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NAS WHITING FIELD
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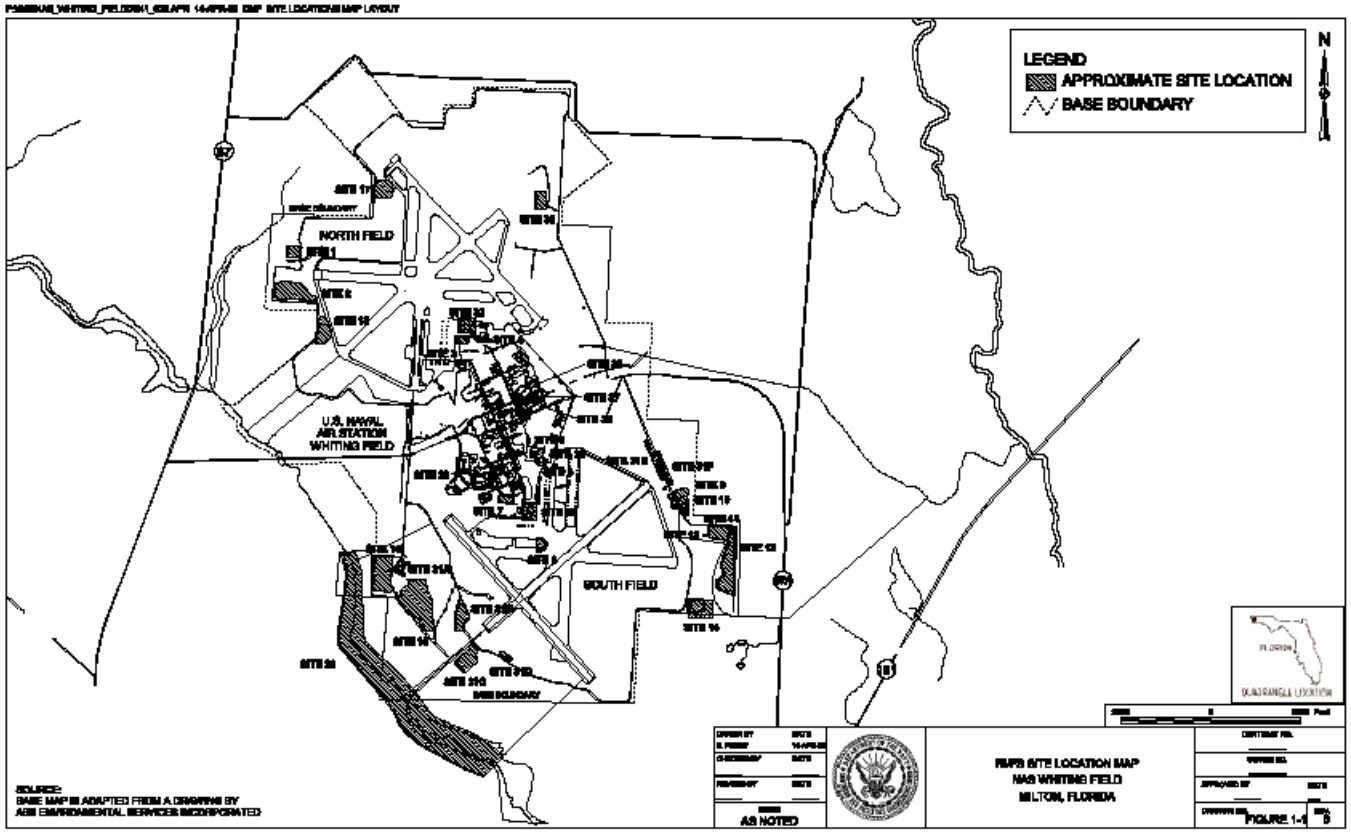
PUBLIC NOTICE RESTORATION ADVISORY BOARD SITE 4 PRESENTATION NAS WHITING FIELD FL
1/1/2001
TETRA TECH NUS

Remedial Action at NAS Whiting Field

Site 4 - North AVGAS Tank Sludge Disposal Area

Site Location Map



Site History

- Site 4 is a former underground storage tank (UST) facility located north of Tow Lane at North Field. The former tank farm covers approximately 2.5 acres and is currently covered with grass.
- The site contained eight 23,700-gallon steel USTs, one 15,000-gallon UST, and one 750-gallon UST dating back to 1943 when NAS Whiting Field first began operations.

