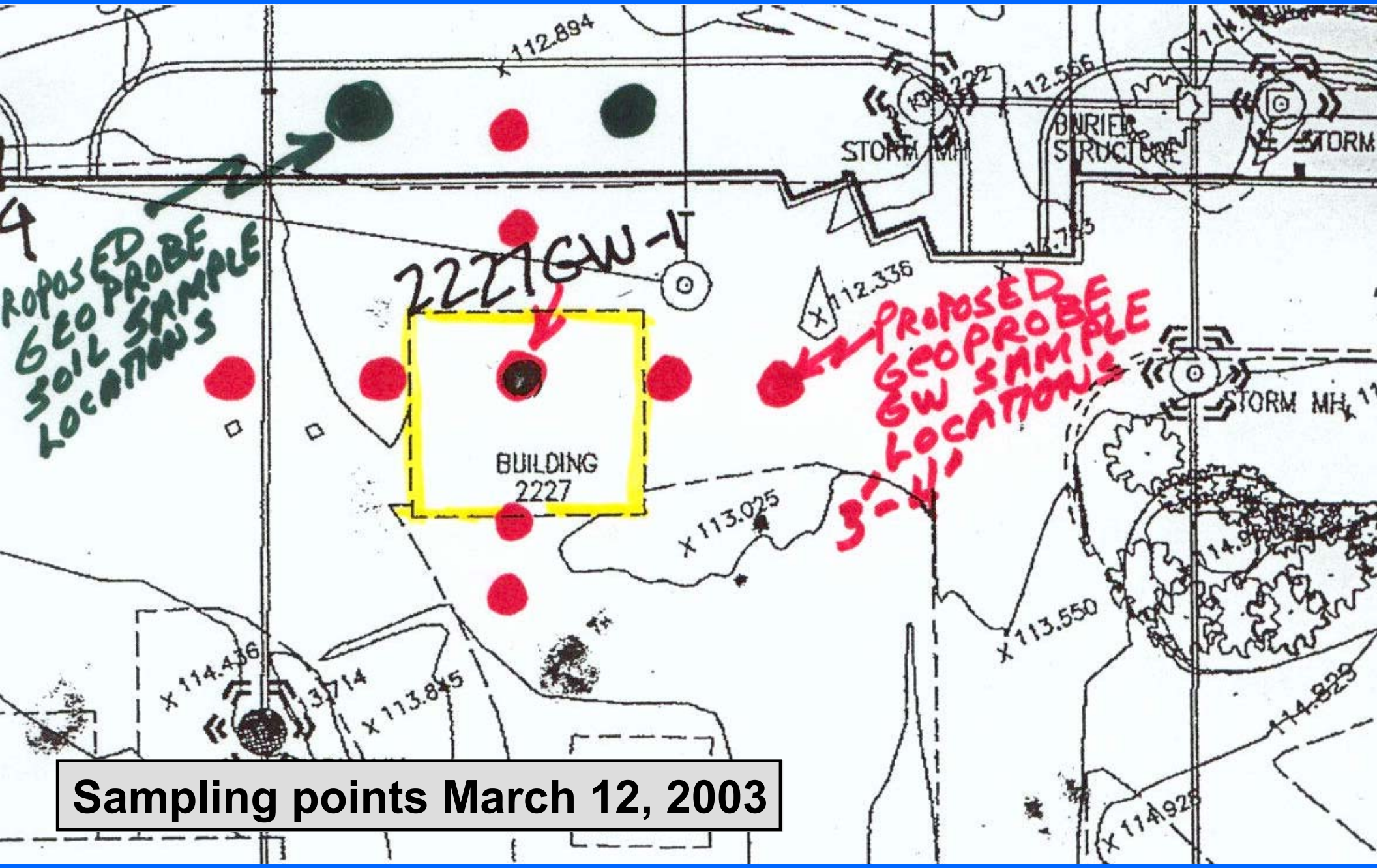
Apparent dechlorination underway at site

Construction to begin in early June 03




Sampling points Jan 19, 2003
13750 ppb PCE*
2360 ppb TCE
840 ppb DCE
67 ppb VC
FORMER BLDG 2240
FORMER 2227 BLDG
C-17 HANGAR
FLOOR ELEVATION AT HANGAR DOOR: 115.40
BUILDING 2250
5.0 ppb DCE
6.8 ppb VC
2240
2250
FORMER BLDGS 2240 &2227

McGuire AFB, NJ C17 Hanger Site Investigation



Sampling points March 12, 2003

McGuire AFB, NJ C17 Hanger Site Investigation

The Approach:

