

Subject: Final Minutes, Quarterly Restoration Advisory Board (RAB) Meeting, Longhorn Army Ammunition Plant (LHAAP)

Location of Meeting: Karnack Community Center, Karnack, Texas

Date of Meeting: February 20, 2014, 6:00 – 7:30 PM

Meeting Participants:

LHAAP/BRAC: Rose M. Zeiler

USACE: Aaron Williams, Rick Smith

USAEC: Robin Paul

AECOM: Dave Wacker, Gretchen McDonnell

TCEQ: April Palmie

USEPA Region 6: Rich Mayer, Janetta Coats, Kent Becher (USGS liaison), Barry Forsythe (USFWS Liason)

USFWS: Paul Bruckwicki

RAB: **Present:** Paul Fortune, Terry Britt, Charles Dixon, Carol Fortune, Judith Johnson, Ted Kurz, Richard LeTourneau, Tom Walker, John Pollard, Jr., Nigel Shivers, Pickens Winters
Absent: Ken Burkhalter, Robert Cargill, Lee Guice, James Lambright, Judy Vandeventer

Public: Dawn Orsak, CLI-TAG
Mary Britt, Carlos Black, Joe Black, Robert Keathley

An agenda handout for the RAB meeting was provided for the meeting. Additional hard copy meeting materials provided included the AECOM slide presentation, a surface water and perimeter well perchlorate data handout, and a GWTP summary handout showing pounds of chemicals removed and volume of water treated. Draft November 2014 RAB meeting minutes were provided to RAB members for review prior to the meeting.

Welcome – Rose Zeiler

Mr. Fortune opened the meeting and invited any first-time attendees to introduce themselves.

Mr. Joe Black introduced himself as a first-time meeting attendee, but lifelong Caddo Lake area resident. Mr. Black stated his son, also named Joe Black, is a candidate for Harrison County judge.

Open Items – Rose Zeiler

Minutes

Ms. McDonnell noted that one change was made to the version of the minutes that had been distributed for RAB review, which was to correct the name of the church where Mr. Pollard serves as deacon. Ms. Fortune made a motion to approve the November 2013 RAB meeting minutes. Motion seconded by Mr. Pollard.

Tour of Longhorn Sites Planned for May

By vote of the RAB members, the tour was scheduled for May 15th at 3PM. Participants should meet in front of the entrance for the USFWS building, just inside the gates of the refuge. The tour will likely take two hours. The tour is for RAB members, but members of the public may attend if their name and contact information is submitted in advance.

New Members

Mr. Kurz stated that he knew a potential candidate for the RAB. Mr. Fortune asked that AECOM provide an application.

Website

The Longhorn website is schedule for debut at the next RAB meeting. When the site becomes active, a notice will be sent to the RAB members and the interested parties list. The address will be <http://www.longhornaap.com>.

A map of the site will allow viewers to click on a site of interest, and be led directly to documents relating to that site. Groundwater plume map updates, fact sheets on remedial technologies in use, and administrative record documents are anticipated to be available on the website.

Installation Action Plan

Dr. Zeiler asked the group if any RAB member had not received their copy of the Installation Action Plan. No member indicated they had not received the document.

Open Questions

Ms. Coats, USEPA, asked if any local government officials had requested tours of Longhorn. Dr. Zeiler stated that local government officials are on the Longhorn interested parties list, so receive notifications of Longhorn RAB activities, but no requests have been received for several years. Dr. Zeiler stated that the interested parties list would be reviewed to ensure it is updated to include current local government officials. William Hatfield was identified as the current county commissioner for the Longhorn area and should be on the interested parties list.

Defense Environmental Restoration Program (DERP) Update – AECOM (Dave Wacker)

Fieldwork Completed and Upcoming Field Activities Planned

Mr. Wacker provided a brief overview of the CERCLA process phases, to facilitate discussion on the status of progress at several LHAAP sites where field work has recently been completed or is underway (LHAAP-46, LHAAP-67, LHAAP-18/24, LHAAP-35B(37), LHAAP-50,

LHAAP-35A(58), LHAAP-12 and LHAAP-16). Five sites (LHAAP-46, LHAAP-67, LHAAP-35B(37), LHAAP-50, LHAAP-35A(58)) are currently in the “remedy in place” phase of the process, undergoing monitored natural attenuation (MNA). See attached AECOM PowerPoint presentation for maps and tables associated with sites referenced below.