Site History (Continued)

- Nine USTs at this site were used to store aviation gasoline (AVGAS) and one UST was used to store contaminated jet fuel. All USTs and associated piping were removed in the mid-1990s.
- There are no records of spills or leaks at Site 4, but petroleum contamination was observed when the USTs were removed.

Remedial Action Objective

- Bechtel Technology & Consulting has developed solar-powered technology incorporating an advanced design powered by a photovoltaic system using solar energy to drive a high-efficiency blower for bioventing or limited soil vapor extraction (SVE)

Remedial Action Objective (Cont'd)

- The objective of the remedial activities is to determine the effectiveness of Bechtel's Solar Remediation System (SRS) in decreasing the concentrations of volatile and semi-volatile organic compounds (VOCs and SVOCs) in the subsurface soil at Site 4.

Remedial Action Objective (Cont'd)

- The pilot system will run for approximately one year.
- This pilot study will include both SVE (pull) and bioventing (push) technologies for soil remediation.

Bioventing

- Bioventing is an in situ technology using microorganisms to degrade organic constituents adsorbed to soils in the unsaturated zone.
- Because the microbes depend on the availability of oxygen to aid in their consumption of organics, an oxygen source needs to be introduced to the soil matrix.

Bioventing (Cont'd)

- The production activity of the indigenous bacteria is enhanced by introducing airflow into the unsaturated zone through extraction or injection wells.

Soil Vapor Extraction

- SVE applies a vacuum through extraction wells to draw soil gas from the unsaturated contaminated soil.
- Pressure gradients within the unsaturated zone induce airflow throughout the porous soil matrix at a rate determined by the soil properties.

Soil Vapor Extraction (Cont'd)

- As the contaminated soil gas is removed, clean air from the surface is drawn into the contaminated zone and the organic compounds are volatilized.

Pilot Study

- As part of the pilot study, five vapor extraction/injection wells and nine sets of monitoring points will be installed at Site 4.
- SRS units will be installed at each of the extraction/injection wells during the pilot study.

Extraction/Injection Wells

- These five 6-inch diameter wells will be installed to three different screened intervals.
- The depths of the extraction/injection well screens are based on the site lithology and vertical contaminant distribution.
- Total depth of the wells is 72 feet below land surface (bls).
- Groundwater at the site is approximately 95 feet bls.

