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ADMINISTRATIVE RECORD
COVER SHEET

AR File Number 3264

Kelly Restoration Advisory Board (RAB)

Technical Review Subcommittee (TRS)

Draft Meeting Agenda

June 8, 2004, 6:30 p.m.
Environmental Health & Wellness Center
911 Castroville Road
(formerly Las Palmas Clinic)

I.	**Introduction**	Dr. David Smith
	a. Agenda Review	
	b. Packet Review	
II.	**Semi-Annual Compliance Plan Report**	Mr. ~~Mark Stough~~ Rick Rogers
III.	**Review of PRB data**	Mr. ~~Don Buelter~~ John Blair
IV.	**Presentation on the Zones 2 and 3 Corrective Measures Study (CMS)**	Mr. Ashley Allinder
V.	**Administrative**	
	a. BRAC Cleanup Team (BCT) Update	Ms. Norma Landez
	b. Spill Summary Report	Ms. Brittany Watts
	c. Documents to TRS/RAB	Ms. Brittany Watts
	d. Action Items	Dr. David Smith

VI. Next RAB Meeting
Kennedy High School Auditorium: July 20, 2004, 6:30 p.m.*

VII. Next TRS Meeting
Environmental Health and Wellness Center: August 10, 2004, 6:30 p.m.*

VIII. Adjournment

**Meeting dates and locations are subject to change.*

Restoration Advisory Board (RAB)
Technical Review Subcommittee (TRS) Meeting Minutes
Environmental Health and Wellness Center

June 8, 2004

Attendees:
Mr. Adrian Cortes, RAB Community Representative Alternate
Ms. Gloria Ramos-Cortes, RAB Community Representative Alternate
Mr. Henry Galindo, RAB Community Representative
Mr. Sam Murrah, RAB Community Representative
Mr. Pete Muzquiz, RAB Community Representative
Mr. Rodrigo Garcia, RAB Community Representative
Mr. Nazirite Perez, RAB Community Representative
Mr. Don Buelter, Air Force Real Property Agency (AFRPA)
Mr. John Glass, AFRPA
Mr. Ashley Allinder, AFRPA
Ms. Norma Landez, AFRPA
Ms. Larisa Dawkins, AFRPA
Mr. Gary Martin, Greater Kelly Development Authority (GKDA)
Ms. Kyle Cunningham, Metro Health
Ms. Linda Kaufman, Metro Health
Mr. Gary Miller, U.S. Environmental Protection Agency (EPA)
Mr. Mark Weegar, Texas Commission on Environmental Quality (TCEQ)
Ms. Abigail Power, TCEQ
Mr. Tim Sueltenfuss, Booz Allen Hamilton (Booz Allen)
Ms. Megan Mabee, Booz Allen
Ms. Christine Best, Booz Allen
Ms. Susan Hook, Booz Allen
Ms. Lynn Myrick, Booz Allen
Dr. David Smith, Smith and Associates (Facilitator)
Ms. Brittany Watts, Smith and Associates
Mr. Rick Rogus, CH2M HILL
Ms. Coriene Hannapel
Ms. Allyson Feist
Ms. Amy Pletz
Ms. Robin Campos
Reverend Bee Dee Doublet
Ms. Rose Ramos
Ms. Lupe Rios
Ms. Rebecca Silva
Ms. Diane Alvarez
Ms. Blanca Ridgeway

The meeting began at 6:31 p.m.

Introductions
Dr. David Smith
Dr. Smith introduced himself as the meeting facilitator and welcomed all RAB members and meeting attendees. He stated that the purpose of the TRS meeting is for the RAB to review technical information.

Mr. Nazirite Perez asked if the RAB Charter was going to be discussed. Dr. Smith said it was not on the agenda for this meeting but will be addressed at the July RAB meeting.

Dr. Smith reviewed the meeting agenda and the supplemental packet information.

January 2004 Semiannual Compliance Plan Report
(July–December 2003)
Mr. Rick Rogus
Mr. Rogus introduced himself as a contractor with CH2M HILL and stated that he would be providing a brief review of the compliance plan report data. He said that the purpose of the project was to fulfill the monitoring and reporting requirements of the compliance plan issued by the Texas Commission on Environmental Quality (TCEQ). He stated that his presentation would give an annual "snapshot" of groundwater plumes.

He explained that during the compliance plan breakout, CH2M HILL reviewed 14 Solid Waste Management Units (SWMUs), 4 Resource Conservation and Recovery Act (RCRA)-permitted units, and Leon Creek. They did annual groundwater sampling of the waste management areas and sampled 461 monitoring wells on and off base from April - June 2003. Those samples were analyzed for volatile organic compounds (VOCs), metals, cyanide, pesticides, and polychlorinated biphenyls (PCBs [Zones 1 and 2 only]). He stated that there have been decreases in the magnitude of chlorinated solvents in the source areas and just downgradient of the remedial systems that have shown to be occurring in the following areas: Zone 4 off base, around recovery systems in Zone 2 near Leon Creek, WP022 (E-3) source area, and downgradient of Site SS040 (i.e. Site MP). He added that the VOC concentrations in the shallow groundwater have been reduced over time at E-3 and now remain stable and confined within the recovery system perimeter.

Mr. Rogus explained that Leon Creek is a small, shallow, slow-moving urban stream flowing through western San Antonio. He added that there is a lack of tree cover along the creek that causes high water temperatures. It is also highly susceptible to flash flooding and has become a receptacle for urban runoff. He stated that when they reviewed Leon Creek, they did physical, chemical, and biological assessments. During July 2003 they measured the stream flow in four segments, flow from selected seeps (six), outfalls (five), and surface water elevations at 23 stations. He added that they created sketches and took photographs to document changes in the stream's physical appearance.

In July 2003, CH2M HILL did a chemical assessment of the creek and sampled 31 surface water stations, 28 sediment stations, eight outfalls, and five seeps, and then analyzed the samples for VOCs, semi-volatile organic compounds (SVOCs), metals, cyanide, and pesticides/PCBs. During July 2003, they also conducted the following tests at eight stream stations and three reference stations: chronic toxicity, fish tissue, and an EPA rapid bioassessment.

Mr. Rogus said that the initial screening showed five surface water and 27 sediment contaminants exceeding the Texas Water Quality Standard (TWQS) guidelines, which are conservative, general guidelines. The chronic toxicity results showed potential surface water sediment toxicity at some of the stations. He added that an ecological risk assessment is being conducted to follow up on these results.

Mr. Adrian Cortes asked if he could have a copy of the report. Mr. Rogus replied that the report is four volumes of nearly 1,000 pages. He said the reports are available for the community to review at the San Antonio Central Library and the Environmental Health and Wellness Center (EHWC).

Mr. Cortes asked if oils were dumped at any of the sites like E-3. Ms. Norma Landez replied that oils were managed at the site but were removed along with the soil. She added that the Air Force then dug a pit and installed a containment system in 1994. She said that the plume has shrunk since then.

Ms. Coriene Hannapel asked what is done with the water after the remediation process. She stated that at Carswell AFB in Fort Worth, they found traces of contaminants in the water after treatment. She asked if the Air Force tests the water that is discharged into Leon Creek after it has been cleaned.

Ms. Landez replied that there are wells installed to check the water periodically to ensure that it meets state standards.

Mr. Mark Weegar added that the state monitors what is discharged to Leon Creek. He said they are required to meet discharge permit standards, and are allowed to discharge certain concentrations in Leon Creek.

Mr. Cortes asked if the Air Force is meeting its discharge permit standards. He also asked what is found in the water after it is treated. Mr. Weegar stated that the TCEQ is not so much concerned with what comes out of the groundwater because the goal is to remediate the site and the higher the chemical concentrations in the water, the more efficient the remediation system is.

Mr. John Glass added that the water is governed by the state regulatory permit. He said the Air Force samples monitoring wells to verify that the water is clean. He stated that their goal is to see that the plume shrinks so they can close the site. He added that site E-3 is progressing towards closure as the remediation is working very well there.

Mr. Weegar said that the monitoring wells help define the plume area. He added that there are always higher levels of contamination near source areas. They installed recovery wells to help recover groundwater that is contaminated around those areas along with the remediation systems. He said that the annual reports determine how well the systems work and what can be done to optimize these systems to move faster through the cleanup. He added that they thoroughly check the systems to ensure they are working properly as they are based on modeling. They can be adjusted to work better if needed.

Permeable Reactive Barrier (PRB) Performance Update
Mr. John Glass

Mr. Glass of the Air Force Real Property Agency (AFRPA) introduced himself and stated that he would be reviewing each PRB site and the results to date. He stated that the Zone 5 Plume A PRB was installed to prevent additional off-base migration of plume A and accelerate degradation of the off-base portion of the plume. He said that the chemicals of concern were trichloroethylene (TCE [primary]), 1,2-dichloroethene (DCE), and vinyl chloride (VC). He added that the PRB installation was completed in September of 2002. The plume has retreated, and the PRB is in place to prevent any further contamination. The PRB was 650 feet in length. To date, the off-base portion of the plume is currently below the maximum concentration limits (MCLs).

Mr. Rodrigo Garcia asked if there was any residual contamination that needs to be pumped out of the PRB for maintenance reasons. Mr. Glass replied no.

Mr. Glass stated that the purpose of the Building 301 PRB was to contain the groundwater source there. He added that the chemicals of concern were perchloroethylene (PCE [primary]), TCE, 1,2-DCE, and VC. The PRB installation was completed in late June 2003 with a total length of 690 feet. The first round of samples was collected in December 2003. Nine wells were sampled, and the results indicated low concentrations (or nondetect) of contaminants within the wall. A second round of samples will be collected in June 2004. Those results should be available by the July 20th RAB.

Mr. Glass stated that the purpose of the building 360 PRB was to contain the groundwater source there. The chemicals of concern were PCE (primary), TCE, 1,2-DCE, and VC. He said that the installation of the PRB was completed in March 2004. The PRB was 800 feet in length with a slurry wall of 400 feet. The first round of samples was collected in May 2004 and the results should be available at the July 20th RAB.

Ms. Hannapel stated that she reviewed a report given to her by Mr. Doug Karas that stated the concentration levels at Building 301 had risen. Mr. Glass responded that there are variants in the plume points, and many things can affect the levels as the seasons and water pathways change. He said that the PRBs do not always work 100 percent effectively at first. There are many variables during the sampling periods. He added that the levels are not measured in months, but years. The annual monitoring helps determine if the PRB is working properly.

Mr. Cortes asked what effect the water has on the community. Mr. Glass replied that based on the exposure pathways, there is no effect on the community. Mr. Weegar added that there are worse effects to the community from the cars they drive than this water.

Mr. Glass stated that the purpose of the 34th Street PRB was to prevent co-mingling of the off-base groundwater source with S-1 plume. The chemicals of concern in this area are PCE (primary), TCE, 1,2-DCE, and VC. The installation was completed in April 2004. The PRB is 540 feet in length, with a planned 100-foot extension in late summer 2004. The first rounds of samples are anticipated to be collected in approximately four months.

Mr. Garcia asked about the exposure levels by the community. Mr. Weegar stated that people do not drink this water. He added that there has also been a fishing advisory at Leon Creek warning people not to consume the fish. He said that the Air Force and the state work together hand-in-hand to make sure people are not affected. He concluded that the concentrations of the chemicals in the water do not affect air quality.

Zones 2 and 3 Corrective Measures Study (CMS)
Mr. Ashley Allinder
Mr. Allinder of AFRPA explained that sites were identified through the RCRA Facility Investigation process. The CMS evaluates and recommends soil and groundwater final remediation alternatives. AFRPA has submitted the Draft Final Zones 2 and 3 CMS to the TCEQ and EPA upon completion.

He said the criteria for detailed evaluation of alternatives were the protection of human health and the environment. In order to meet this need, the Air Force had to attain media cleanup standards; control sources of release; comply with applicable standards for management of wastes; view long-term reliability and effectiveness; watch for reduction of toxicity, mobility, or volume; and monitor short-term effectiveness and cost. He said that source removal involves excavation, soil vapor extraction, electrical-resistive heating, bioaugmentation, and soil flushing. Source control involves technologies such as installing a slurry wall, PRB, pump-and-treat system, and vitrification. For the groundwater in Zones 2 and 3, he said they preferred the following controls:

- Building 301 – iron PRB
- Building 360 – iron PRB and slurry wall
- Building 258 – slurry wall and hydraulic containment
- Zones 2 and 3 groundwater plume – iron PRB and slurry wall
  - 940-linear foot PRB
  - 820-linear foot slurry wall

Mr. Allinder said that the Zones 2 and 3 CMS is available for review at the San Antonio Central Library, Kelly Library, and the EHWC. A proposed plan is being developed for the Zones 2 and 3 CMS report, which will provide information regarding the evaluated and preferred alternatives for each site. He added that there will be an information session for the Zones 2 and 3 CMS and Proposed Plan prior to the July 20th RAB meeting. This is a great opportunity to ask questions and provide comments on these documents.

Administrative

BRAC Cleanup Team (BCT) Update
Ms. Norma Landez
Ms. Landez stated that there was not a BCT meeting this month. However, there will be one in July, and those details will be reported at the July RAB meeting.

Spill Summary Report
Ms. Brittany Watts
Ms. Watts stated that there were no spills to report.

Documents submitted to the TRS
Ms. Watts
Ms. Watts stated that there were many documents submitted and a list was provided in the RAB member packets.

Action Items
Dr. Smith
Dr. Smith reviewed the action items from the December 2003 TRS meeting:

- **Provide copies of Texas Department of Health's Leon Creek fishing advisory report to RAB members.**
  Copies of this report are provided under the project update tab of RAB member binders.

- **Kelly to verify that Site OT-1 Air Emissions information has been reported to the Agency for Toxic Substances and Disease Registry (ATSDR).**
  The Air Force has not been able to verify that ATSDR received a copy of the report; however, the Air Force provided ATSDR with all the documents that it had concerning past air emissions. A final exhaustive list of all references utilized by ATSDR will accompany the Final Past Air Emissions Report.

- **Provide listing of Interstate Technology and Regulatory Council (ITRC) technical training available for consideration as RAB/TRS training.**
  Copies of this list are provided under the project update tab in RAB member binders.

- **Provide updates on natural attenuation.**
  The Air Force will continue to provide updates on the environmental cleanup at Kelly.

- **Provide copies of 2004 Annual Work Plan to RAB members for the development of future Technical Assistance for Public Participation (TAPP) funding requests.**
  Copies of this plan are provided under the project update tab in RAB member binders.

There were no action items resulting from the June meeting.

Dr. Smith announced that the next RAB meeting was scheduled for July 20, 2004, at Kennedy High School Auditorium at 6:30 p.m. He also stated that the next TRS meeting was scheduled for August 10, 2004, at the EHWC.

The meeting adjourned at 8:32 p.m.

Attached are copies of the November and December 2003 TRS meeting minutes for your review. These minutes will not be voted on for approval until the installation of a TRS Chair.

November 12, 2003
Technical Review Subcommittee (TRS)
of the Kelly Restoration Advisory Board (RAB)
Meeting Minutes

Meeting Attendees:
Dr. Gene Lené, RAB Community Representative
Mr. Sam Murrah, RAB Community Representative
Mr. Rodrigo Garcia, RAB Community Representative
Mr. Daniel Gonzales, RAB Community Representative
Mr. Armando Quintanilla, RAB Community Alternate
Mr. William Ryan, Air Force Real Property Agency (AFRPA)
Ms. Larisa Dawkins, AFRPA
Mr. Gary Martin, Greater Kelly Development Authority (GKDA)
Ms. Kyle Cunningham, San Antonio Metropolitan Health District (SAMHD)
Mr. Gary Miller, Environmental Protection Agency (EPA)
Ms. Abigail Power, Texas Commission on Environmental Quality (TCEQ)
Mr. Paul Flaningan, Boeing Communications Representative
Ms. Robyn Thompson, Booz Allen Hamilton (Booz Allen)
Mr. Tim Sueltenfuss, Booz Allen
Ms. Megan Mabee, Booz Allen
Ms. Susan Hook, Booz Allen
Mr. Scott Courtney, Booz Allen
Dr. David Smith, Smith and Associates (Facilitator)
Ms. Brittany Watts, Smith and Associates
Mr. Randy Alvarez
Ms. Crystal Gomez
Ms. Jill Johnston
Mr. Shawn Duffy
Ms. Elizabeth Gomez
Ms. Rachel Lumsdon
Ms. Martha Cave
Mr. Juan Reyes
Ms. Hilary Ramos
Mr. Bill Heasy
Mr. Jslu Siberl

The meeting began at 6:33 p.m.

