

Marine Corps Base Camp Lejeune Restoration Advisory Board Meeting Minutes

RAB Meeting: November 7, 2006

ATTENDEES: Robert Lowder/Camp Lejeune
Charmaine Forbes/Camp Lejeune
Daniel Hood/NAVFAC Atlantic
Gena Townsend/USEPA Region IV
Joe Colella/Shaw
Christopher Bozzini/CH2M HILL
Jessica Skeeane/CH2M HILL
Donna Laudermilch/CH2M HILL
Marcy Gallick/Rhea

Laura Bader/RAB Co-Chair
Leonard McAdams/RAB Member
Jerome Gundrum/RAB Member
Richard Mullins/RAB Member
Tom Mattison/RAB Member
Cynthia Rester/RAB Member

FROM: Donna Laudermilch/CH2M HILL

DATE: December 4, 2006

LOCATION

Coastal Carolina Community College, Business Technology Building, Room 106 in
Jacksonville, North Carolina

MINUTES

6:00 PM

I. Welcome and Introductions

II. Site 89 Treatability Studies

Objective: The purpose of this agenda item was to discuss the treatability studies at Site 89. Mr. Christopher Bozzini from CH2M HILL led this discussion.

Overview: Site 89 is located on the New River Air Station side of the Base and is the site of the former Defense Reutilization and Marketing Office (DRMO), which operated until 2000. In addition, a Base Motor Pool operated at the site until 1988, using solvents such as trichloroethene (TCE), methyl-ethyl-ketone (MEK), and acetone.

The contaminants of concern at Site 89 are chlorinated solvents from industrial uses, including 1,1,2,2-Tetrachloroethane (1,1,2,2-PCA), 1,1,2-Trichloroethane (1,1,2-TCA), TCE, cis-1,2-Dichloroethene (cis-1,2-DCE), and vinyl chloride.

Recent site activities include a Time-Critical Removal Action (TCRA) involving low temperature thermal desorption [completed in 2000]; a Non Time-Critical Removal Action

(NTCRA) involving electrical resistance heating [completed in 2005]; and a Remedial Investigation [completed in 2006]. A Feasibility Study has been started that identified the potential technologies for the remediation of groundwater at the site. Due to the large volume of contaminated groundwater and the potentially high remedial costs, the Partnering Team decided to conduct a treatability study that would evaluate several of the potential technologies including:

- Air Sparging with a horizontal directionally-drilled (HDD) well
- Ferox Injections
- Enhanced Reductive Dechlorination (ERD) substrate injection
- Permeable Reactive Barrier (PRB)

The objectives of the Treatability Studies are to: 1) obtain information on the design parameters in order to better refine the Feasibility Study; and 2) determine the effectiveness of each technology based on contaminant reduction and reagent distribution/zone of influence. The treatability study will evaluate the four approaches. The overall goal for the site is to implement the technology that works the best.

The RAB reviewed the proposed treatability study locations and then discussed the design details of each treatability study as follows:

Air Sparging

- Air sparging involves the injection of air through the HDD well located beneath the contamination. As the air mixes and rises, VOCs are stripped from the water into the air. This is the same technology as was implemented for the Site 86 pilot study.
- The HDD air sparge well will be 600 feet long, with 250 feet of screen, installed at 40 feet below ground surface (bgs).
- Five monitoring wells and three soil vapor monitoring wells (to monitor vapors between the system and a building located 300 feet away) will be installed.
- The sparge system will be started up and operated for three months.
- After three months, pneumatic fracturing will be conducted in four borings above the sparge well to break up the subsurface and improve air distribution. Pneumatic fracturing involves the injection of nitrogen gas into the subsurface to enhance permeability.
- The sparge system will then be operated for an additional three months.
- Monitoring will include groundwater and soil vapor monitoring for VOCs. Baseline samples will be collected prior to start-up and then samples will be collected on a monthly basis for six months.
- A zone of influence evaluation will be conducted which includes a tracer test as well as collection of water levels and dissolved oxygen.

Ferox

- Ferox is an in situ chemical reduction technology. The Ferox process is a patented method of fracture-assisted injection. It involves pneumatic fracturing to inject zero valent iron (ZVI) into individual soil borings.
- ZVI consists of pure iron metal granules or powder that are specially manufactured and packaged to prevent premature corrosion.
- Once released into the environment, oxidation of the iron under anaerobic conditions yields ferrous iron and hydrogen ions, both of which are reducing agents for chlorinated solvents.
- The injections will be completed at four locations, spaced 25 feet apart.
- Three monitoring wells will be installed.
- Monitoring will include groundwater sampling for VOCs and confirmation soil borings to evaluate the zone of influence. Baseline samples will be collected prior to injection and then samples will be collected 1, 3, and 6 months after injection.