LHAAP-46 Plant 2 Area Update – Remedy In Place

Primary contaminant is trichloroethene (TCE) in groundwater with a maximum current concentration of 144 micrograms per liter ($\mu\text{g/L}$), and a clean-up level of 5 $\mu\text{g/L}$. The remedy for the site is MNA and land use controls, so additional wells were installed earlier this year and the initial monitoring round conducted.

Contamination at the site consists of shallow (to ~30' bgs) and intermediate (~30-60' bgs) groundwater zone plumes with a total of 21 wells now being monitored to observe the plumes. Mr. Wacker showed maps of the shallow and intermediate zone groundwater TCE plumes. Quarterly MNA monitoring is in progress. A Remedial Action Completion Report is being generated at this time.

Mr. Fortune asked how long a site will be monitored to determine whether MNA is a suitable remedy. Eight quarters of monitoring are prescribed before enough data is collected to perform an initial evaluation of MNA effectiveness. Mr. Wacker stated that the total estimated duration to complete remediation is stated in the ROD. Mr. Fortune asked when the quarterly monitoring started. Mr. Wacker stated that the remedy for LHAAP-46 has been in place for about a year, and the eight quarters of monitoring needed to judge MNA effectiveness started when the remedy was put in place. Mr. Fortune asked if there was additional data collected from prior to AECOM that could be used in determining whether MNA is working. Mr. Wacker stated that, although older data was used for nature and extent definition prior to implementation of the remedy, the eight quarters of monitoring needed to judge the effectiveness of MNA started when the remedy was implemented.

LHAAP-67 AST Farm – Remedy In Place

This site has TCE concentrations similar to the LHAAP-46 site, but confined to the shallow groundwater zone. MNA and land use controls for TCE in groundwater is the remedy. Additional wells were installed and the initial monitoring round conducted. The total plume size is relatively small, approximately 300 feet by 400 feet.

A Remedial Action Completion Report is being generated at this time, and the annual report will be prepared in August 2014.

LHAAP-18/24 Burning Ground 3 & Unlined Evaporation Pond – Interim Remedy In Place

As background, Mr. Wacker stated that LHAAP-18/24 was the primary waste management area for LHAAP and is the most highly contaminated site at Longhorn. Currently, the interim remedial action in place consists of collection of impacted groundwater from collection trenches (located along down-gradient sides of the site and in hot spots within the site), and routing of collected groundwater to the GWTP for removal of contaminants. Annual sampling of the interceptor collection trenches (ICTs), will be conducted in February.

A significant amount of additional investigation work has been completed at LHAAP-18/24 this year toward completing a revised feasibility study for the site, and additional work is being proposed to collect more information required to support the revised feasibility study. The

additional work relates to defining the extent of DNAPL source material in the former Unlined Evaporation Pond (UEP) area where liquid wastes were disposed on a daily basis during the site's operation.

Mr. Fortune asked for clarification on the UEP versus the INF Pond. Mr. Wacker explained that the UEP was a waste disposal area within the LHAAP-18/24 site. The INF Pond is in different location, not within the LHAAP-18/24 site, where treated water from the GWTP can be stored when water cannot be discharged to Harrison Bayou due to low water flow in the bayou.

LHAAP-35B(37) – Chemical Laboratory – Remedy In Place

This site is the former Chemical Laboratory with shallow groundwater impacted by tetrachloroethylene (PCE) and TCE plumes. LHAAP-35B(37) is also the site of the bioplug demonstration study being conducted by the US Army's Aberdeen Testing Center. The bioplug demonstration study is separate from the remediation specified in the ROD for the site.

If the bioplug approach does not reduce contaminants to acceptable levels during its performance period, the aquifer will be allowed to return to natural conditions and AECOM will begin the monitored natural attenuation remedy as approved in the ROD. AECOM has already installed the MNA monitoring well network specified in the ROD.

LHAAP-50 Former Sump Water Tank – Remedy In Place

LHAAP-50 was the site of a large above-ground water tank that received sump water from across the plant. Issues at the site are perchlorate in soil, and perchlorate and VOCs in groundwater.