Welcome and Introductions
Dr. David Smith
Dr. Smith introduced himself as the facilitator and welcomed all the RAB members and meeting attendees. He conducted a review of the meeting agenda and supplemental packets. He stated that Mr. Scott Courtney would be presenting the Palm Heights Permeable Reactive Barrier (PRB) update for Mr. Walt Peck, and Mr. Gary Martin and Mr. William Ryan would be giving the Building 361 update for Mr. Jack Shipman. (Mr. Peck and Mr. Shipman were unable to attend the meeting.)

Discuss Election of TRS Chair
Dr. David Smith
Dr. Smith explained that several RAB members had voiced concerns about the election process at the September TRS meeting. The main concern was that some felt that the voting was not handled appropriately and should be re-approached. He added that no formal voting guidelines for subcommittees had been established by the RAB charter, and stated the Executive Committee would review the process and discuss how to handle it for future elections. He noted that Mr. Buddy Pletz would remain the Chair, with the aid of Mr. Rodrigo Garcia, until after RAB elections in January; at that time, the RAB plans to have established new guidelines and plans to conduct new elections at the February TRS.

Mr. Armando Quintanilla asked if it was the job of the RAB members present at the TRS to appoint the TRS co-chair. Dr. Smith replied that it is the job of the TRS members to elect the co-chair, and the RAB Executive Committee was going to develop guidelines to conduct elections in the future. Dr. Gene Lené asked if any RAB member could be a TRS member and if the TRS appointed its own chair. Dr. Smith answered that, to his understanding, any RAB member could serve as a member of the TRS, and those participants are voting members at the TRS elections.

Building 361 Update
Mr. Gary Martin
Mr. Martin explained that ten employees had come forward and volunteered to be tested for radium exposure; he expected three more volunteers by the end of the week. The Greater Kelly Development Authority (GKDA) took seven urine samples and sent them to the lab. Those results should be back sometime after the Thanksgiving holidays. He explained that Boeing and the Air Force had conducted separate environmental tests, and all excavated soil was located and tested. The Texas Department of Health (TDH) used a radium detector when testing the soil and found nothing alarming. Boeing collected two samples and the results should be available next week.

Mr. William Ryan said there will continue to be a lot of construction at KellyUSA to further the redevelopment efforts. He added that the Air Force continues to work closely with Mr. Martin and GKDA to coordinate plans of excavation and digging. Mr. Ryan noted that the Air Force wants to be actively involved in the process early on and is currently looking at ways to improve the communication process between all parties. The Air Force and GKDA are trying to create this process quickly. They are also developing a plan to close this site, as all parties are anxious to complete the project at Building 361.

Mr. Garcia asked if the Building 361 hangar was still shut down. Mr. Martin said yes, and provided radium and radon fact sheets for the TRS to review. Mr. Garcia said he was concerned and wants the polychlorinated biphenyls (PCB's) and radium issues to be ongoing agenda items. Mr. Martin said that radon and radium are naturally-occurring substances. The soil sample results should be available next week or the following week and GKDA will assess any health and safety dangers. Mr. Dan Gonzales asked about the pre-bid process, stating that maybe GKDA and the Air Force need to emphasize steps more clearly to the contractors coming in to avoid this in the future. He stated that there should be a penalty for contractors who do not follow certain steps. Mr. Martin replied the problem was not with the contractor but with the

information exchanged between the contractor and the Air Force. He continued by stating that there is now an improved communications process and they will ensure that the right people see the right documents at the right time. The Air Force and GKDA are scheduled to meet every Monday morning from now on to discuss construction projects.

Mr. Quintanilla asked if Radium 266 was found at Building 361 and if the half life of Radium is 6.7 years. Mr. Martin said it is more like 1600 years. Mr. Quintanilla then asked if the area was to be cleaned up under CERCLA. He stated that if Kelly is a Superfund site, then the work should be done under CERCLA. Mr. Ryan replied the Air Force has a Radioisotope Committee that will oversee any remediation at the site. Mr. Quintanilla questioned if people at Brooks had looked at it yet and whether the groundwater had been tested. Mr. Ryan said yes. Mr. Quintanilla then asked if it had higher levels of radioactivity. Mr. Ryan said they do not know at this point. Mr. Quintanilla inquired about the Environmental Protection Agency's (EPA) role in this. Mr. Gary Miller, the EPA representative, said that TCEQ is overseeing what is happening at Building 361. However, EPA will eventually have to review the plans, as they are required to sign off when the land is transferred. Mr. Quintanilla said he wanted to see a comparison of the radioactivity data with San Antonio Water System (SAWS) and Bexar Metropolitan Water District data.

Mr. Ryan explained that the PCB issue is being monitored by Lackland Air Force Base. Mr. Garcia stated that the Leon Creek area was Kelly's responsibility before it became a Lackland problem and that Kelly should continue to review it. Mr. Quintanilla said Congressman Rodriguez's staff is looking into the PCB issue. Dr. Smith reviewed the proposed action items from this discussion.

Palm Heights Permeable Reactive Barrier (PRB) Update
Mr. Scott Courtney

Mr. Courtney introduced himself and stated that he has worked as a hydrogeologist with Booz Allen Hamilton (Booz Allen) for the last six years on the groundwater cleanup team. He explained that for the past 6–8 years they have conducted soil and groundwater investigations in Zone 4. The Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI), submitted to TCEQ and EPA, reported the results of the soil and groundwater investigation. Following this, the Air Force completed the Corrective Measures Study (CMS), which evaluated the technologies and determined which ones best fit the site. A combination of remedial approaches was recommended and narrowed down to the preferred alternatives. For Palm Heights, the AFRPA proposed to install PRBs to intercept the groundwater contamination. There are two areas of groundwater contamination along the Union Pacific Railroad (UPRR) line, and the Air Force has installed monitoring wells there. Two PRBs are planned, one 1,000 and the other 500 feet in length. The contractors will drill wells and inject a mixture of iron filings and gel using a high-pressure injection technique.

Mr. Courtney added that once wells have been installed, the PRB and wells will not be noticeable to the community. Mr. Quintanilla inquired about the cost of the project. Mr. Courtney said it will cost approximately $4 million for construction. Mr. Quintanilla asked the start dates. Mr. Courtney replied the AFRPA is planning to begin construction in early 2004, and the entire process should take a few months. Mr. Quintanilla then asked how often the monitoring wells are checked. Mr. Courtney said they had already collected the first round of samples. He added that once the PRB was installed, another round of samples would be collected. An annual monitoring program will take place that is consistent with regulatory

requirements. Mr. Quintanilla stated his concern about what the Air Force is looking for. Mr. Courtney said the contaminants of concern are tetrachloroethene (PCE), trichloroethene (TCE), dichloroethene (DCE), and vinyl chloride (VC). Mr. Quintanilla asked what streets were in the area. Mr. Courtney stated there are no streets along the UPRR line where this project is taking place. Mr. Quintanilla then asked how the Air Force is handling deed restrictions. Mr. Courtney replied that the Air Force is working access agreements with the railroad. Mr. Garcia asked if this meant they would not have to deal with residents. Mr. Courtney replied this was right.

Mr. Garcia asked what happens if the iron filings become dirty and need to be changed out. Mr. Courtney said there are techniques to rejuvenate the PRB, but that this will not likely be necessary. Mr. Quintanilla asked how long it would take to clean up the area. Mr. Courtney said the PRBs will address plumes coming from off-base sources and will not treat the source area. Mr. Sam Murrah asked how they identify the sources. Mr. Courtney replied there are ongoing investigations at the present.

Administrative
BRAC Cleanup Team (BCT) Update
William Ryan
Mr. Ryan gave a Building 361 update. He said the Air Force is in the process of responding to comments from TCEQ on the Zone 3 RFI. In the new fiscal year the Air Force has new goals for property transfers and expects to transfer 200 acres to GKDA by the end of September 2004. The Air Force will determine whether the parcels are suitable for transfer and are trying to transfer properties to GKDA as quickly as possible that do not have restrictions associated with them. Properties with restrictions are more difficult to transfer. Mr. Quintanilla asked if there were any restrictions for the 200 acres. Mr. Ryan said none had been identified. He stated that they have already transferred a new administrative building at 145 Duncan. The 200 acres include Lindberg Park, the Non-commissioned Officers (NCO) club, the base clinic, the terminal area, and Bungalow Colony (a historical district).

Mr. Sam Murrah asked how the Air Force knows what is contaminated. Mr. Ryan replied there are 1400 wells that determine where groundwater is and where it is moving. The Air Force must demonstrate to EPA that the parcel will not be affected. He said all property will be transferred eventually. Mr. Ryan said the Air Force will provide EPA with a history of data from the wells that have been monitored for some time.

Ms. Kyle Cunningham asked to move the minutes up on the agenda for approval as she had to leave early.

Approval of Minutes from Previous Meeting
Dr. David Smith
Ms. Cunningham asked to change a comment on page five. She stated that air monitoring will be conducted on a real-time basis. Mr. Quintanilla said the spelling on page five for the Quintana Road project needed to be changed. Mr. Murrah asked to change his title in the attendee's portion of the minutes. Minutes were approved as corrected.

Spill Summary Report
Ms. Brittany Watts
There was one spill to report. Ms. Watts explained that a vehicle caught fire while being jump-started. The resulting fire melted the battery and radiator hose, which caused a release of battery

acid and radiator fluid. The spill was contained and cleaned up. The waste is being characterized for disposal. A courtesy notification was made to TCEQ.

Documents to TRS/RAB
Ms. Brittany Watts
Ms. Watts had two documents to be submitted.

- 240B Six Sites Closure Investigation Report for Zone 2 (Revised Section 7, Site CS-2)
- 581A Closure Report for Yard S-01 (DRMO SWMU 018) and Yard U (DRMO SWMU 016)

Mr. Quintanilla expressed his desire to be briefed on submitted reports. Dr. Smith asked if the TRS should put a process in place to review the documents. Ms. Cunningham explained that the reports are available to the community at the Environmental Health and Wellness Center (EHWC) Library. Mr. Quintanilla stated it is the job of the TRS to review the reports. Ms. Cunningham said that Ms. Linda Kaufman at the center would be able to host a group or allow people to come individually to review them. Mr. Garcia said he wants an executive summary of the reports provided to the RAB in their material packets. Dr. Lené asked if any of the reports have executive summaries. Mr. Ryan replied that some do, while others contain only data.

Action Items from Previous Meeting
Ms. Brittany Watts
Ms. Watts explained that the action item from the last meeting was postponed to the December TRS due to scheduling conflicts.

Action Items from Present Meeting

- Compare radioactivity levels in Building 361 groundwater to Edwards Aquifer wells/SAWs data. Mr. Armando Quintanilla motion, Mr. Rodrigo Garcia seconded. The motion was approved.
- Continue to report on radium issue at future meetings.
  Mr. Garcia made the motion, Mr. Quintanilla seconded. The motion was approved.
- Continue to report PCBs issues at Leon Creek
  Mr. Gonzales made the motion; Mr. Quintanilla and Mr. Garcia seconded. Dr. Lené and Mr. Murrah expressed concern that this issue is related to Lackland and the Lackland Community Council on Restoration is the forum for discussion on this topic. Ms. Abigail Power stated that there are environmental professionals at Lackland who deal with the Leon Creek PCB questions. Mr. Quintanilla said the meetings are not publicized. Ms. Power replied that the meetings are publicized in area surrounding Lackland and in local papers. At the last TRS, the meeting was announced, and the Booz Allen staff sent notices reminding the RAB to go if interested. She also stated that the next Lackland CCR meeting will be held January 21, 2004 at 7:00 p.m. at Valley High Middle School. Dr. Lené said this issue was taking away time from issues the Kelly RAB should handle. Mr. Gonzales asked if the CCR would forward their meeting minutes to the TRS to incorporate in materials packets. Ms. Power said they could put in a request for this. The motion was approved three votes to two.
- Status report of Technical Assistance for Public Participation (TAPP) funding, overview of TAPP program, and listing of past TAPP projects.
  All were in favor.
- Liquid incinerator report review.

- Invite Texas Department of Health (TDH) to present findings of fish study in Leon Creek where a health advisory was issued (and for the Agency for Toxic Substances and Disease Registry to review study).

Other topics discussed for future meetings

- Provide executive summaries of submitted reports for review.
- Provide list of Lackland CCR meetings and a copy of meeting minutes.
- Ms. Power requested that photocopied material be duplexed.

Mr. Quintanilla stated that he favored the seating setup at this meeting and asked that we change it at the meetings at the EHWC to reflect this new style.

Additional Comments

Dr. Smith thanked everyone for coming and reminded them of the upcoming meetings. The next TRS is scheduled for December 9, 2003 at the EHWC. The next RAB is scheduled for January 20, 2004 when new RAB members will be elected. He added that application packets were on the sign-in table for those might be interested. He also asked that the TRS members return their nametags.

The meeting adjourned at 7:45 p.m.

December 9, 2003
Technical Review Subcommittee (TRS)
of the Kelly Restoration Advisory Board (RAB)
Meeting Minutes

Meeting Attendees
Dr. Gene Lené, RAB Community Representative
Mr. Sam Murrah, RAB Community Representative
Mr. Ruben Peña, RAB Community Co-Chair
Mr. George Rice, RAB Community Representative
Mr. Nazarite Perez, RAB Community Representative
Mr. Armando Quintanilla, RAB Community Alternate
Mr. William Ryan, Air Force Real Property Agency (AFRPA)
Mr. Doug Karas, AFRPA
Ms. Larisa Dawkins, AFRPA
Ms. Linda Kauffman, San Antonio Metropolitan Health District (SAMHD)
Mr. Gary Miller, Environmental Protection Agency (EPA)
Ms. Abigail Power, Texas Commission on Environmental Quality (TCEQ)
Mr. Mark Weeger, TCEQ
Ms. Ellie Wehne, TCEQ
Mr. Michael Tennant, Texas Department of Health (TDH)
Mr. Kirk Wiles, TDH
Ms. Jerry Ward, TDH
Ms. Robyn Thompson, Booz Allen Hamilton (Booz Allen)
Mr. Scott Courtney, Booz Allen
Ms. Megan Mabee, Booz Allen
Ms. Susan Hook, Booz Allen
Ms. Brittany Watts, Smith and Associates
Dr. David Smith, Smith and Associates (Facilitator)

The meeting began at 6:34 p.m.

Welcome and Introductions
Dr. David Smith
Mr. Ruben Peña convened the meeting in the absence of the TRS chair, Mr. Buddy Pletz. Dr. Smith introduced himself as the meeting facilitator and welcomed all RAB members and meeting attendees. He conducted a review of the meeting agenda and pointed out that Mr. Scott Courtney would be presenting the Building 361 update for Mr. Ryan, and the item was moved up on the agenda as Mr. Courtney had to leave early. The approval of the meeting minutes was also moved to the beginning of the meeting agenda, due to a decision made at the November Executive Committee meeting.

Mr. Peña made a motion to approve the minutes from the October 2003 TRS meeting. Dr. Gene Lené and Mr. Sam Murrah seconded the motion. The meeting minutes were approved.

Building 361 Update
Mr. Scott Courtney
Mr. Courtney explained that his presentation was added to the agenda in response to Mr. Armando Quintanilla's questions about the groundwater data during the November TRS meeting presentation on Building 361. Mr. Courtney presented a PowerPoint briefing and pointed out the difference between the shallow groundwater and Edwards Aquifer data available. He explained the San Antonio Water System (SAWS) and Bexar Metropolitan Water District (BMWD) data, stating that the Edwards Aquifer samples are collected at the points of entry into the distribution system. In contrast, he stated that shallow groundwater samples are collected from monitoring wells as a grab sample, and added that the procedure for gathering water quality data is to sample the water first, and then to dry out the sample well and test the remaining sediment. He also clarified that the water sampling data was collected during the Building 326 investigation, not the Building 361 investigation, as some members had thought.