ERD

- The basic premise of ERD involves injection of a carbon source which is a food for microorganisms. The microorganisms eat the carbon source and then degrade solvents.
- ERD of cVOCs is implemented by adding a suitable substrate to 1) deplete competing electron acceptors and 2) provide an electron donor source for reductive dechlorination.
- A 50/50 blend of sodium lactate and emulsified oil will be injected using a geoprobe followed by a water flush.
- The injections will be completed at four locations, spaced 25 feet apart, and a tracer will be added to the injection to evaluate the zone of influence.
- Three monitoring wells will be installed.
- Monitoring will include groundwater sampling for VOCs and natural attenuation indicator parameters (NAIPs). Baseline samples will be collected prior to injection and then samples will be collected 1, 3, and 6 months after injection.

PRB

- A PRB is a constructed subsurface "barrier" containing a reactive material. PRBs are installed perpendicular to the flow path of the contaminated groundwater plume.
- Contaminated water flows through the PRB and natural processes degrade the contaminants, so the water exiting the wall is clean.
- The wall will include 40% mulch and 60% sand. The mulch acts as a carbon source for anaerobic bacteria. The mulch will be from the Base recycle area.
- The PRB will be 200-250 feet long and 2 feet thick, installed to a depth of 25 feet. The wall will be installed using a continuous trenching machine.

- A horizontal pipe will be installed along the bottom of the wall to allow for future injections of substrate, if desired.
- Six monitoring wells will be installed in and around the PRB.
- Monitoring will include groundwater sampling for VOCs and total organic carbon (TOC). Baseline samples will be collected prior to injection and then samples will be collected 1, 3, and 6 months after injection.

The project schedule is as follows:

- Install wells, inject, build PRB - November/December 2006
- 6 months of O&M and monitoring - through 6/2007
- Summary report - August 2007

The NAVFAC representative stated that the Partnering Team knows all of the technologies being implemented will work, but the goal of the Treatability Study is to identify the technology that works the fastest and the cheapest, since cleanup will likely range from \$5 to \$20 million.

III. Site 93 Remedial Action

Objective: The purpose of this agenda item was to discuss the remedial action at Site 93. This discussion was led by Mr. Joe Colella from Shaw.

Overview: The RAB reviewed a figure showing the location of Site 93. The contaminants of concern are chlorinated solvents, which were discovered in 1993 during removal of an underground storage tank (UST). Contamination at the site exists to a depth of 16 feet, and groundwater is shallow (1 to 4 feet bgs).

The remedy selection process is as follows:

- Ongoing studies were conducted at Site 93 from 1997 until 2002.
- Various pilot studies were recently conducted at chlorinated groundwater sites including an in situ chemical oxidation (ISCO) pilot study involving potassium permanganate injection at Site 35 (completed in February 2005).
- A Feasibility Study for Site 93 was completed by CH2M HILL in November 2005.
- EPA models showed that North Carolina groundwater quality standards could be met within 7 years in the source area versus 14 years with a no action approach.
- ISCO using potassium permanganate was selected as the appropriate remedy (to decrease the remediation time).

The RAB reviewed a figure of the treatment area, which includes:

- 200 injection points, spaced 10 feet apart.
- Injection points installed 16 feet deep with 10 feet of screen.
- Monitoring wells installed outside of the treatment area to a depth of 20 feet.

A total of 92,000 pounds of potassium permanganate will be diluted to 2.8% in solution, for an estimated total of 397,000 gallons of solution injected into the treatment area.

The project chronology is as follows:

- 10/2/06 - Begin installation of the injection well field
- 10/3/06 - Install 5 monitoring wells and continue well field installation
- 10/24/06 - Install batch mixing plant
- 10/25/06 - Complete test injections using potable water
- 10/30/06 - Begin injecting potassium permanganate solution

The injections are currently being completed during daylight hours and are expected to continue for 90+ days.

During this discussion, Mr. McAdams mentioned that the treatment area had turned purple last week, and questioned whether that was due to too much potassium. According to Mr. Colella (Shaw), the purple water was due to "daylighting" because of the high groundwater table present at the site. There has been some ponding on-site, but all of the purple water has been contained. Shaw keeps a neutralizing agent on site, and has adjusted the flow rate in order to minimize the occurrence of daylighting. Mr. Mattison stated that with the amount of rainfall today, the water levels at the site may raise quite a bit. According to Mr. Colella, if the water levels rise, the system may have to be shut down for a few days, while the site equilibrates.