System Configuration

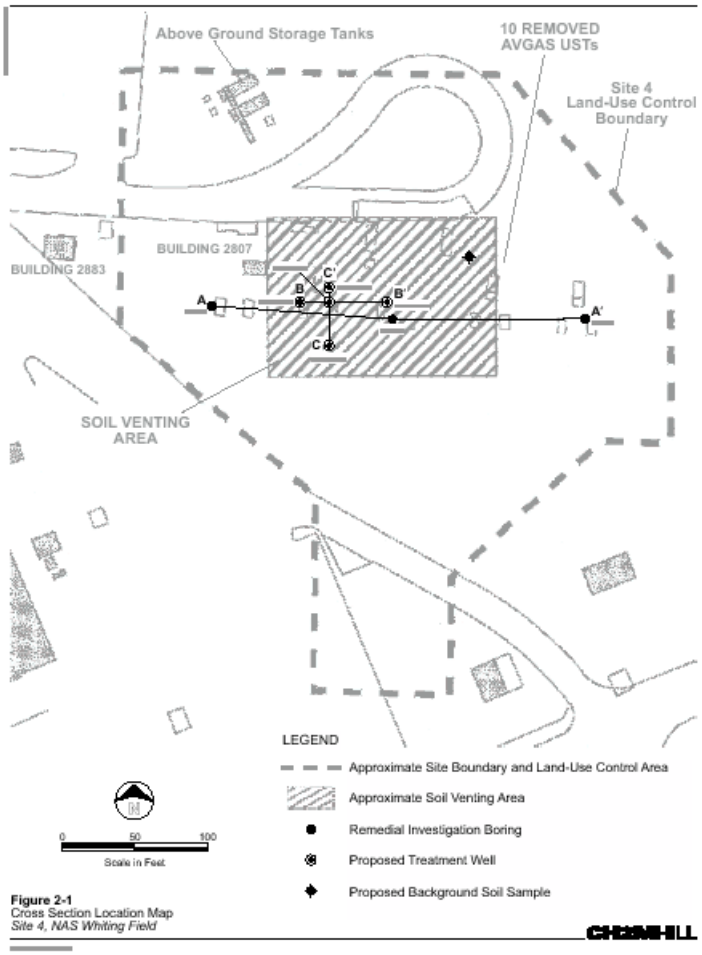
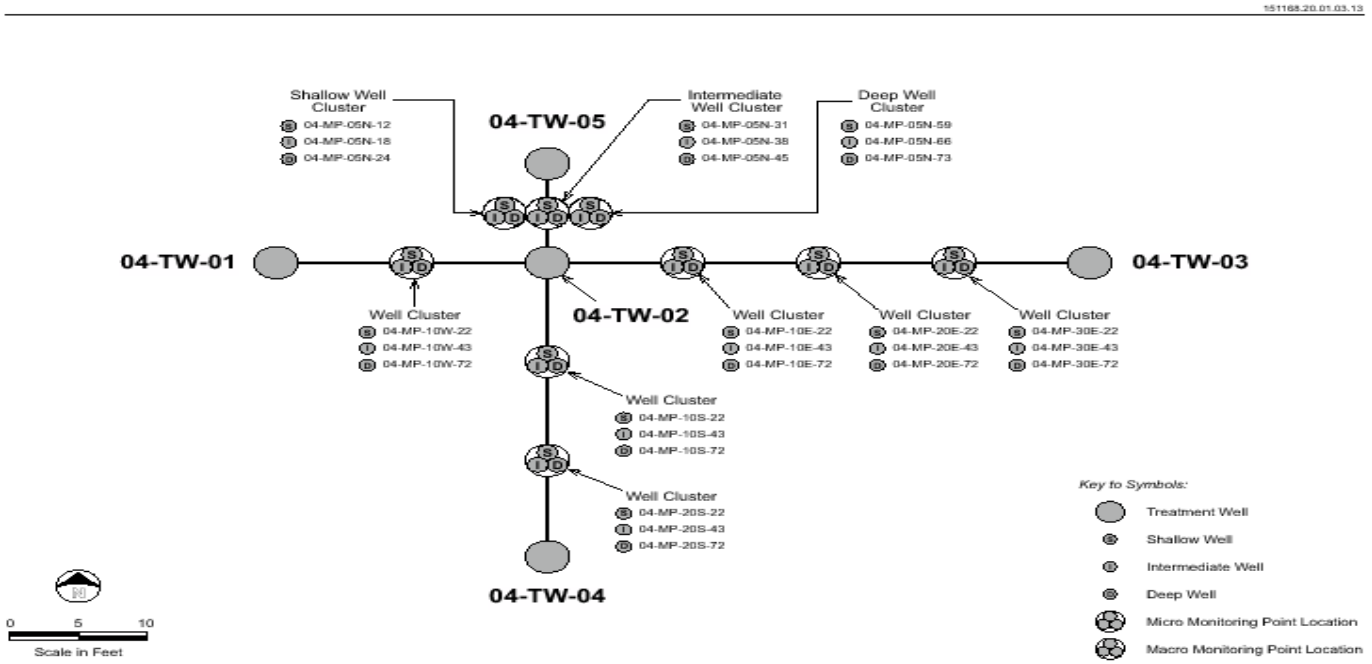


Figure 2-1
Cross Section Location Map
Site 4, NAS Whiting Field

System Layout



Monitoring Points

- Due to the uncertainty in the influence of the SRS operating in the extraction and injection modes, two types of multi-completion monitoring points are proposed for the pilot study.
- Multi-completion monitoring points will be installed between the extraction/injection wells to monitor the pressure and soil gas in the area during the pilot study.