While difficult to compare, concentrations in both aquifers are very low and do not present a risk to public health.

Mr. Sam Murrah asked Mr. Courtney to clarify the term "soil concentrations" used to describe environmental conditions at Buildings 326 and 361. Mr. Courtney said that "concentrations" in this case means contaminant levels. Mr. George Rice asked if 4.7 is an average number for SAWS data. Mr. Courtney said he was not sure, and explained that the data is from an annual report and there are no descriptions on the Web site of how the data was reported. He added that the information is available to the public, and encouraged those with questions to see him after the meeting for the contact information.

Mr. Rice stated that the quality of the shallow groundwater from Edwards Aquifer used to be very good. He said many San Antonio households received their water from this source. Mr. Courtney said he was sure Mr. Rice was right, but due to urban sprawl, the water quality has been significantly degraded.

Texas Department of Health (TDH) Report of Leon Creek Fish Study
Mr. Michael Tennant
Mr. Michael Tennant introduced himself as a TDH Seafood Safety Division (SSD) representative, and introduced his colleagues, Mr. Kirk Wiles and Ms. Jerry Ward from the Austin SSD and the TDH Department of Toxicology. Mr. Tennant pointed out three sample sites in Leon Creek where 22 fish were collected. He explained that all metals found there were detected below human health concern levels. Mr. Murrah asked him to clarify whether polychlorinated biphenyls (PCBs) were detected at levels to warrant concern about human health risks. Mr. Tennant confirmed that they were; at Site 3, there were three of four species of fish containing PCBs above the human health concern level.

Mr. Tennant explained that they look at cancer risks and systemic risks associated with their sample findings. He said that at Site 2, next to Lackland Air Force Base property, there is a hazard quotient for PCBs associated with systemic risk concerns. He said no one should consume fish from Site 2, and that TDH issued a fish consumption advisory to inform the community of this. He said TDH should collect samples of additional fish species and continue to monitor fish from Leon Creek.

Mr. Mark Weegar asked if carp suckers and gar are species of fish that are typically consumed. Mr. Tennant replied that these species are not commonly consumed, but might be consumed in lower income families. Ms. Ward added that some large-mouthed bass sampled tested positive for PCBs, which raised concerns. She added that though carp and gar are not often consumed, large-mouthed bass typically are, and this was a reason to alert the public that contaminant levels were of concern.

Mr. George Rice asked why there are different contamination concentrations at different sites. Mr. Tennant replied that fish do not always move freely, as they get concentrated in certain areas when the water levels are low, and this may affect the contaminant levels found in the fish. Mr. Murrah stated that when the creek runs properly, the fish travel upstream. Mr. Tennant agreed with him. Mr. Nazarite Perez mentioned that a few months ago at another TRS meeting, someone said there was no risk posed by eating the fish. Ms. Abbi Power clarified this statement by saying that Mr. Ed Roberson, the Lackland Environmental Chief, came to that meeting and spoke about the area of the creek on Lackland property. She stated that the primary site of concern is located on Lackland AFB, and has very limited access. Mr. Tennant reiterated that the advisory included areas outside of Lackland AFB, and fish should not be consumed from the areas of the creek from Highway 90 to Military Drive.

Mr. Quintanilla asked what is being done to remove the PCBs on the Air Force property. Mr. Tennant replied that this question would be better posed to the appropriate Air Force personnel. Mr. Quintanilla stated he recommends removing the PCBs. Mr. Tennant replied that it is very hard to remove PCBs, as they have a long lifespan. Ms. Powers asked if there are other bodies of water contaminated by PCBs. Mr. Tennant said that Mountain Creek Lake near Austin has had a consumption ban since 1996. He said there was a slight decline in the PCB levels since that time; however, there is still a ban. Ms. Ward said that at one time it was legal to dump substances in these waters. It is often hard to pinpoint the source of the PCBs, she explained, and the contamination is therefore hard to remediate. Ms. Powers asked if there were other bodies of water besides military sites contaminated with PCBs. Ms. Ward stated that there were multiple bodies of water in the state of Texas contaminated by PCBs.

Mr. Rice requested a copy of the TDH presentation. Mr. Quintanilla asked if TDH is done with the cleanup efforts. Mr. Kirk Wiles said that the Air Force is the agency responsible for environmental cleanup of the areas in question.

Mr. Peña asked how many signs had been posted in the advisory area, and if they were bilingual. Mr. Tennant explained that the Air Force is responsible for posting the signs and translating them into Spanish on Lackland AFB. Mr. Peña asked if TDH had any idea of the fish population. Mr. Tennant replied that there are ample fish species and fish populations, but that the sample size collected for this study was very small. Mr. Peña asked why there is not a barrier to prohibit people from fishing under the Highway 90 bridge. He added that some people in this area do not read English, or read at all.

Mr. Peña said he has seen people on nice days out fishing in these areas. He asked if they ate the fish they caught, would they be at risk. Mr. Tennant said they may be if they consumed contaminated fish over many years. He added that the advisory is meant to stop exposures for people in the area. He asked that anyone who sees or hears of fishing in this area send the

information to TDH. Ms. Powers asked if there is a difference between an advisory and a ban. Mr. Tennant replied that unlike a ban, an advisory cannot legally keep people from fishing.

Mr. Ryan asked who is responsible for putting the signage on the land that does not belong to the Air Force. No one at the meeting could provide an answer. Ms. Linda Kaufman of SAMHD said she will revisit this issue with health department. Mr. Quintanilla stated that he knows families that fish under the bridge near Military Drive and asked TDH to contact them. Mr. Tennant asked everyone to please spread the word that fish from the creek adjacent to the golf course have been found to have high levels of PCBs. Mr. Weeger reiterated that the fish of most concern were on Air Force property adjacent to the golf course, and people cannot enter that property without appropriate permission.

Mr. Ryan asked Mr. Tennant if he had been invited to speak to the Community Council on Restoration (CCR) at Lackland. Mr. Tennant replied that he had not. Mr. Quintanilla then asked if the Agency for Toxic Substances and Disease Registry (ATSDR) was aware of the advisory. Mr. Tennant replied that ATSDR was familiar with the issue, as the agency works closely with TDH. Mr. Weeger added that the Texas Commission on Environmental Quality (TCEQ) is also conducting an ecological risk assessment.

Mr. Quintanilla asked that all RAB members receive a copy of the TDH presentation. Mr. Rice made the motion, Mr. Perez seconded.

ATSDR Process Update
Ms. Larisa Dawkins

Ms. Dawkins said that she understood that TRS members were concerned with the status of the ATSDR past air emissions report. She explained that the ATSDR has submitted the document for an external review process. Ms. Dawkins stated that the Southwest Workers Union (SWU) requested that all publications be translated into Spanish, which will prolong the process of releasing the document. She said the comments from the community comment period (60-90 days) will be addressed by ATSDR and appended to the final report, and then the document will go through another review process to ensure the Spanish translation is accurate. She added that the report should be ready some time next year.

Mr. Karas asked if Mr. Quintanilla had additional information from ATSDR about the release of the report. Mr. Quintanilla replied that he heard the document was to be released in spring 2004. Ms. Dawkins stated that ATSDR works hard to ensure the accuracy of the report before its release.

Liquid Incinerator Report
Mr. William Ryan

Mr. Ryan stated that there was a motion at the last meeting for a briefing on one of the reports submitted to the TRS library. He explained that the liquid incinerator report was a compilation of numerous studies. He handed out a map showing the location of Site OT-1, which housed a liquid waste incinerator used from 1977-82. Mr. Ryan stated that site investigations conducted from 1990-99 revealed concentrations of semivolatile organics.

Mr. Quintanilla asked if emissions data was presented to ATSDR. Mr. Ryan said he would confirm that appropriate emissions data was reported; if it was not reported, he would send it to

ATSDR. Mr. Quintanilla added that he wants to know about the 43 unpermitted sites with emissions. Mr. Ryan asked if he had a title of the report where he got that information. Mr. Quintanilla said he had it written in his notes that it had been documented in a previous report, but could not recall the name of the report. Mr. Ryan stated that the Air Force has provided ATSDR with all of the data they have requested to date on this subject.

Technical Assistance for Public Participation (TAPP) Funding Status Report
Mr. Doug Karas

Mr. Karas gave an overview of the TAPP program. He outlined what TAPP grants can and cannot be used for. He gave a summary of previous and current Kelly TAPP projects. He said waivers can be requested for additional funding, but must be approved by the Air Force. He stated that there is approximately $9,000 remaining for Kelly TAPP funding. He added that if the TRS wants to request a waiver for additional funding, they need to identify specific projects requiring further TAPP review. Mr. Weeger asked what the timeline is for getting the waiver request. Mr. Karas replied that the sooner the project is identified, the sooner the money is received. Mr. Quintanilla asked about technical training. Mr. Karas said that the TRS needs to identify the type of training and discuss it with the RAB members. Mr. Quintanilla asked if they could use the money to send RAB members to The University of Arizona to hear a Permeable Reactive Barrier (PRB) update from experts. Mr. Karas said the policy is to bring experts to San Antonio to speak with the whole RAB. Mr. Weeger said that the Instructional Technology Resource Center (ITRC) gave training to RAB members a year and a half ago. Mr. Quintanilla said he wants a technology overview given to the RAB, to explain how new technologies might expedite the cleanup process. Mr. Weeger said that ITRC does interactive training, and RAB members should look on the ITRC Web site to identify training courses that might be of interest. Mr. Quintanilla requested that the identification of technical training become an action item. Mr. Ryan added that ITRC has a schedule for Web-based training, and would look into the Air Force bringing the information to the next RAB meeting. Mr. Rice said he wants updates on monitored natural attenuation, and how it works. Mr. Karas asked if Mr. Rice would be willing to give a presentation to the RAB on it. Mr. Rice said it may take a while to prepare, but he will consider it.

Mr. Weeger stated that members could look at the EPA Web site for information on Superfund sites. He stated that the best use of RAB funds is at the onset of a project when they are deciding on a technology. Mr. Karas said he can provide information on projects coming up for next year, and what documents will be presented. Mr. Ryan added that the Air Force provides lists each month to the RAB of the environmental cleanup documents generated Mr. Weeger said that TCEQ just received the 2004 Annual Work Plan from the Air force. He added that this would be a good place to start identifying other documents to review.

Administrative
BRAC Cleanup Team (BCT) Update
William Ryan

There was no BCT this month.

Spill Summary Report
Brittany Watts

There were no spills to report.

Documents to TRS/RAB
Brittany Watts
There was one document submitted:

- *241B Closure Report-Fire Control Training Area FC-2, Zone 2, Former KAFB November 2003*

Action Items from previous meeting
Brittany Watts
All actions items from the previous meeting were completed as requested.

TRS Action Items from current meeting

- Provide copies of TDH Leon Creek fishing advisory report to RAB members
- Kelly to verify that Site OT-1 Air Emissions information has been reported to ATSDR
- Provide listing of ITRC technical training available for consideration as RAB/TRS training.
- Provide natural attenuation outcome studies/status report (EPA/ITRC)
- Provide copies of 2004 Annual Work Plan to RAB members for the development of future TAPP funding requests.

Additional Comments
The next RAB meeting is scheduled for Tuesday, January 20, 2004, at 6:30 p.m., at the Kennedy High School Auditorium. New RAB members will be appointed during this meeting.

The next TRS meeting is scheduled for February 10, 2004, at 6:30 p.m., at the Environmental Health and Wellness Center.

Dr. Smith encouraged everyone to pass along RAB applications to people they know.
Mr. Quintanilla stated that the TRS should review all documents submitted to the TRS library.
Ms. Watts explained that as requested, the executive summaries from each report are placed in the supplemental packets for the TRS to review.

The meeting adjourned at 8:27 p.m.

January 2004 Semiannual Compliance Plan Report (July-December 2003)

Report Summary

Presentation to the TRS
June 8, 2004

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Project Scope

- Fulfill the monitoring and reporting requirements of the Compliance Plan issued by the TCEQ.
- Provide an annual "snapshot" of groundwater plumes.

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Compliance Monitoring Breakout

- 14 Waste Management Areas (SWMUs)
- 4 RCRA-permitted units
- Leon Creek

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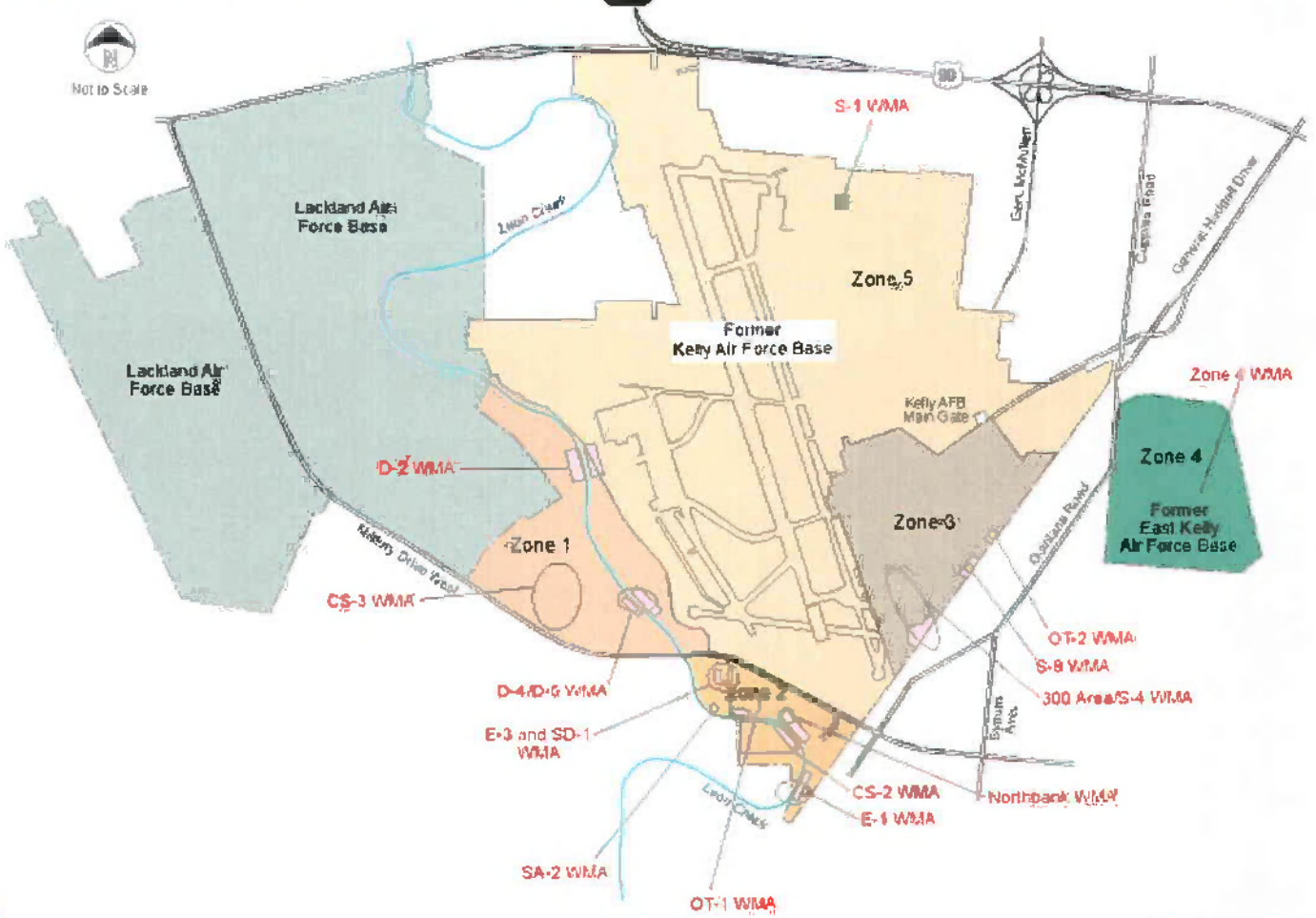
Waste Management Areas