Ms. Rester mentioned that Camp Geiger used to have dry cleaning plant located between 9th and 10th Streets and between B and C Streets. The dry cleaner burnt down in 1973, but she was curious if any PCE was detected in the groundwater near the barracks (Building G920). According to Mr. Bozzini (CH2M HILL), significant levels of PCE have not been detected at Site 93 and the contaminant of concern is TCE. If the dry cleaner had a release, PCE would be detected because the direction of groundwater flow is towards the Site 93 treatment area.

IV. Site 84 Closeout

Objective: The purpose of this agenda item was to discuss the status of the closeout for Site 84. This discussion was led by Rhea representative, Ms. Marcy Gallick.

Overview: Site 84 was purchased by the Navy in 1941, but Building 45, located on the site, was leased to Tidewater Electric until the 1960s. Historical information on the property was not available, but former employees of Tidewater Electric indicated transformers were historically cleaned on site. The contaminants of concern are polychlorinated biphenyls (PCBs), which were found in old transformers.

The Navy took back the site from Tidewater Electric and began an investigation, during which petroleum contamination was also identified. Building 45 was removed and the contaminated soil surrounding the building was excavated. Confirmation samples collected by a previous consultant indicated PCB contamination remained in the soil located at the southwest end of the excavation footprint. A second phase of removal was planned; however the Navy decided to investigate further rather than chase the contamination. Rhea was tasked with completing the investigation and subsequent remedial action. In areas with elevated PCBs, Rhea completed numerous test pits.

The remediation goals for the Site are based on the U.S. Environmental Protection Agency (USEPA) Office of Solid Waste and Emergency Response (OSWER) recommended cleanup goals for low-occupancy areas (industrial land use). The PCB cleanup level is 10 mg/kg. Petroleum-contaminated soil will not be removed unless it is co-mingled with PCBs; however samples will be collected in order to identify what levels of petroleum hydrocarbons are left in place (for the UST group).

The performance requirements for the removal action were as follows:

- PCB soil concentrations 10 ppm or greater will have at least 2 feet of clean cover.
- In-place sampling of areas where the concentrations of PCB and TPH remain above remediation goals.
- Entire site re-vegetation
- Fence installation

The remedial actions included:

- April 2006
 - Lay out fence location
 - Perform reconnaissance of borrow area (used to fill excavation and provide clean cover)
 - Survey existing elevation (used to verify presence of two feet of clean cover when finished)
 - Work area and baseline survey
 - Collect pre-disposal samples
- June 2006
 - Erosion and sedimentation control
 - Locate utilities
 - Excavation of high level PCBs (removed 680 tons of soil and disposed of it off-site)
 - Collect in-place soil samples
 - Back-fill over top of excavation and provide clean cover
 - Construct access road
 - At the end of June, the area was hit by a tropical storm, so the site was not able to be re-vegetated
- August 2006
 - Re-grade/rebuild road (including re-survey of the area to verify 2 feet of clean cover)
 - Create protective enclosure for wellhead
 - Fertilize and hydroseed area
 - Perform final elevation survey
 - Replace silt fence (due to the tropical storm)
 - Plan removal of Embarq phone box
- October 2006
 - Embarq phone box removal/regrading
 - Re-fertilization
 - Reseeding of any areas light on grass

Sampling and analysis during the removal action included: (1) in-place sampling, (2) sidewall sampling (in excavation areas), (3) disposal sampling (of piles staged prior to being loaded onto a truck), and (4) QA/QC samples.

The remaining actions include:

- Closure Report
- PRAP
- Public Meeting
- ROD

Mr. Mattison asked when the public meeting would be held and what notice would be provided. According to Mr. Hood (NAVFAC representative), the public meeting will likely be held in conjunction with a RAB meeting. The public will have two weeks notice for the meetings and will have 30 days to provide comments.

Mr. Mattison also asked for any cost estimates on the cleanup effort. According to Mr. Hood, Site 84 was more expensive than originally planned. The multiple removal actions cost an estimated \$4 million, and the investigation cost an estimated \$1 million.

Mr. Lowder indicated the Base plans to use Site 84 as a Marine Corps museum site. The plans were on hold until the locations of remaining PCBs were identified. Now the museum can be built with land use controls (LUCs) in place. According to Mr. Hood, the Base can build on the site now because a museum is considered industrial use and the rest of the site would be a parking lot. The only people that would be at risk would be the construction workers, who would be properly trained.

V. Next RAB Meeting

The Next RAB Meeting will be **Thursday, February 8, 2006 6:00 PM - 8:00 PM**. Mr. Bob Lowder will secure a location for the meeting and send the information to the RAB members.