Areas of perchlorate-impacted surface soil have been excavated and removed (approximately 183 cubic yards), and disposed at an off-site landfill. Mr. Wacker showed a map defining the excavation area.

To address groundwater, 19 new monitoring wells were installed to support implementation of the approved monitored natural attenuation remedy. An annual report will be prepared to provide an evaluation of the remedy.

LHAAP-58 Shops Area – Remedy In Place

Multiple plant activities that were conducted in this area and could have contributed to contamination at the site (paint shop, laundry, carpentry, etc.). VOCs have impacted groundwater at the site. There are two separate groundwater plumes; "eastern plume" and "western plume", each with their own remediation strategy.

In the center of the east plume, where concentrations are on the order of a few thousand micrograms per liter, In-Situ Bioremediation (ISB) is being completed to more aggressively treat those higher concentration impacts. Approximately 225 gallons of Wil-Clear Plus, a sodium lactate food source for microbes that will degrade VOCs, was injected at each of 12 injection points in the east plume. Injection of the food source was followed by injection of bioaugmentation solution after confirmation that the type of microbes required to degrade the contaminants were not present at the site. This site is subject to quarterly MNA monitoring.

Mr. Wacker reviewed some initial contaminant data from the eastern plume, showing a reduction of PCE and TCE in well 03WW01. However, well 35AWW09 showed an increase of PCE, which is likely due to movement of contaminated water resulting from injection of the food source and bioaugmentation solution. Mr. Wacker used these examples to illustrate why we perform eight quarters of sampling over two years to obtain a better view of the actual performance of the remedy after the immediate effects of fluid injection dissipate.

Mr. Fortune asked what the western plume contaminants were. Mr. Wacker stated that the contaminant is TCE. Mr. Fortune asked what activities were done to create the contamination. Mr. Wacker stated that there were multiple operations in this area that could have caused solvent impacts, including a paint shop.

LHAAP-12 and LHAAP-16 – Remedy In Place (Operation and Maintenance)

Continuing operation and maintenance activities have been performed at these landfill sites.

Annual sampling of wells associated with LHAAP-12 was recently completed. MNA is being reevaluated at LHAAP-12 and there is the possibility some minor additional work may be done (i.e., installation of a new well). The contaminant concentrations at LHAAP-12 are fairly low and Army is working to demonstrate that MNA is reducing contaminant concentrations at the site. This year, MNA effectiveness could not be effectively evaluated because the only contaminated well at the site was dry during the sampling event, and could not be sampled, leaving us without a new data point for the trend analysis.

As an interim measure to prevent impacts to Harrison Bayou, LHAAP-16 has extraction wells collecting water for treatment at the GWTP. The annual sampling of these extraction wells was done in February. An additional round of sampling more wells at LHAAP-16 was done a few months ago, and that data will likely be presented at the next RAB meeting. Mr. Wacker noted that decision on a final remedy for LHAAP-16 has been delayed due to the dispute between Army and USEPA.

CERCLA 5-Year Review Process for Multiple Sites

The 5-Year Review has been performed and the report document is being reviewed by the USEPA. The review included sites with either final or interim remedies in place, such as LHAAP-12 and LHAAP-16 landfill sites, LHAAP-18/24 associated with the GWTP, the Pistol Range and LHAAP-49 Acid Storage Area.

Mr. Wacker explained that a CERCLA 5-Year Review is required every five years for any site that has been closed but not restored to unrestricted use conditions. Sites at Longhorn that are restored to conditions suitable for future industrial use, but not suitable for residential use, require these reviews.

GWTP

The GWTP continues to operate to contain the groundwater plumes at LHAAP-18/24 and LHAAP-16. See attached handout showing treated groundwater volumes and mass of chemicals removed. Treated water is either discharged to Harrison Bayou or released back to the LHAAP-18/24 site.

Mr. Dixon asked if the chemicals removed from groundwater are destroyed or released to the air. Mr. Wacker stated that perchlorate is destroyed by bacterial treatment. Metals are precipitated from the water, resulting in a small amount of sludge that is periodically disposed of at a landfill. VOCs are stripped from the water and discharged to the air, with air discharges being monitored in several locations to ensure Texas air standards are not exceeded. Mr. Wacker pointed out that air samples have been collected from multiple locations for over a year without any Texas air standard being exceeded. Dr. Zeiler stated that the GWTP will be on the Longhorn RAB tour route in May, where the RAB will be provided with a briefing on how the plant works.