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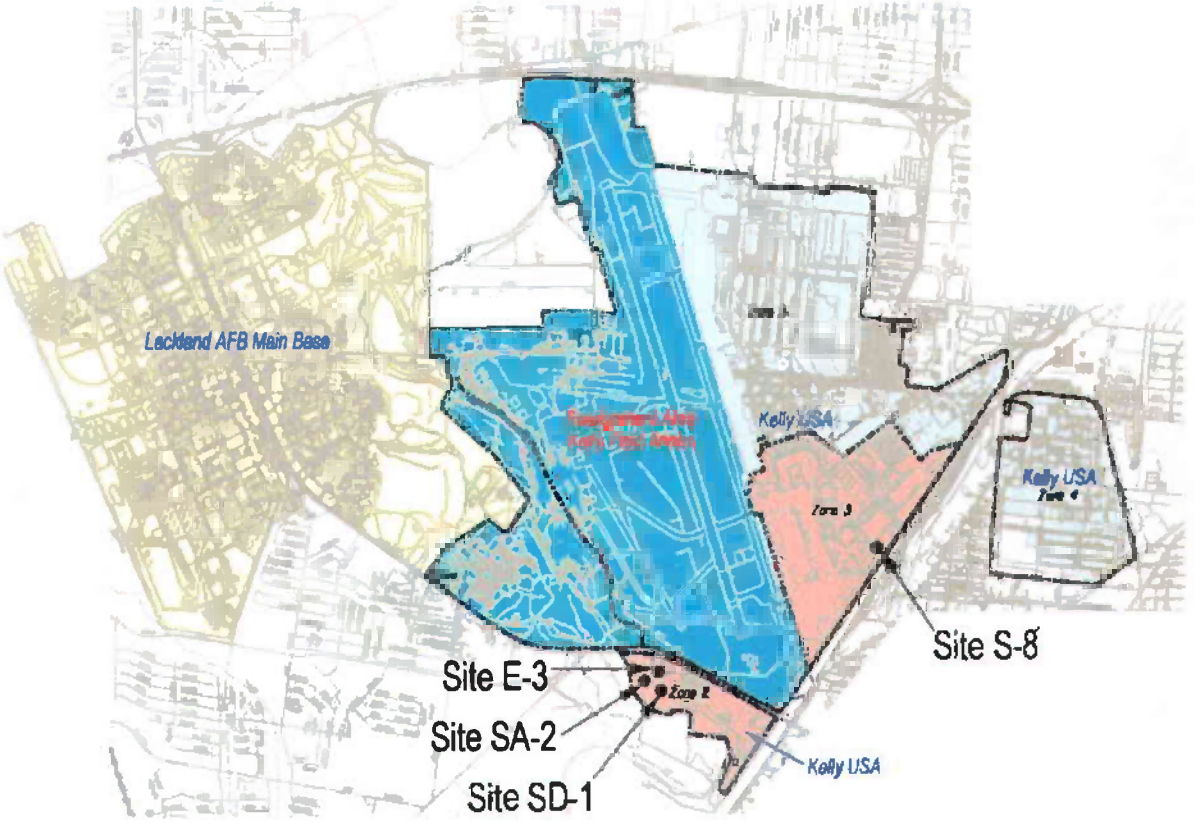
4 RCRA-Regulated Units



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Sampling/Monitoring

- Annual GW sampling of Waste Management Areas. (Apr - June 03)
- Semi-annual GW sampling of four RCRA-regulated units (SA-2, SD-1, E-3, S-8). (July 03)
- Semi-annual GW level measurements. (Sept 03)
- Annual biological sampling of Leon Creek. (July 03)
- Semi-annual surface water/sediment sampling of Leon Creek. (July 03)

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Annual WMA Sampling

- Sampled 461 monitoring wells on and off-base during April – June 2003.
- Samples analyzed for VOCs, SVOCs (in the CP-wells), metals, cyanide, pesticides/PCBs (Zones 1&2 only).

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2003 Results for the Annual Sampling

- Decreases in the magnitude of chlorinated solvents in the source areas and just downgradient of the remedial systems has been shown to be occurring in the following areas:
  - Zone 4 off-base
  - Around recovery systems in Zone 2 near Leon Creek
  - WP022 (E-3) Source area - remaining steady
  - Downgradient of Site SS040 (MP)

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Annual Sampling Frequency of Detection/Max

VOCs	2002	2003
PCE	4,710 ug/L (62%)	1,990 ug/L (60%)
TCE	1,250 ug/L (70%)	23,500 ug/L (70%)
DCE	581,000 ug/L (74%)	1,820 ug/L (75%)
VC	23,600 ug/L (27%)	3,510 ug/L (22%)

SVOCs, Pesticides and PCBs were not detected in ~ 98% - 99% of the samples

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Semi-annual Sampling of four RCRA Units

- Sampled 40 monitoring wells during July 2003
- Wells monitor the following sites:
  - SA-2, SD-1 and E-3 (Zone 2)
  - S-8 (Zone 3)
- Samples analyzed for VOCs, SVOCs, metals, cyanide, pesticides/PCBs (Zone 2 only)

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RCRA Sampling Results

- VOC concentrations in the shallow groundwater have been reduced overtime at E-3 and now remain stable and confined within the recovery system perimeter.
- SD-1 and SA-2 monitoring indicates that there is no impact to shallow groundwater from these sites. SD-1 was closed to TCEQ RRS 2. SA-2 is pending closure to TCEQ RRS 2 (awaiting approval of eco-risk)
- S-8 monitoring indicates that natural degradation is occurring.

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RCRA Sampling Frequency of Detection

- VOCs

	2002	2003
PCE	72 ug/L (37%)	349 ug/L (23%)
TCE	6.7 ug/L (34%)	14.3 ug/L (45%)
DCE	102 ug/L (71%)	251 ug/L (78%)
VC	90 ug/L (26%)	230 ug/L (30%)
CLBZ	5,710 ug/L (25%)	11,100 ug/L (60%)

- **SVOCs, Pesticides and PCBs were not detected in approximately 99% of the samples.**

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Semi-Annual Water Level Measurements

- Approximately 400 wells were measured during September 2003.

- Wells were checked for total depth, GW level, and free product (LNAPL and DNAPL).

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Leon Creek Monitoring

- Small, shallow, slow moving urban stream flowing through western San Antonio
- Lack of tree cover causes high water temperatures, which reduces the amount of oxygen in the water
- Highly susceptible to flash flooding
- Receptacle for urban runoff

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Leon Creek Monitoring

- Physical Assessment

- Chemical Assessment

- Biological Assessment

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Physical Assessment of Leon Creek

- During July 2003 we measured:
  - Stream flow in 4 segments.
  - Flow from selected seeps(6) and outfalls(5).
  - Surface water elevations at 23 stations.
- Created sketches and took photographs to document changes in the stream's physical appearance.

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Chemical Assessment of Leon Creek

- During July 2003 we sampled:
  - 31 surface water stations.
  - 28 sediment stations.
  - 8 outfalls and 5 seeps.
  - Analyzed samples for VOCs, SVOCs, metals, cyanide, pesticides/PCBs, General Chemistry

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Biological Assessment of Leon Creek

- During July 2003 we conducted the following tests at 8 stream stations and 3 reference stations :
  - ChronicToxicity
  - Fish tissue
  - EPA Rapid Bioassessment

Reference stations: Medio and Salado Creeks, Medina River

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Leon Creek Sampling Results

- Initial screening shows 5 surface water and 27 sediment contaminants exceeding the Texas Water Quality Standard (TWQS) guidelines, which are conservative, general guidelines.

- Chronic Toxicity results showed potential surface water sediment toxicity at some of the stations. An ecological risk assessment is being conducted to follow up on these results.

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Leon Creek Sampling Results

- Of the 3 reference stations, only one (Medio) is meeting its aquatic life use designation, which is Intermediate Aquatic Life, unlike Leon Creek's High Aquatic Life designation.
- PCBs (1254, 1260) were the only exceedances of TWQS guidelines in the fish tissue samples.

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Leon Creek

- Trend analysis shows that Leon Creek has remained fairly constant over the years
- A final Tier 2/Tier 3 Ecological Risk Assessment report was submitted to the regulators the first week of May (2004) and based on the findings of the report there are no risks to the receptors in Leon Creek.

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Questions ??

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U.S. Air Force Real Property Agency

Integrity - Service - Excellence

Zones 2 & 3 Corrective Measures Study (CMS)

TRS

8 June 2004

Ashley Allinder, P.E.

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Introduction

- Sites were identified through the RCRA Facility Investigation process
- CMS evaluates and recommends soil and groundwater final remediation alternatives
- AFRPA has submitted the Draft Final Zones 2 & 3 CMS to the TCEQ and EPA

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Zones 2 & 3 Sites Evaluated in CMS

- Zone 2
  - E-1
  - Building 522
- Zone 3
  - Building 301
  - Building 360
  - Building 258 (MP)
  - South Ramp Area
  - Building 365 Defueling Cart Area and Building 362 Container Storage Area
  - Building 348 OWS Area
  - Building 324 and Former Building 318 Area
  - Building 375 OWS Area
  - Building 375 Container Storage Area and Cleaning Room
  - Building 316 Pretreatment Area
  - Building 361/363/365

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Zones 2 & 3 Sites Soils Evaluation

- Based on new data and/or development of site-specific criteria using the Soil Attenuation Model, the following sites are proposed for closure under Risk Reduction Standard 2:
  - South Ramp Area
  - Building 365 Defueling Cart Area and Building 362 Container Storage Area
  - Building 375 OWS Area
  - Building 375 Container Storage Area and Cleaning Room
  - Building 316 Pretreatment Area
  - Building 361/363/365

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Zones 2 & 3 Sites

- Groundwater, Zones 2 & 3
- Zone 2
  - E-1
  - Building 522
- Zone 3
  - Building 301
  - Building 360
    - NW Corner
    - Basement
  - Building 258 (MP)
  - Building 324
  - Building 348 OWS

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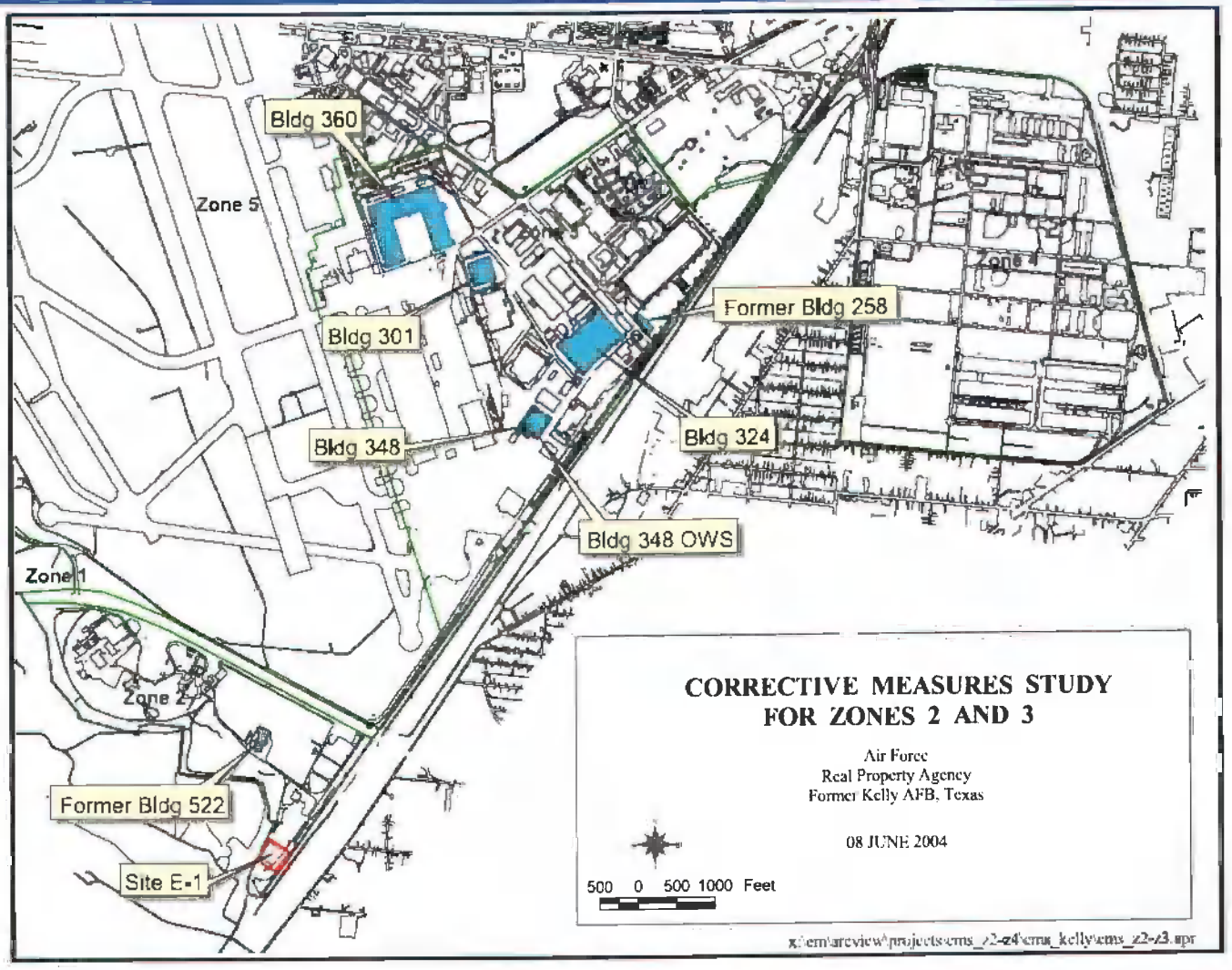
Zones 2 & 3 Sites



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Criteria For Detailed Evaluation of Alternatives

- Overall Protection of Human Health and the Environment
- Attain Media Cleanup Standards
- Control Source of Releases
- Comply with Applicable Standards for Management of Wastes
- Long-term Reliability and Effectiveness
- Reduction of Toxicity, Mobility, or Volume
- Short-term Effectiveness
- Implementability
- Cost

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Remediation Technologies

- **Source Removal**
  - Excavation
  - Soil Vapor Extraction
  - Electrical Resistive Heating
  - NAPL extraction
  - Bioaugmentation
  - Soil Flushing
- **Source Control Technologies**
  - Slurry Wall
  - Permeable Reactive Barrier
  - Pump and Treat
  - Vitrification

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Groundwater, Zones 2 & 3

- Proposed Preferred Alternatives
  - Building 301 – iron permeable reactive barrier
  - Building 360 – iron permeable reactive barrier and slurry wall
  - Building 258 – slurry wall and hydraulic containment
  - Zone 2 & 3 GW Plume – iron permeable reactive barrier and slurry wall
    - 940 linear foot permeable reactive barrier
    - 820 linear foot slurry wall