Micro-Scale Monitoring Points

- The first type of multi-completion monitoring points will be used to determine the vertical distribution of flow, pressure, and oxygen near the extraction/injection wells (micro scale analysis).

Macro-Scale Monitoring Points

- The second type of multi-completion monitoring points will be used to determine the overall effectiveness of the pilot study objective (macro scale).
- Data loggers will be installed in each of the monitoring points to measure and record oxygen and pressure readings.

Pilot Study

- The focus of the pilot study testing is the evaluation of the vertical and horizontal impact of the SRS units at Site 4.
- This will be completed though a series of tests operating the SRS units in a pull configuration, push configuration, and a push/pull configuration.

Pilot Study

- Due to the treatment well construction, each of the screened intervals will be evaluated independently.
- The shallow interval will be evaluated first, then the intermediate interval, and finally the deep interval.
- A total of 42 tests will be run. Each test is scheduled to operate for one-week.

Baseline Sampling

- Prior to the evaluation of the SRS units, baseline sampling will be performed to determine the pretreatment conditions at the site. Three types of data will be collected:
  - Physical Lithologic Data
  - Contaminant Concentration Data
  - Site Meteorological Data

Baseline Sampling

- Three soil samples will be collected from multiple depth intervals (shallow, intermediate, and deep) from three macro-scale monitoring points and three micro-scale monitoring points.
- Soil samples will also be collected from a background location.
- The soil samples will be collected at depths corresponding to the screened intervals of the treatments wells (i.e., 22, 43, and 72 feet bls).

Baseline Sampling

- The background samples will be collected from an area of known contamination that will not be within the influence of the treatment system.
- This background location will be within the contaminated soil zone and will be used to evaluate the impact of natural attenuation at the site.

Physical Data

- The physical data will include information on the soil type, bulk soil density, grain size, and porosity. From these data, a site-specific geologic cross-section will be generated.

Contaminant Data

- Contaminant data will include soil gas (methane, hydrogen sulfide, lower explosive limit [LEL], oxygen, and carbon dioxide).
- Analytical soil concentrations will include benzene, toluene, ethylbenzene, and total xylenes [BTEX], polycyclic aromatic hydrocarbons [PAHs], total recoverable petroleum hydrocarbons [TRPH], total organic carbon [TOC], and organic vapor analyzer (OVA) field measurements.

Quarterly Soil Sampling

- After each quarter of system operation, soil samples will be collected in the areas previously sampled during the baseline sampling.
- Results will be compared to baseline sample results.

End of Pilot Study

- After one year of operation, the data will be compiled and presented in a Pilot Study Completion Report.
- The report will include a summary of the methodology, compare the final soil analytical results with the baseline results, describe any maintenance problems, and will provide conclusive evidence of the effectiveness of the treatment system.

End of Pilot Study

- The report will also present a cost-benefit analysis comparing the operating cost of SRS treatment system and its effectiveness to the cost of other remedial techniques including natural attenuation.

Study to Date

- On January 2, 2001, baseline soil sampling began at Site 4.
- Soil borings were drilled at each of the treatment system locations and the background boring location.
- The concrete tank pads were encountered approximately 16 feet bls. As a result, the entire system configuration has been shifted approximately 45 feet south.

Study to Date

- Soil samples were collected from the background location and several monitoring point locations.
- Due to extremely high levels of VOC concentrations in the breathing zone, much the fieldwork has been performed in Level C protection (respirators).
- Recently, the VOC levels have increased and the work must be carried out in Level B protection (supplied air)

Study to Date

- The lower explosive limit (LEL) has also been encountered and the work has occasionally been shut down.
- Due to the explosion hazard, the SRS units are now being manufactured with plastic parts and will be equipped with explosive atmosphere sensors.

Upcoming Events

- Installation of the treatment wells and monitoring points will be completed in February 2001.
- The SRS units are currently under construction and will be delivered to the site in May 2001.
- Startup of the system is expected in June 2001 and should be complete in May 2002.

QUESTIONS?