Perimeter Well and Surface Water Sampling

Perchlorate sampling is conducted quarterly for groundwater at several locations along the perimeter of the former facility footprint in accordance with the 1999 dispute resolution. Historically, Army voluntarily sampled these wells for a wide variety of chemicals that were used at the plant. Surface water is also sampled for perchlorate at five locations. The latest quarterly data is from the September 2013 sampling event indicated no detections of perchlorate at any of the surface water sampling locations (see attached handout), and no real changes in observations from the monitoring wells.

Upcoming Work, Meetings and Documents

Remedial Action Operation quarterly sampling will continue at LHAAP-46, LHAAP-50, LHAAP-58 and LHAAP-67. Semi-annual compliance sampling will be conducted at LHAAP-18/24 in May. Finalization of the CERCLA 5-Year Review report will be signed this year. Generation of remedial action completion reports for LHAAP-37, LHAAP-46, LHAAP-50, LHAAP-58 and LHAAP-67 is ongoing.

LHAAP-18/24 and LHAAP-29 will have some additional field work completed to install a few wells, and perform some soil sampling associated with the feasibility studies for both the sites. Work on remaining sites will be delayed until resolution of the dispute between Army and USEPA.

Mr. LeTourneau asked who is responsible for abandonment of monitoring wells once they are no longer needed. Dr. Zeiler stated that most wells are maintained for long periods of time, beyond the contract duration of any one consultant, so the Army is responsible for abandonment of wells.

Other Environmental Restoration Issues – Rose Zeiler

Dispute Resolution

Mr. Wacker showed a list of sites where work is being delayed due to the dispute between Army and USEPA over clean-up levels and land use controls. Mr. Mayer explained that USEPA has a dispute process that is followed when they disagree with what another federal agency wants to do with respect to conducting clean-up of sites. Mr. Mayer stated that the Longhorn dispute is being worked at the highest levels in both Army and USEPA, where it is in the hands of the Deputy Assistant Secretary of the Army and the USEPA Administrator.

Mr. Mayer stated that a meeting between Army and USEPA had been planned for next week, but it has now been tentatively rescheduled for April.

Mr. Fortune asked if the dispute will be settled at this meeting. Mr. Mayer stated that the Deputy Assistant Secretary of the Army will present their side of the dispute to the USEPA Administrator during this meeting, and the USEPA Administrator will likely make a decision after that meeting. Dr. Zeiler stated that the Army has an appeal process to follow if the Army does not agree with the USEPA Administrator's decision.

Mr. Britt asked what we are doing to make sure conditions are not degrading while the dispute goes on. Dr. Zeiler stated that we are doing monitoring.

Dr. Zeiler asked AECOM to prepare a slide bulleting the dispute issues for the next RAB meeting.

DNAPL Presentation

Dr. Zeiler provided a basic introduction to Dense Non-Aqueous Phase Liquids, or DNAPLs. DNAPLs are heavier than water, opposed to light non-aqueous phase liquids (LNAPLs) like gasoline or oil which will float on water. Due to their density, DNAPLs will travel down through the subsurface until they hit an aquitard (a layer that impedes its progress, like a clay). The layered sands and clays at Longhorn provide discontinuous "shelves" of limited extent that can be overflowed with DNAPL. (See attached AECOM Powerpoint presentation slides 8 through 10 for an illustration of how DNAPL moves in the subsurface.)

There are areas where DNAPL "pools" in places, but there is also "residual" left behind in cracks and fractures where DNAPL once was in greater quantities. Our biggest challenge is to find it. Whatever treatment is used, it will be to treat that DNAPL where it is. DNAPL is extremely difficult to clean-up. In 2003, well-known contaminant hydrogeologist John Cherry said that a DNAPL residual site had never been remediated to true drinking water standards. Many DNAPL sites have instead been remediated to "alternative clean-up levels" developed and agreed to by regulatory agencies because the technology did not exist to achieve clean-up to drinking water standards. In summary, Ms. Zeiler stated that the best approach is to find the DNAPL and get rid of it, because it is a long-term endeavor to clean-up residual DNAPL left in an aquifer.