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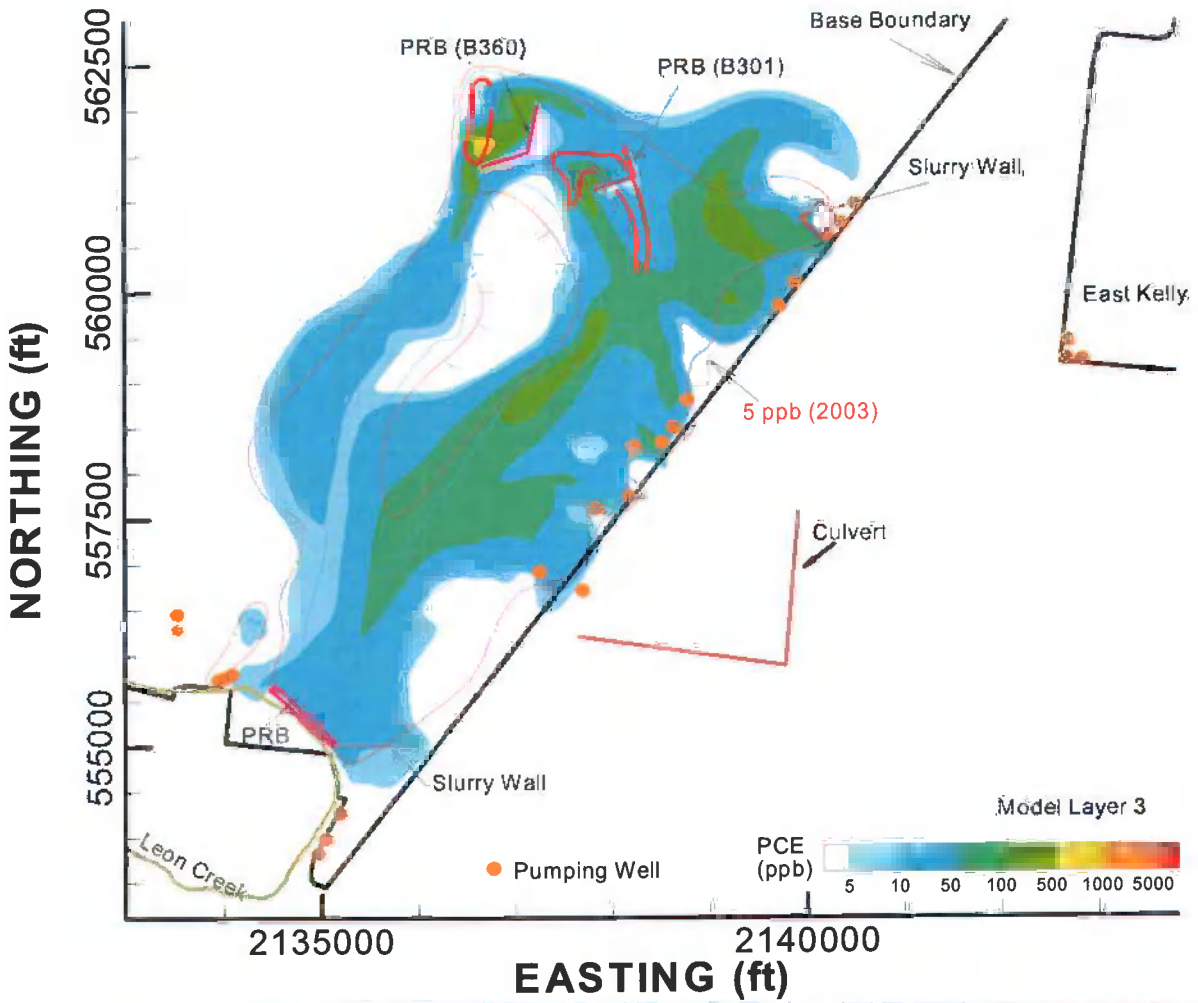
Groundwater - PCE 5 yrs



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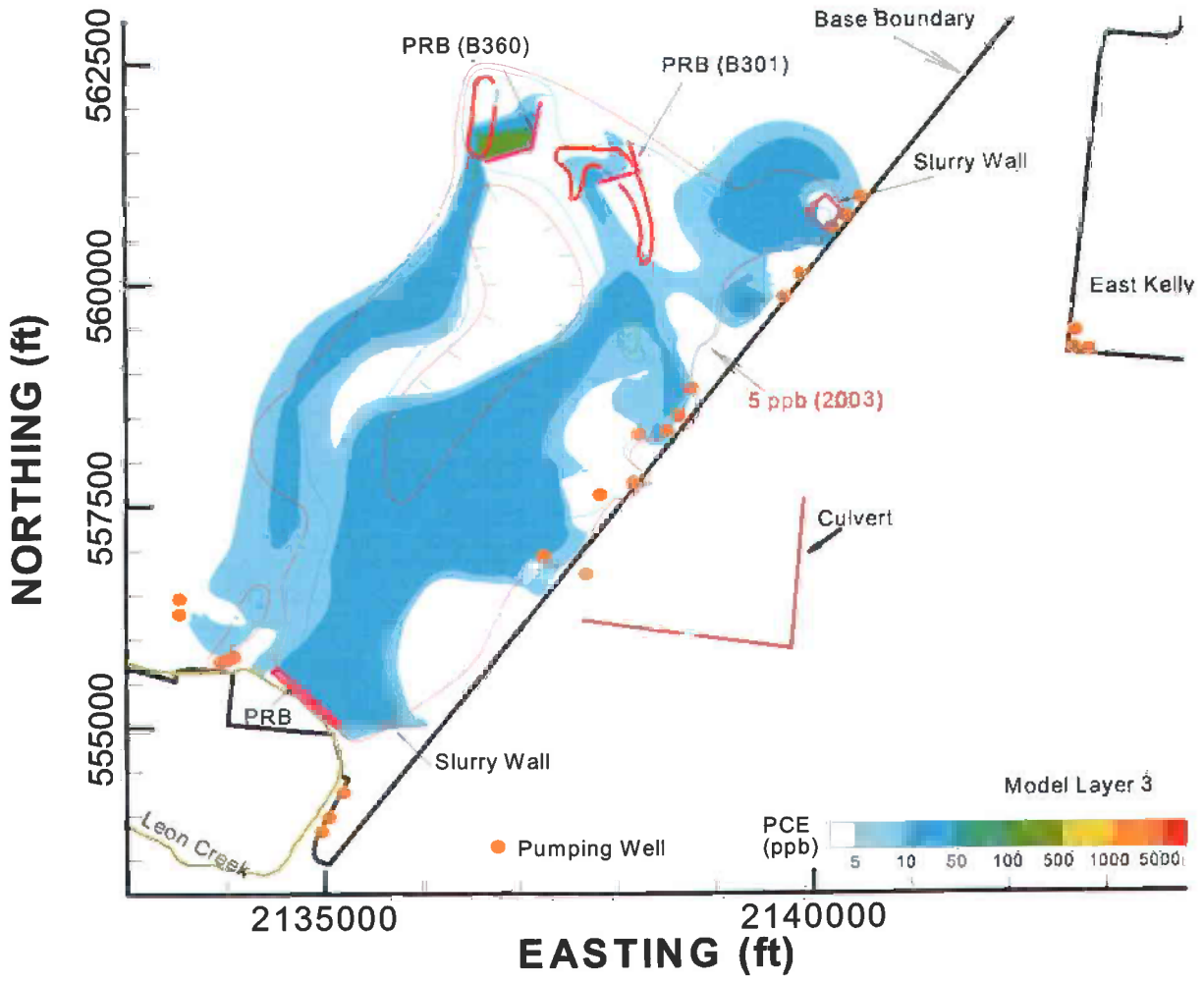
Groundwater - PCE 10 yrs



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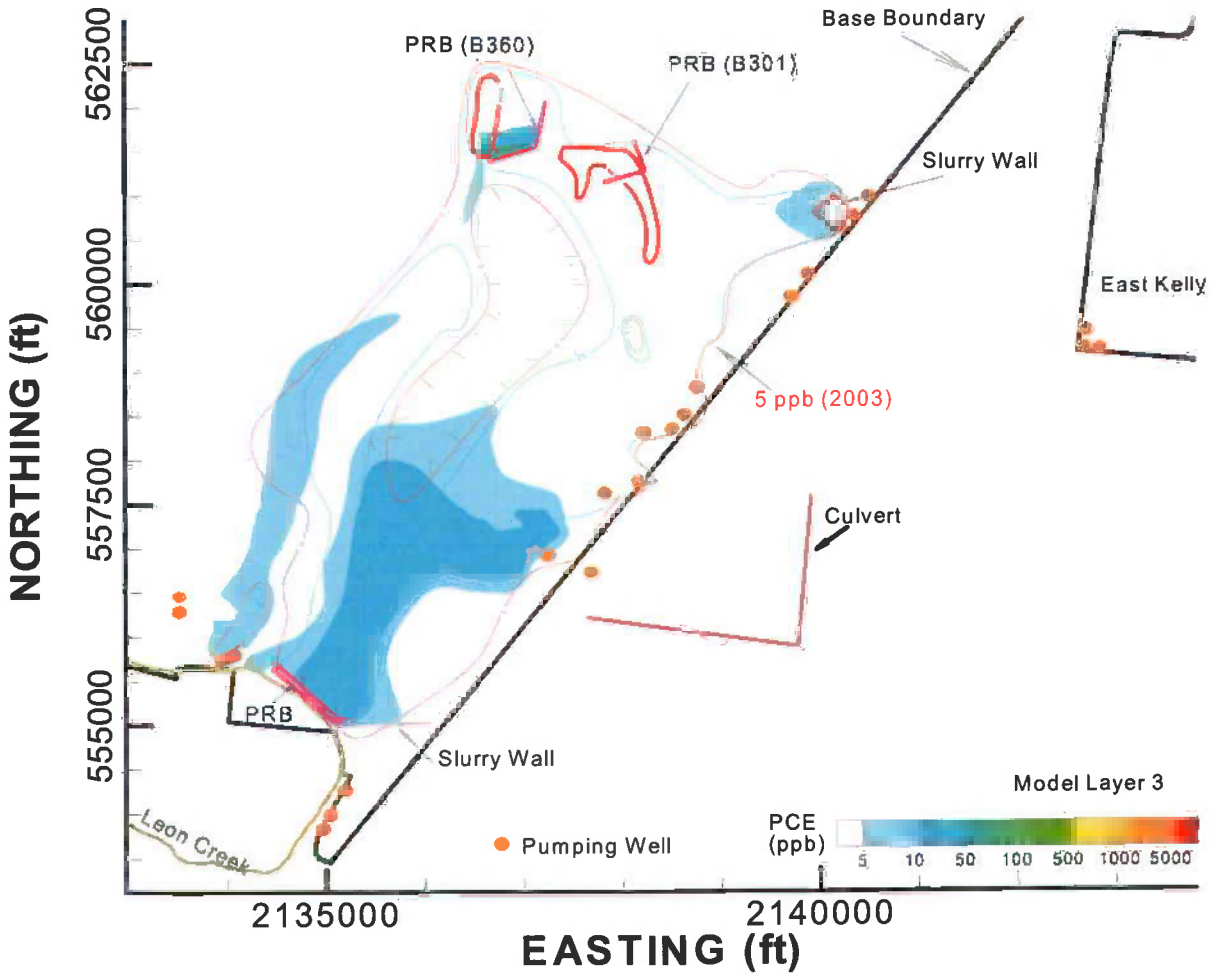
Groundwater - PCE 15 yrs



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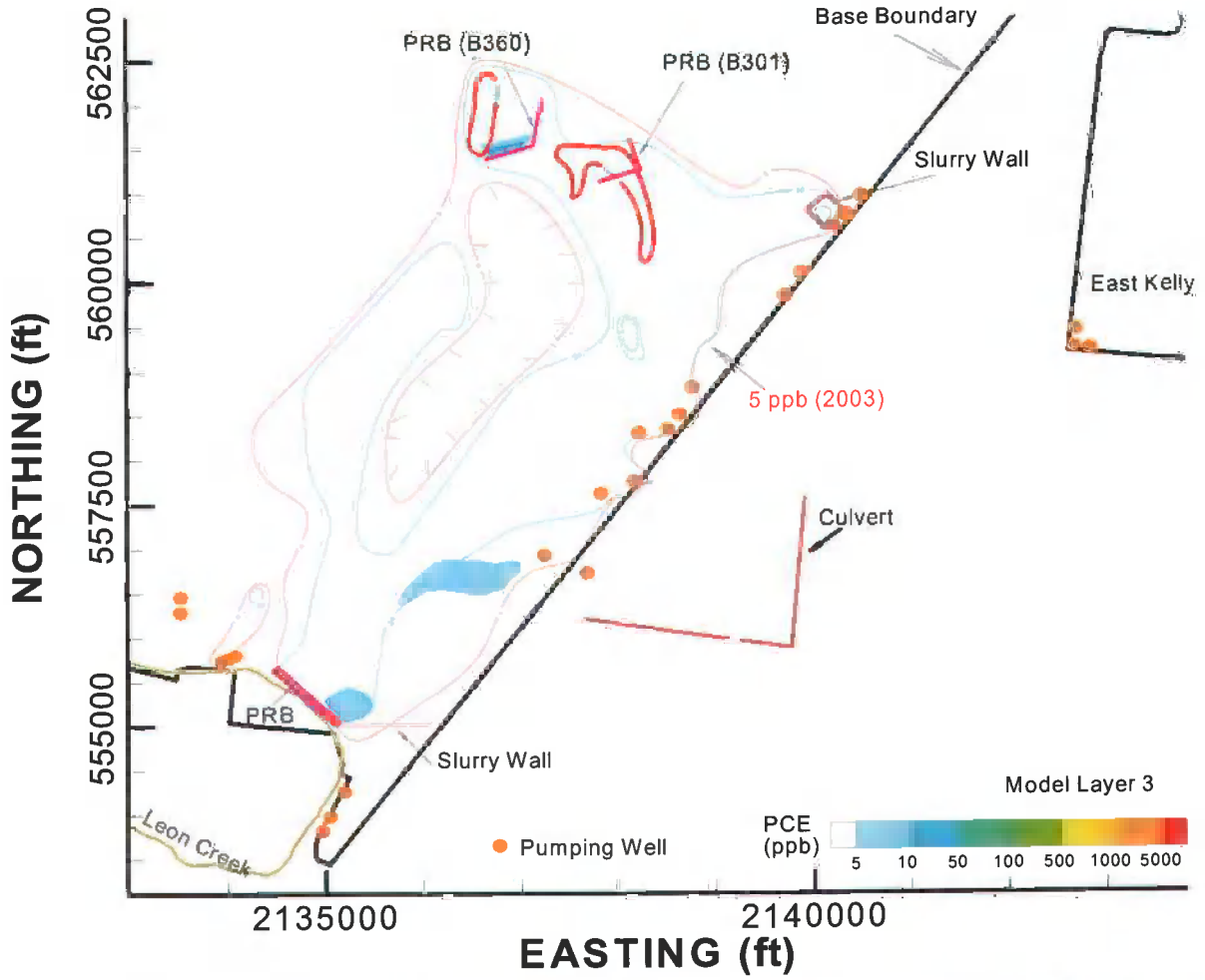
Groundwater - PCE 20 yrs



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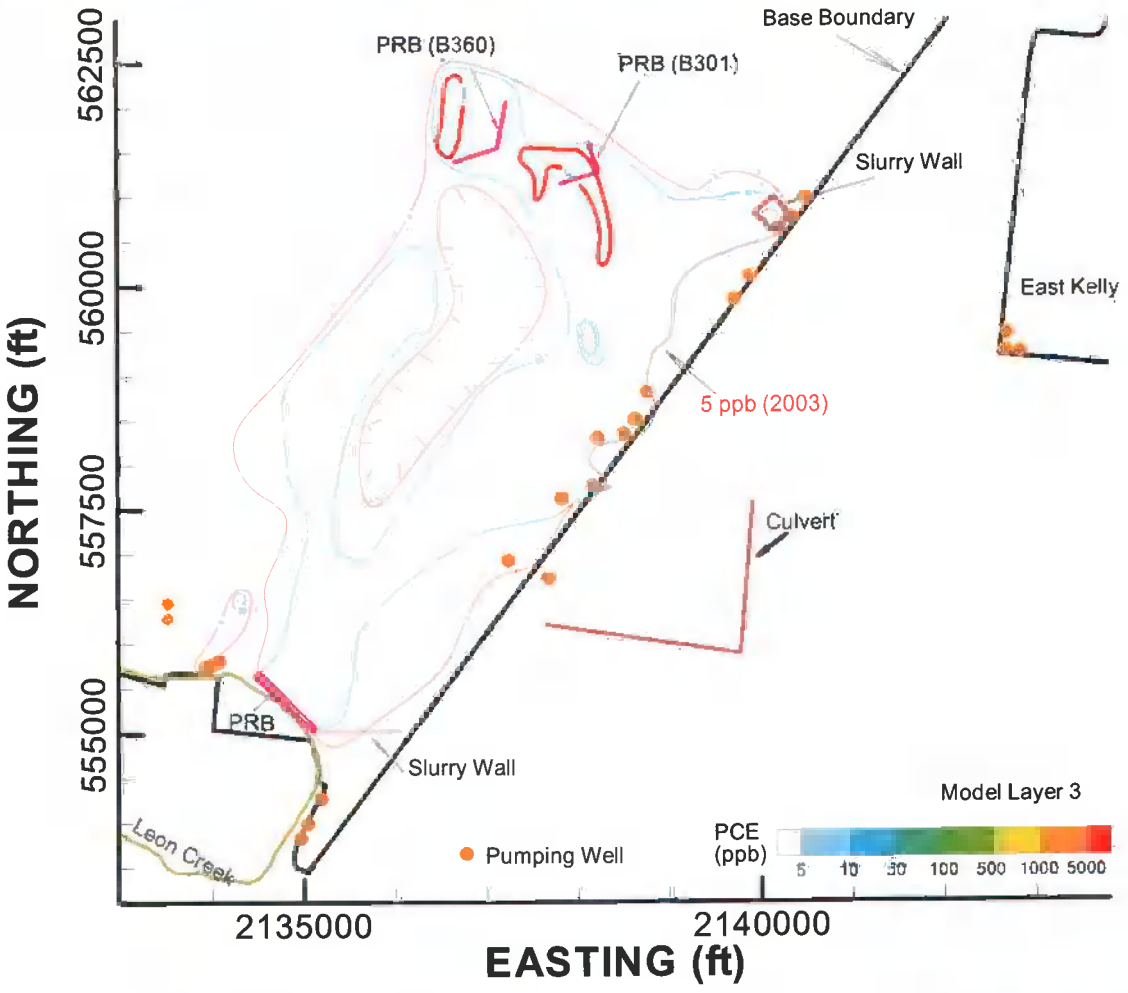
Groundwater - PCE 25 yrs