- Use Triad approach to attempt to locate chlorinate solvent source and plume

  DQO process used to plan project
  Core technical team:
    US Air Force
    NJ DEP
    US EPA Region 2
    Hayworth Engineering Sciences
    Tri-Corders Environmental

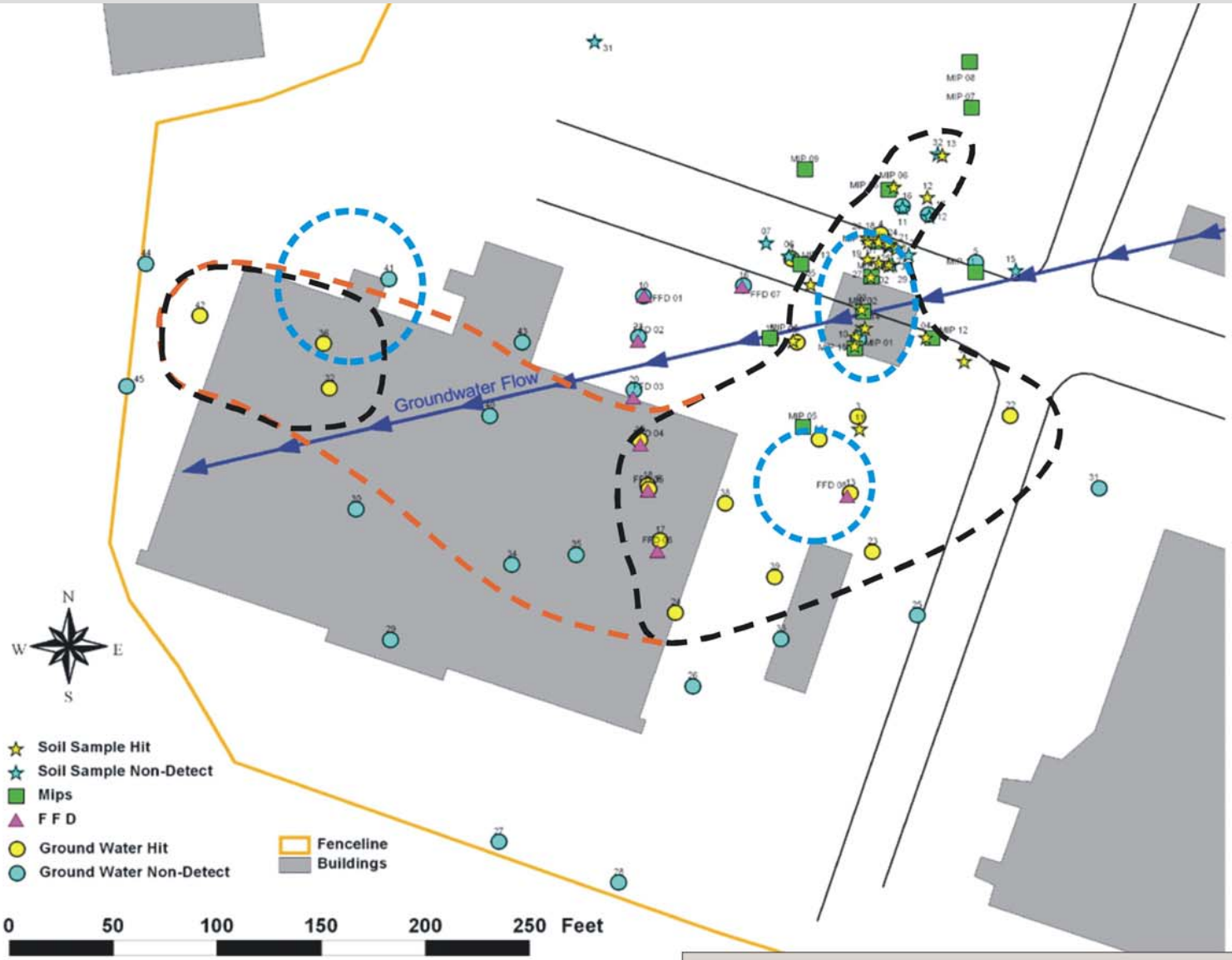
- Technology

  CPT deployed MIP, soil and groundwater sampling tools
  Geoprobe soil and groundwater sampling
  Tri-Corders direct sampling ion trap mass spectrometer
  Groundwater Modeling System for data management

C-17 Hanger Investigation, CSM Field Day 15, 16 May 2003

14 field days
15 MIP penetration
15 Geophysical CPT penetrations
>20 continuous soil core logged