For LHAAP-18/24 and LHAAP-29, we will be working to collect additional data to more closely define the volumes of DNAPL we need to treat so we can identify which technology has the best chance of success. Mr. Mayer stated that even dissolved-phase chlorinated solvents are very difficult to remediate because they partition into soil materials and then release into groundwater later. Mr. Mayer further stated that over 100 sites nationwide have been approved for an alternative clean-up level because they have tried various technologies and demonstrated that remediation to the USEPA maximum contaminant level (MCL) is "impracticable".

Mr. LeTourneau asked what depth the contamination is at. Mr. Wacker stated that LHAAP-29 has contaminants at 90 feet below ground surface. The perimeter of the contamination has

been defined horizontally, and we have identified clean groundwater underneath the contamination at 90 feet, but we need to tighten the perimeter to know better how much true volume we are dealing with. Mr. LeTourneau asked how we know contamination will not move from where it is now at 90 feet down to 150 feet or other depths. Dr. Zeiler remarked that is was a primary question, but not one that anyone here could answer, but we do believe the contamination moved quickly to where it is now, in a matter of days or months rather than years. We know where the bottom of the contamination is now, but it could change. An aquitard could stop the travel of the contaminant, but if the aquifer is fractured or discontinuous, it could allow contamination to move deeper.

Mr. Kurz asked whether the work at Longhorn would end up being judged as having diminishing returns at some point, resulting in the government ending funding of remediation work there. Dr. Zeiler responded that Army must continue to fund remediation work at Longhorn until remediation is complete. For funding, Army generates a liability projection every year for their sites as part of the budgeting process, and it projects costs for the next 30 years. Until Army can demonstrate that a clean-up goal will be met, costs will be projected for 30 years out every year.

Dr. Zeiler went on to explain that when a remedial technology reaches a point of “diminishing returns”, you typically to switch to a different method to reach the end goal. Or, using LHAAP-29 as an example, when you find the assumptions made when the remedy was decided were not valid, another option needs to be explored. For LHAAP-29, an additional technology will be evaluated and treatability testing done to ensure options being evaluated are viable. The last resort is to arrive at agreement on an alternative clean-up standard, as has been done at many sites with residual DNAPL impacts similar to LHAAP-18/24, where clean-up to the usual standards is beyond our existing technology.

Mr. Fortune stated that when Longhorn first became an National Priorities List site, the initial estimates given for time and funding to remediate Longhorn were 6-7 years and \$50M dollars to clean-up. Mr. Mayer stated that the estimates done at that time were done before migration of contaminants was well understood, and what has been learned since then that has shown those estimates to be invalid.

Look Ahead at the Schedule

Next RAB meeting is tentatively scheduled for May 15th from 6PM – 7:30PM at the Karnack Community Center.

A motion to adjourn was made by Ms. Fortune and seconded by Mr. Britt.

Adjourn

February Meeting Attachments and Handouts:

- *Meeting Agenda*
- *Minutes from November 2013 RAB meeting*
- *AECOM Powerpoint Presentation*
- *GWTP Treated Groundwater Volumes Handout*
- *Surface Water Sampling Results Handout*

Acronyms

AECOM	AECOM Technical Services, Inc.
bgs	below ground surface
BRAC	Base Realignment and Closure
CERCLA	Comprehensive, Environmental Response, Compensation, and Liability Act
CLI	Caddo Lake Institute
DERP	Defense Environment Response Program
DNAPL	Dense Non-Aqueous Phase Liquid
GWTP	Groundwater Treatment Plant
ICT	interceptor-collector trench
INF	Intermediate-Range Nuclear Forces
ISB	In-Situ Bioremediation
LHAAP	Longhorn Army Ammunition Plant
LNAPL	Light Non-Aqueous Phase Liquid
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
PCE	tetrachloroethylene
RAB	Restoration Advisory Board
ROD	Record of Decision
TAG	Technical Assistance Grant
TCE	trichloroethene
TCEQ	Texas Commission on Environmental Quality
TSDH	Texas State Department of Health
UEP	Unlined Evaporation Pond
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Center
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
µg/L	micrograms per liter
VOC	volatile organic compound