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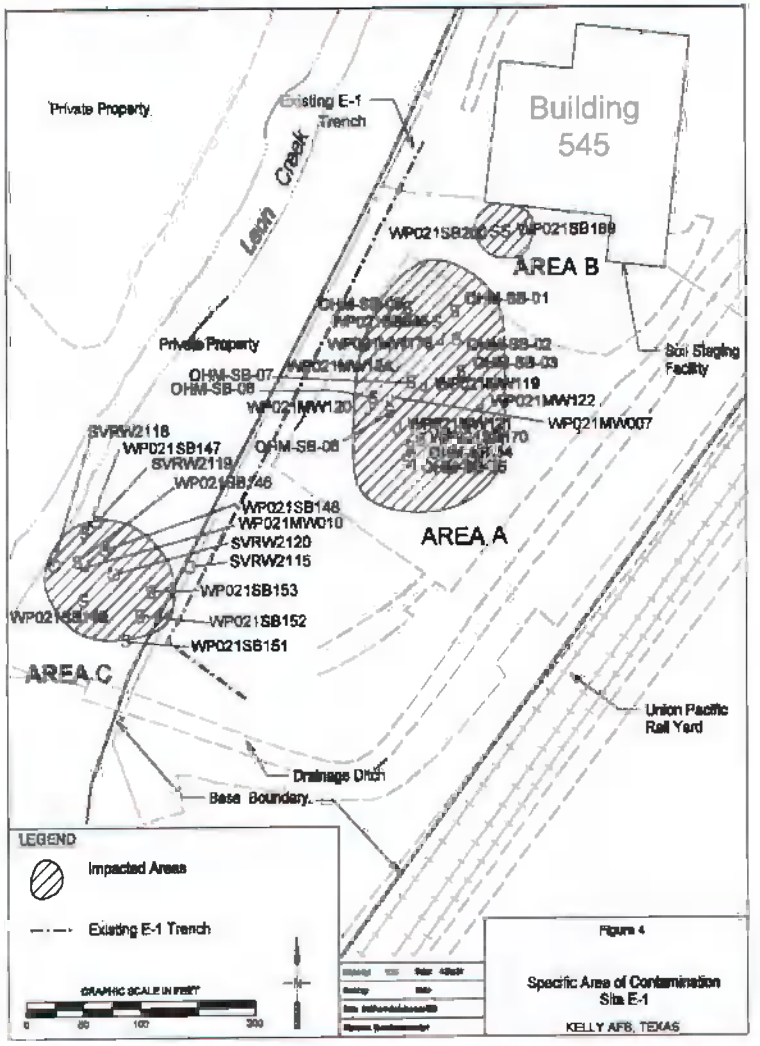
Site E-1

- Site History
  - Chemical Evaporation Pits
- Area A (Soil COC)
  - PCE – 888 mg/kg
  - TCE – 4.45 mg/kg
  - Chlorobenzene – 39 mg/kg
- Area B
  - TCE – 350 mg/kg
- Area C
  - Cr – 670 mg/kg



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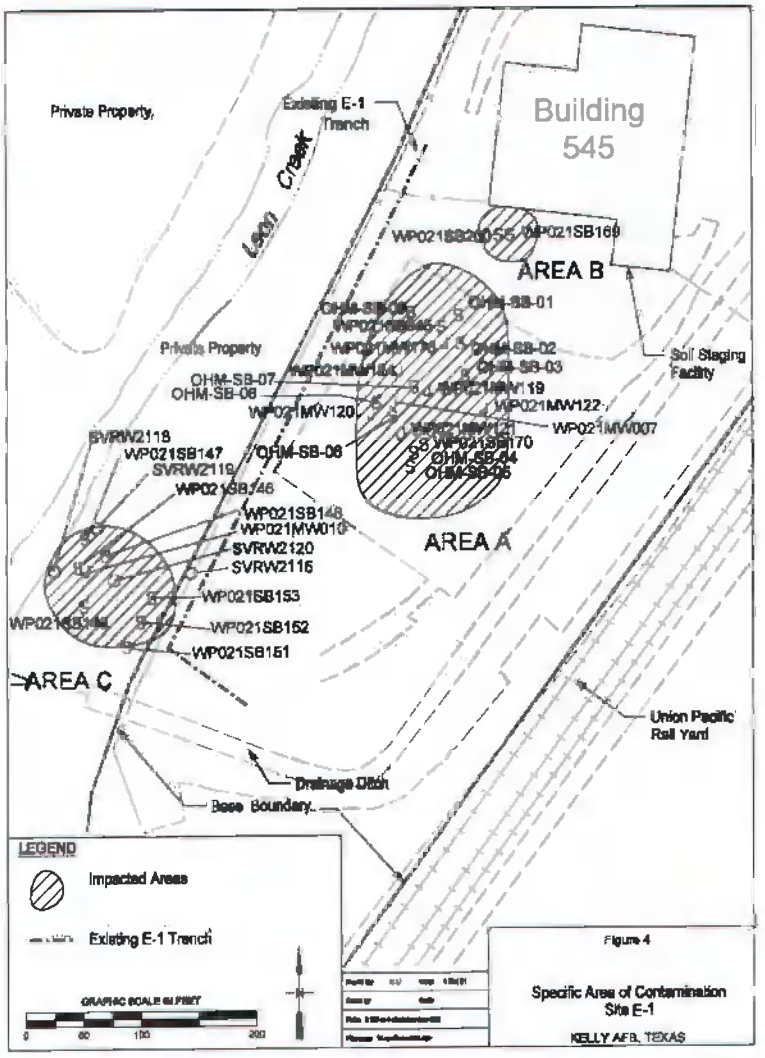
Site E-1

- Current Interim System
  - Groundwater Collection Trench
- Estimated Treatment Volume
  - 40,000 cubic yards
- Estimated organic contaminant mass
  - 8,500 lbs

- Proposed Preferred Alternative
  - Soil
    - ►*Excavate*
  - Groundwater
    - ►*Groundwater Collection Trench & Bioaugmentation*



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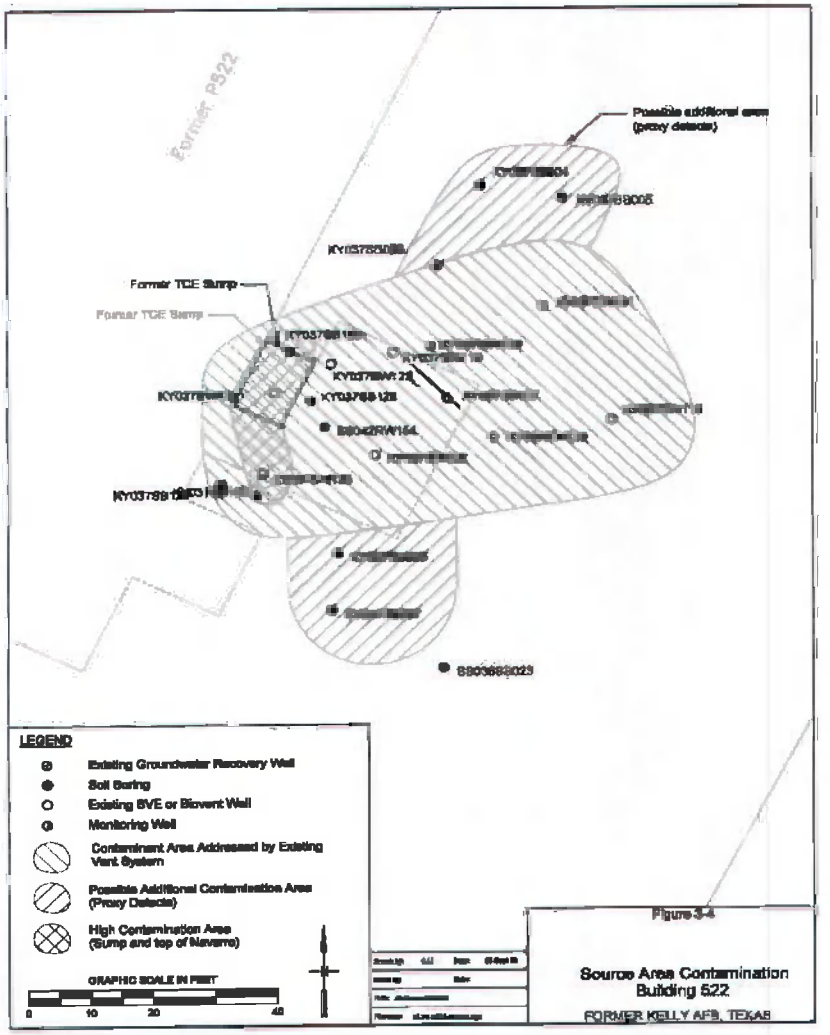
Building 522

- Site History
  - Paint Stripping Operations
- TCE – 710 mg/kg
- Estimated Treatment Volume
  - 4,000 cubic yards
- Estimated organic contaminant mass
  - 55 lbs TCE



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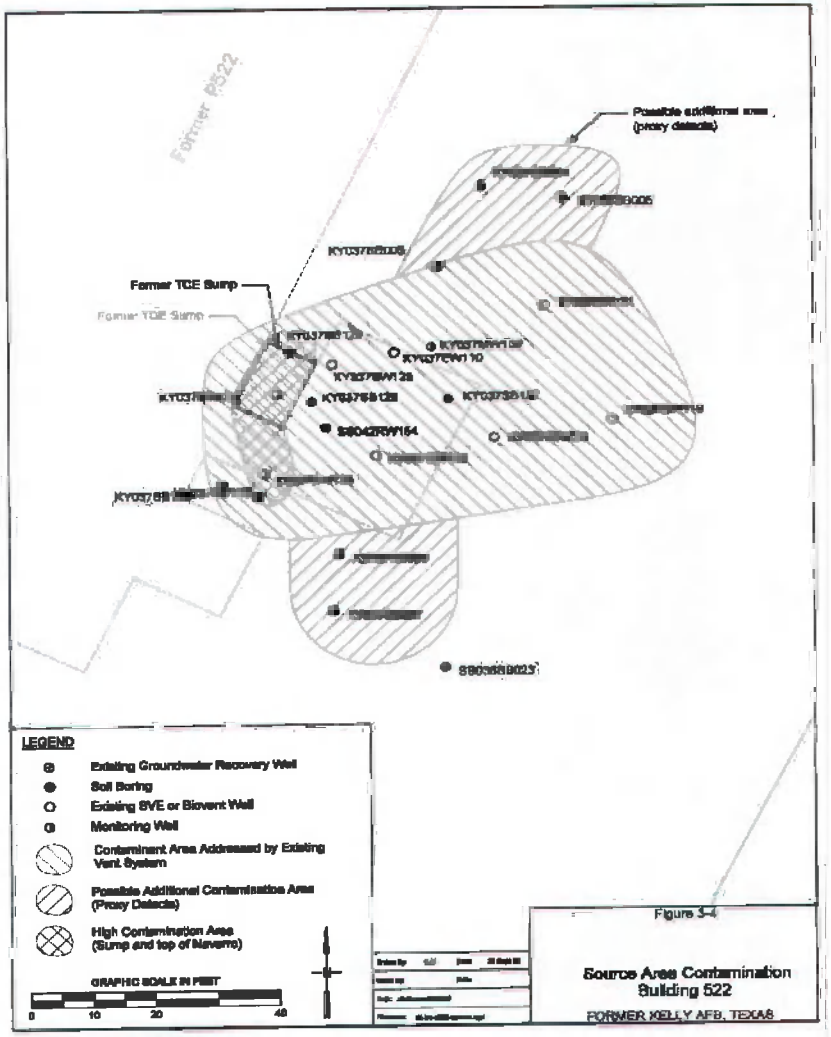
Building 522

- Current Interim System
  - SVE
- Proposed Preferred Alternative
  - Soil
    - ▶ *Optimize current SVE System*
  - *Groundwater*
    - ▶ *Bioaugmentation*



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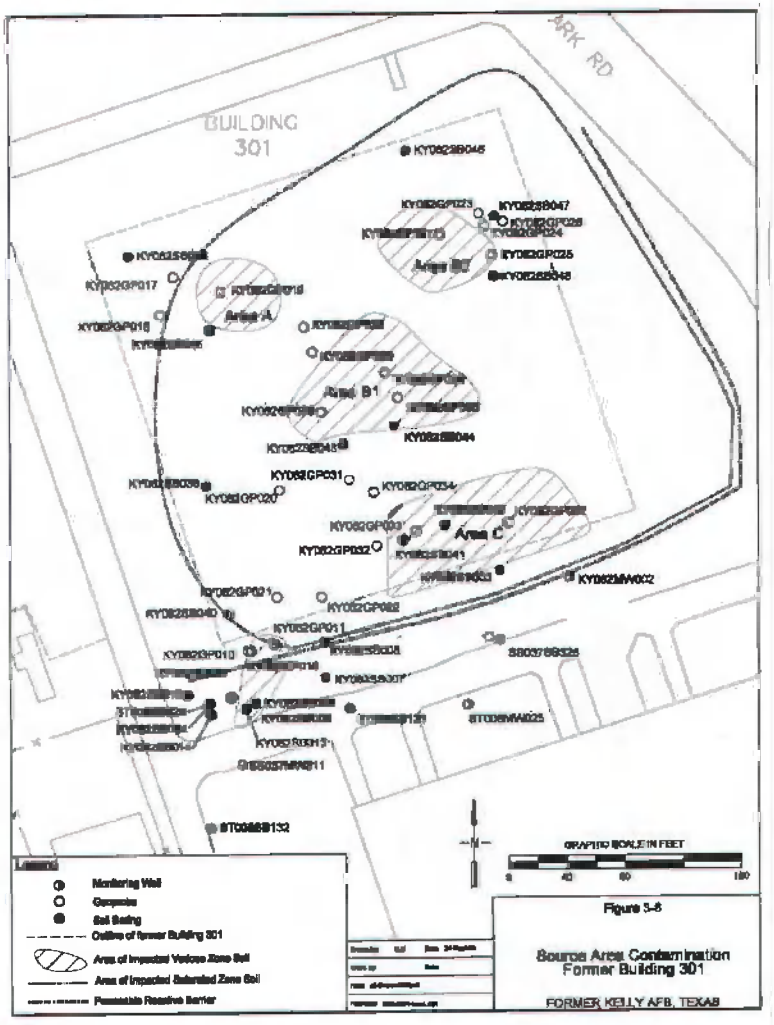
Building 301