Data collected using DSITMS and EPA Method 8265
33 soil sampling locations, 234 discrete soil analyses
45 GW sampling locations, 162 discrete GW analyses
244 QC analyses



McGuire AFB, NJ C17 Hanger Site Investigation

Triad approach PCE source investigation results

Sampled at 108 plan view locations

Determined source had been removed when oil/water separator was removed

Completely mapped dissolved phase plume

Confirmed natural attenuation was occurring

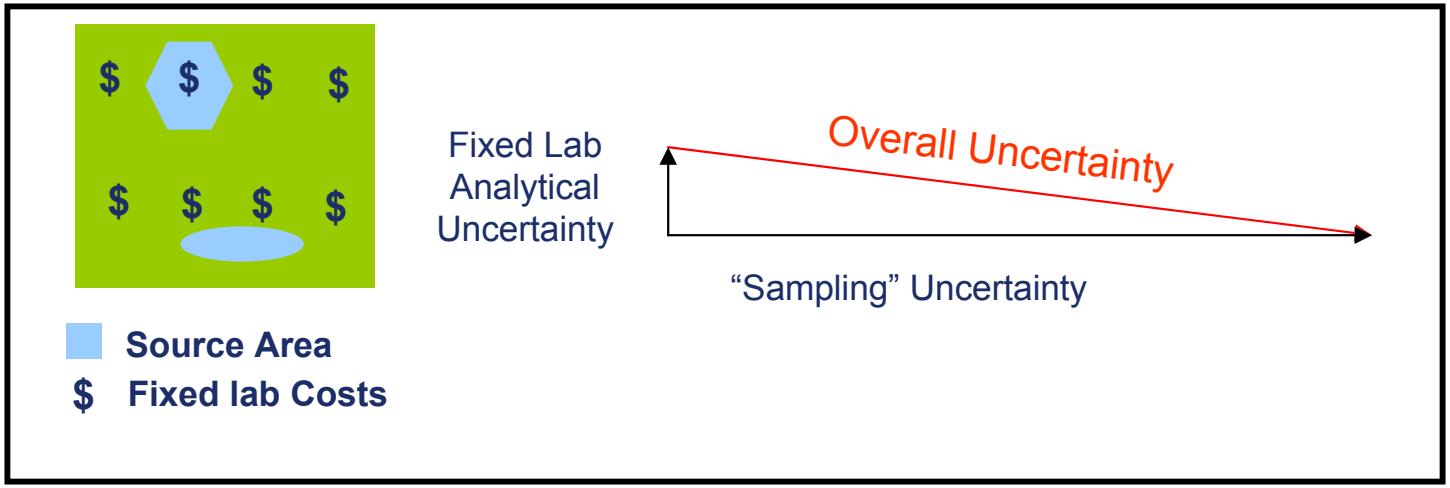
Provided data for interim remedial action design

Completed planning, field work and IRA design within seven weeks

IRA decisions made by regulators and site managers within 5 days of demobilization from the site

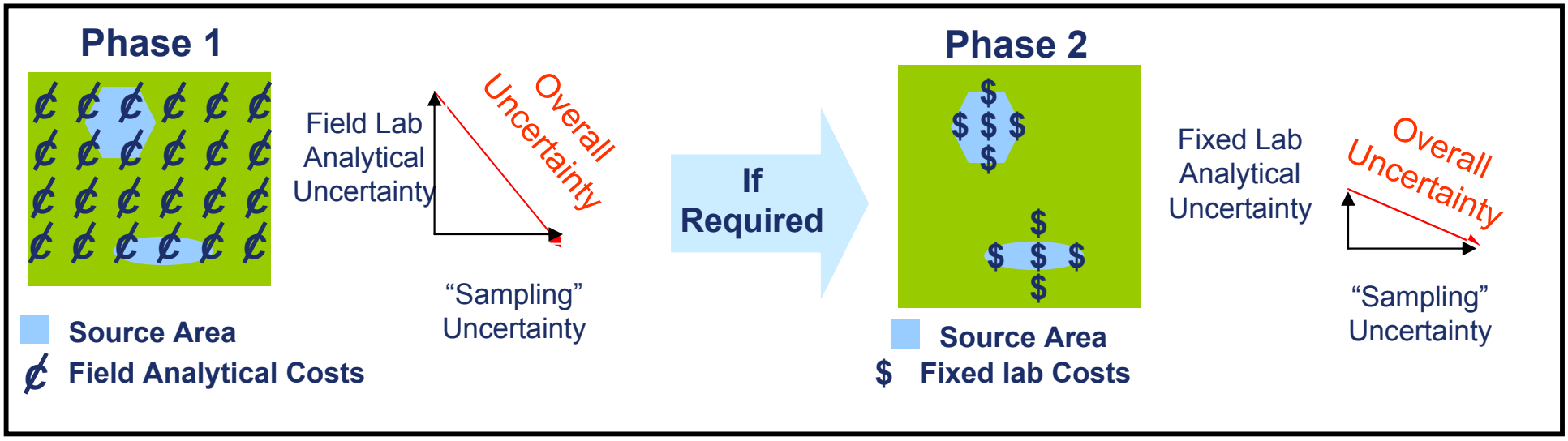
Hanger construction project back on schedule