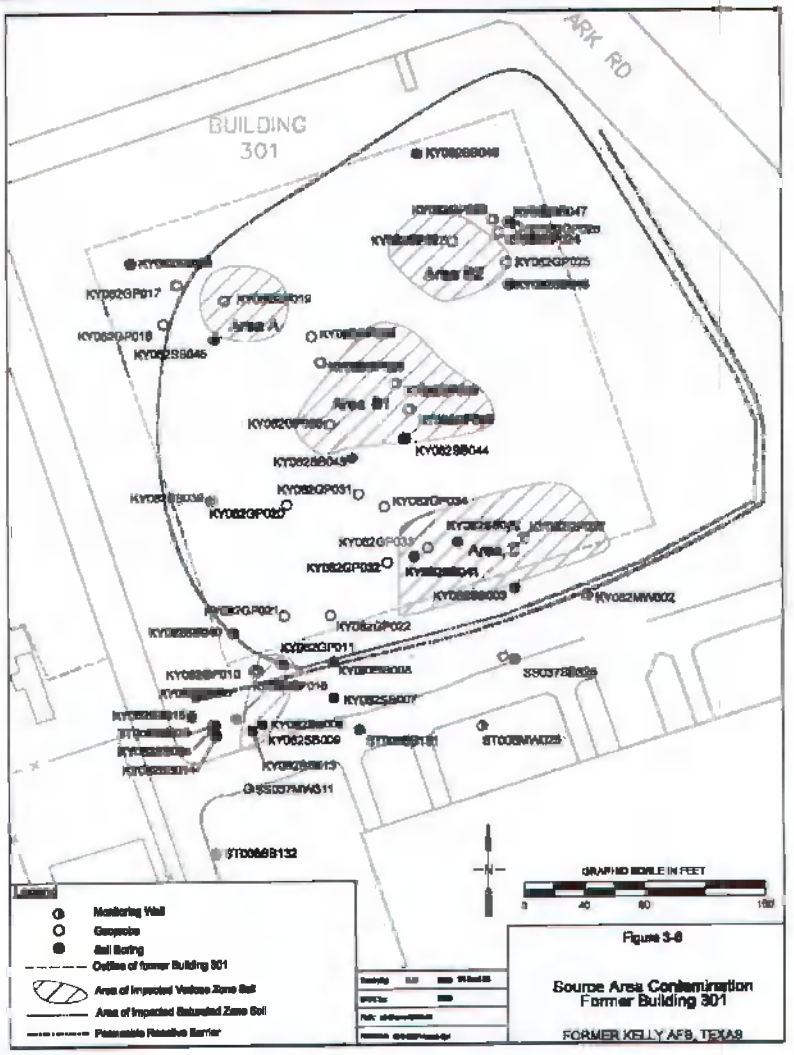
- Site History
  - Plating Operations
    Wastewaters included: heavy metals, acid, caustic and cyanide
- Subsurface Soil COC
  - PCE 4.8 mg/kg
- Building 301 Areas
  - Area A – Degreaser Pit
  - Area B – Plating Area
  - Area C – Sumps
  - Area D – Container Storage Area



U.S. AIR FORCE

Building 301

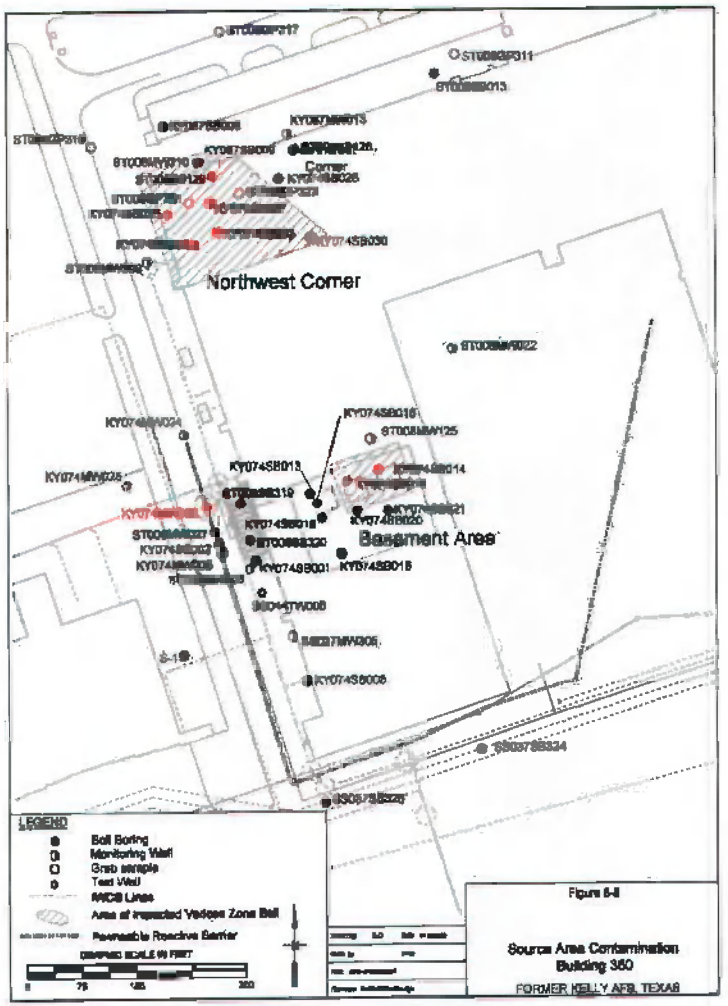
- Estimated Treatment Volume
  - 5,700 cubic yards
- Estimated organic contaminant mass
  - 40 lbs (95% PCE)
- Current Interim System
  - Iron PRB
- Proposed Preferred Alternative
  - Soil
    - ►Electrical Resistive Heating
  - Groundwater
    - ►Iron PRB



U.S. AIR FORCE

Building 360 NW Corner

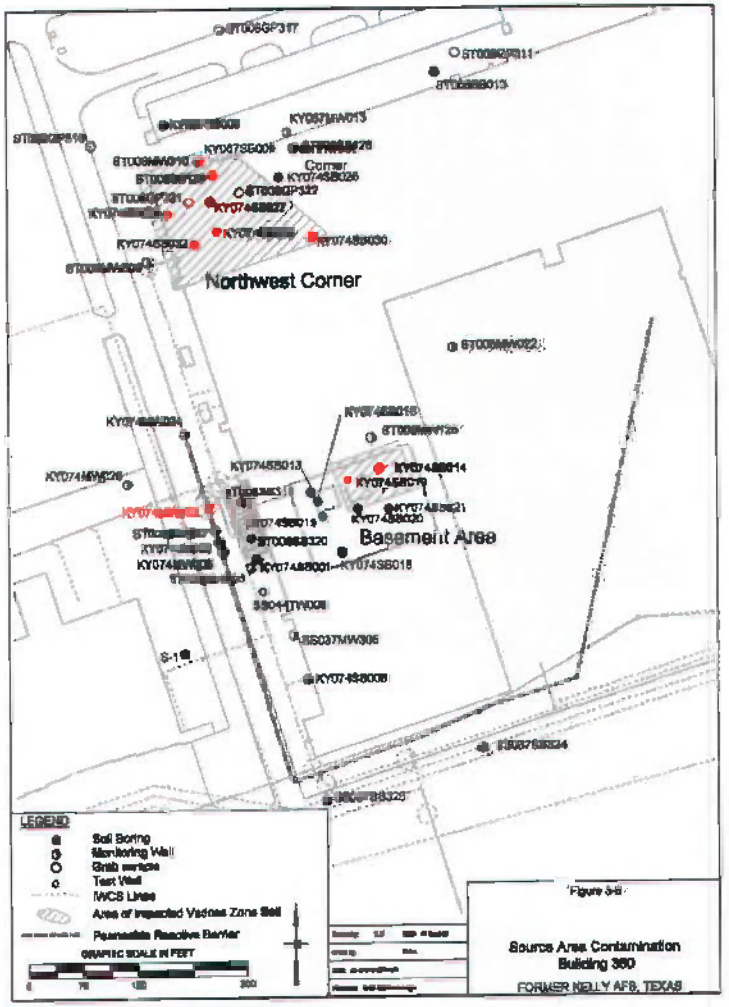
- Site History
  - Engine Cleaning
- Subsurface Soil
  - PCE – 1.6 mg/kg
- Estimated Treatment Volume
  - 11,500 cubic yards
- Estimated organic contaminant mass
  - 1,000 lbs



U.S. AIR FORCE

Building 360 NW Corner

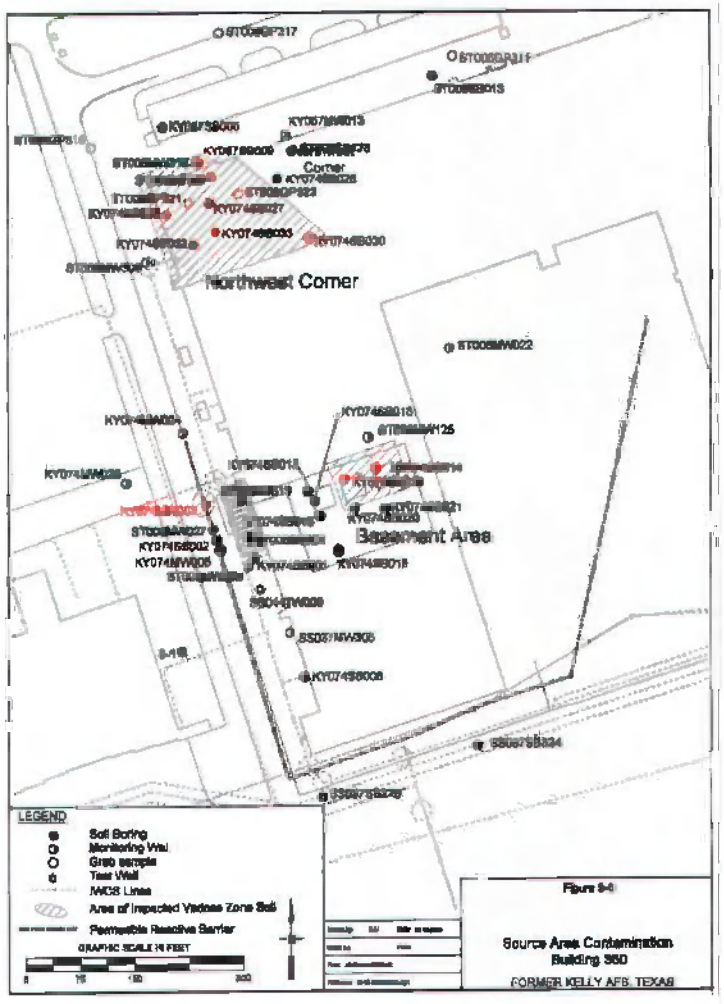
- Current Interim System
  - Iron PRB & Slurry Wall
- Proposed Preferred Alternative
  - Soil
    - ►SVE
  - Groundwater
    - ►Iron PRB & Slurry Wall



U.S. AIR FORCE

Building 360 Basement

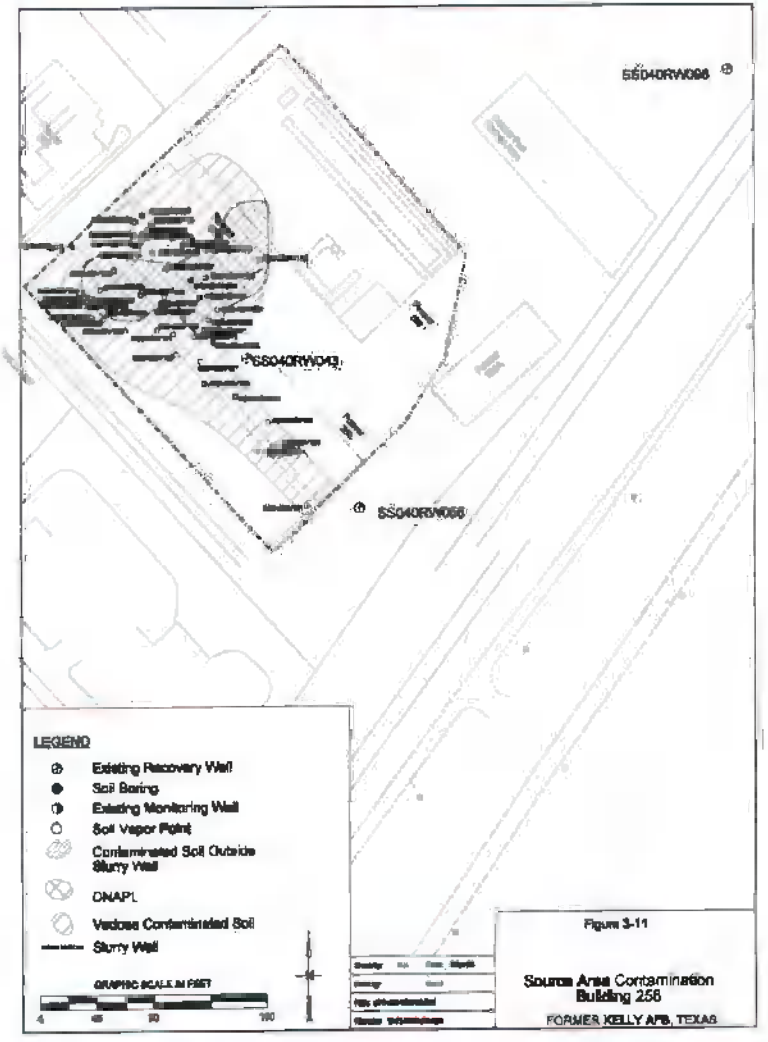
- Subsurface Soil
  - PCE – 90 mg/kg
- Current System
  - Iron PRB & Slurry Wall
- Estimated Treatment Volume (Saturated Soil)
  - 2,000 cubic yards
- Estimated organic contaminant mass (Saturated Soil)
  - 11 lbs
- Proposed Preferred Alternative
  - ► Bioaugmentation



U.S. AIR FORCE

Site MP/Building 258

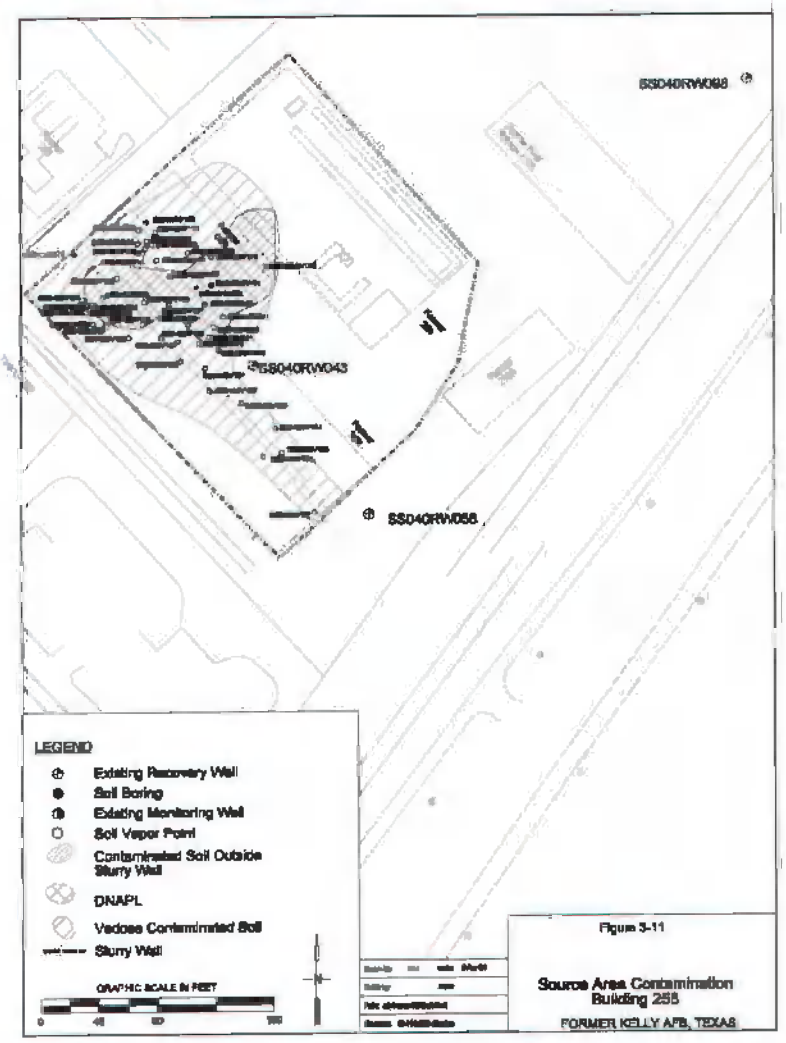
- Site History
  - Metal Plating Activities
- Subsurface Soil COCs
  - PCE – 11,000 mg/kg
  - TCE - 30 mg/kg
- Estimated Treatment Volume
  - 23,000 cubic yards
- Estimated organic contaminant mass
  - 650 lbs