Uncertainty Management

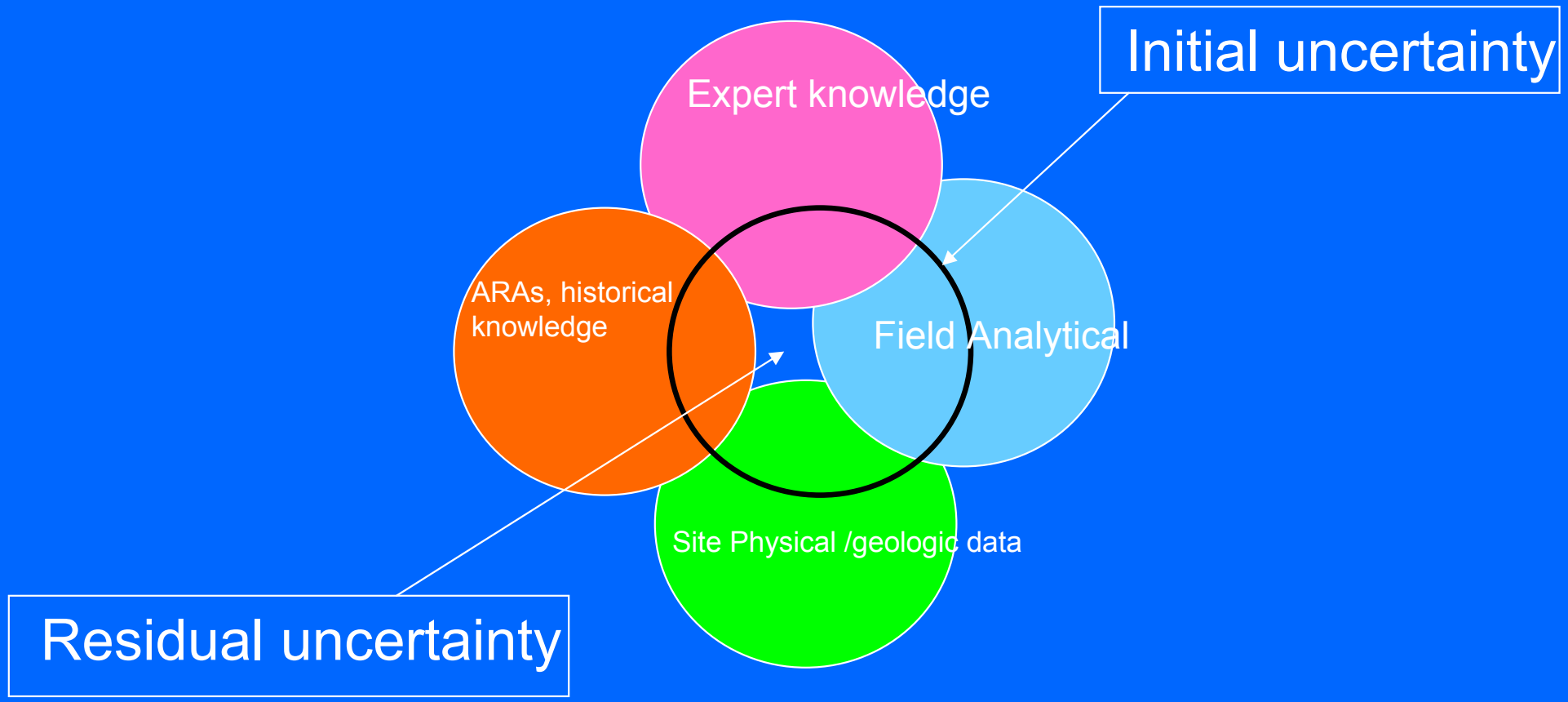


Conventional Approach

Triad Approach



Managing Uncertainty in Site Characterization using the Triad Approach



How do you know when enough (data) is enough?

Using the Triad approach allows the decision to stop taking data to be made with confidence BEFORE you leave the site.