U.S. AIR FORCE

Site MP/Building 258

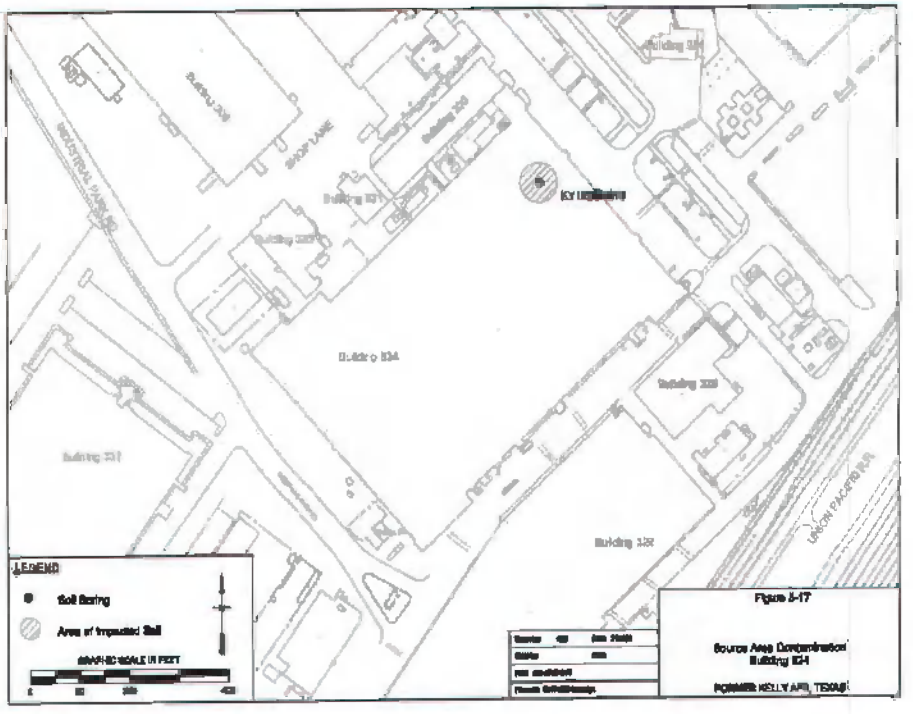
- Current System
  - Slurry Wall, 1 RW inside the wall, 3 RWs outside the wall
- Proposed Preferred Alternative
  - ▶ Operate/Maintain Current System



U.S. AIR FORCE

Building 324

- Site History
  - General Purpose Aircraft Maintenance Building; propeller repair and assembly, machine shop, starter/generator repair, bearing function, sheet metal
- Subsurface Soil COCs
  - PCE – 0.65 mg/kg
- Estimated Treatment Volume
  - 100 cubic yards

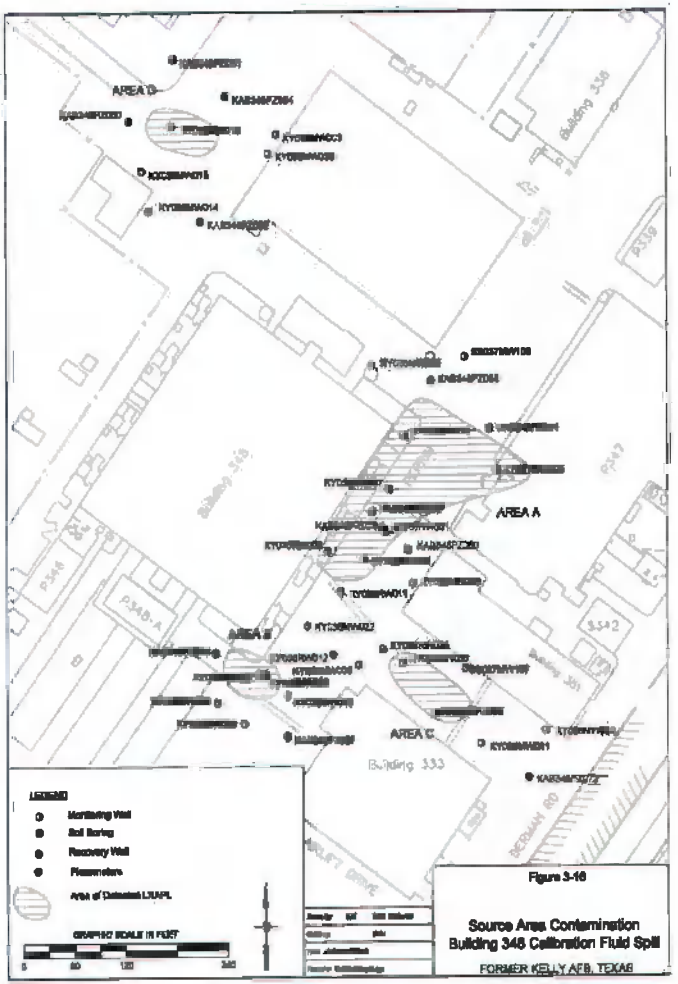


- Proposed Preferred Alternative
  - ▶SVE

U.S. AIR FORCE

Building 348

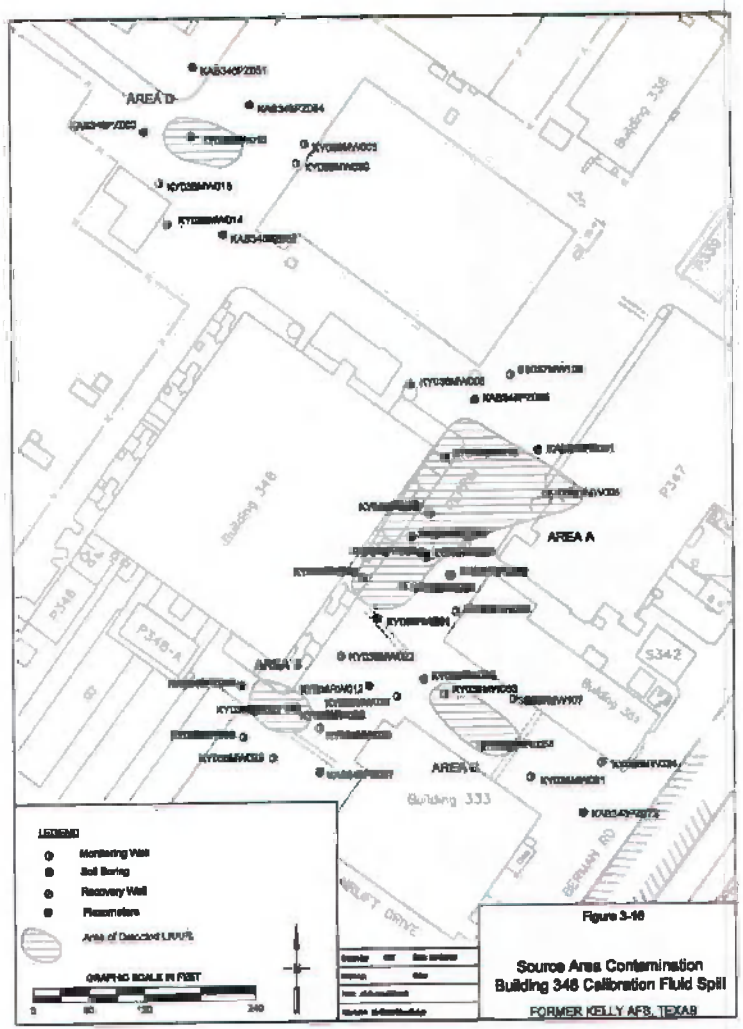
- Site History
  - Aircraft Engine Accessory Overhaul Shop
- Subsurface Soil COCs
  - PCE – 7.2 mg/kg
- Estimated Treatment Volume
  - 122 cubic (excluding LNAPL)
- Estimated Organic Mass
  - 1.1 lbs (excluding LNAPL)



U.S. AIR FORCE

Building 348

- **Proposed Preferred Alternative**
  - ▸ **SVE for Organic Mass**
  - ▸ **MNA & Passive Bailing for LNAPL**



U.S. AIR FORCE

Public Participation

- Zones 2 & 3 CMS available for review at the San Antonio Library, Kelly Library, and the EHWC
- Proposed Plan is being developed for the Zones 2 & 3 CMS Report
  - Provides information regarding the evaluated and preferred alternatives for each site
  - Announces a Public Comment Period and Public Meeting
- Information Session for the Zones 2 & 3 CMS and Proposed Plan July 20th prior to the RAB meeting
  - Opportunity to ask questions and provide comments

U.S. Air Force Real Property Agency

Integrity - Service - Excellence

Former Kelly AFB
Technical Review Subcommittee
8 June 2004

Review of
Permeable Reactive Barriers
Performance Update

U.S. AIR FORCE

U.S. AIR FORCE

Zone 5 Plume A PRB

- Purpose: Prevent additional Off Base Migration of Plume A and accelerate degradation of Off Base Portion of Plume
  - TCE (primary), 1,2-DCE and vinyl chloride
- Installation was completed in September 2002
  - Total Length 650 feet
- Results to date
  - Off base portion of plume currently below MCLs
  - Within PRB
    - 3 wells below MCL
    - 4th is 2 ppb above MCL

U.S. AIR FORCE

Building 301 PRB

- **Purpose: Contain Bldg. 301 Groundwater Source**
  - **PCE (primary), TCE, 1,2-DCE and vinyl chloride**
- **Installation was completed in Late June 2003**
  - **Total Length 690 feet**
- **Sampling Events**
  - **1st Round of samples collected in December 2003**
    - **Three transects (nine wells) sampled**
      - Low concentrations or non-detect found within wall
  - **2nd Round of Samples to be collected in June 2004**
    - **Results will be available at the July 20th RAB**

U.S. AIR FORCE

Building 360 PRB

- Purpose: Contain Bldg. 360 Groundwater Source
  - PCE (primary), TCE, 1,2-DCE and vinyl chloride
- Installation was completed in March 2004
  - PRB Total Length: 800 feet
  - Slurry Wall total length: 400 feet
- Sampling Event
  - 1st Round of samples collected in May 2004
    - Results will be available at the July 20th RAB

U.S. AIR FORCE

34th Street PRB

- **Purpose: Prevent Commingling of Off Base Groundwater Source with S-1 Plume**
  - **PCE (primary), TCE, 1,2-DCE and vinyl chloride**
- **Installation was completed in April 2004**
  - **Total Length 540 feet**
  - **Planned 100 foot Extension (late summer 2004)**
- **Sampling Event**
  - **1st Round of samples anticipated to be collected in approximately 4 months**

TEXAS DEPARTMENT OF HEALTH

FISH AND SHELLFISH CONSUMPTION ADVISORY

ADV-26

This advisory is issued as a result of sampling of the Lower Leon Creek in Bexar County. Samples of fish taken from this stretch of the Lower Leon Creek indicate the presence of PCBs that may pose a threat to human health if consumed.

COUNTIES:	Bexar
AREA:	Leon Creek from the Texas State Highway 90 bridge downstream to Military Drive.
SPECIES AFFECTED:	All species of fish.
CONTAMINANT:	PCBs
CONSUMPTION ADVISORY:	TDH recommends no consumption of any species from this stretch of Leon Creek.

This advisory shall remain in effect until rescinded or modified in writing.

Issued this 27th day of August, 2003.

Susan E. Tennyson, Chief
Bureau of Food and Drug Safety

TDH

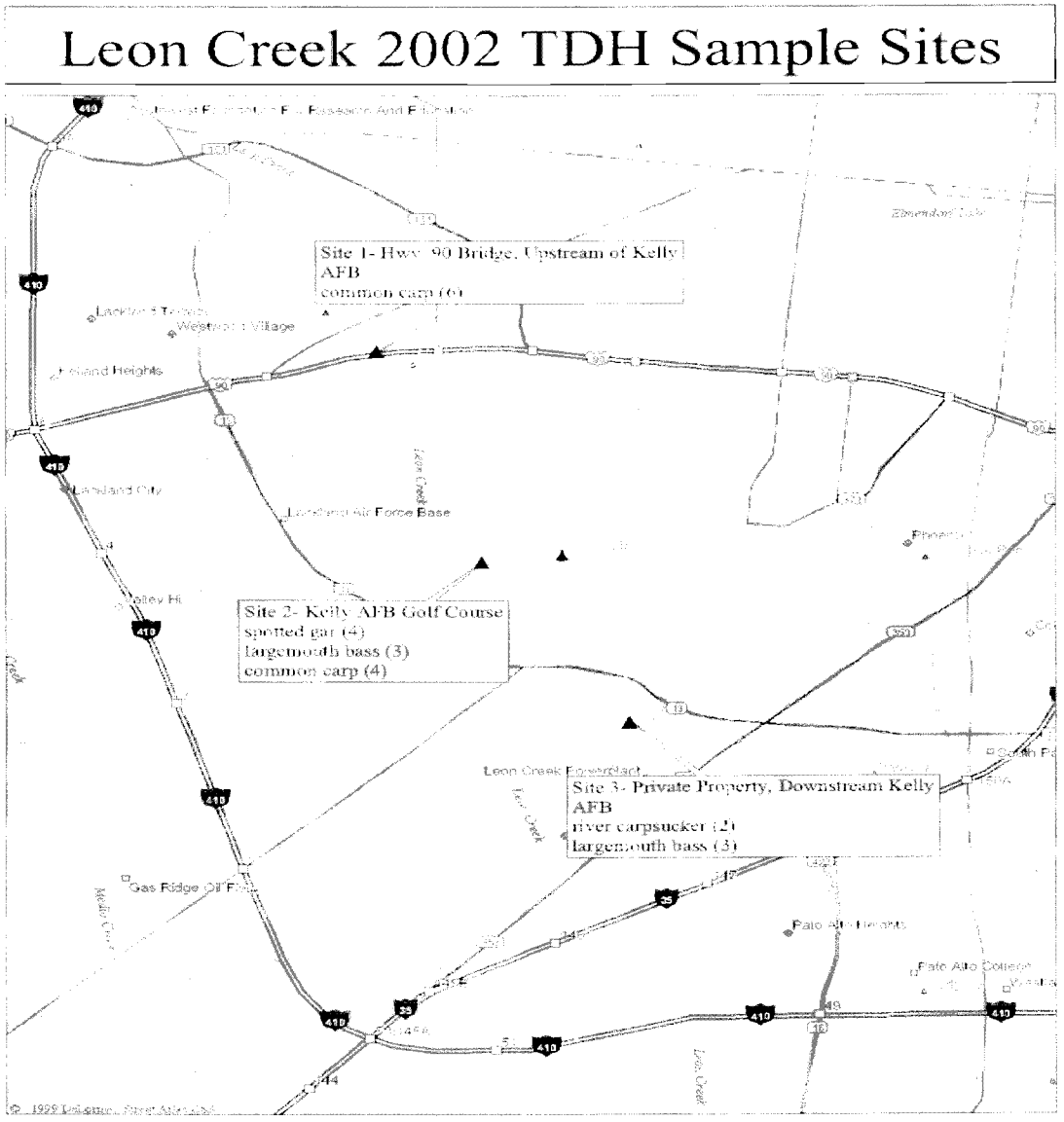
TDH

Lower Leon Creek

Quantitative Risk Characterization

2003

Leon Creek 2002 TDH Sample Sites



TDH

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Metals Detected in Lower Leon Creek Fish Tissue Collected in 2002

- Cadmium
- Copper
- Mercury
- Selenium
- Zinc

TDH

TDH

Organic Contaminants Detected in Lower Leon Creek Fish Tissue Collected in 2002

- Polychlorinated Biphenyls (PCBs)
- Chlordane
- DDD
- DDE
- DDT
- Heptachlor epoxide
- co-eluted 3/4 methyl phenol
- Tetrachloroethene
- Trichloroethene

TDH

TDH

PCBs in Fish by Site and Species, 2002

Site 1 (Upstream of Kelly AFB at TX Hwy. 90)		
Species	**# Detected / # Analyzed**	**Mean Concentration (mg/kg)**
Common carp	1 / 6	0.035

TDH

TDH

PCBs in Fish by Site and Species, 2002

Site 2 (Golf Course at Kelly AFB)		
Species	**# Detected / # Analyzed**	**Mean Concentration (mg/kg)**
Common carp	3 / 4	0.345
Largemouth bass	1 / 3	0.028
Spotted gar	4 / 4	0.470
All Species Combined	8 / 11	0.304

TDH

PCBs in Fish by Site and Species, 2002

Site 3 (Downstream of Kelly AFB near Military Drive)		
Species	**# Detected / # Analyzed**	**Mean Concentration (mg/kg)**
Largemouth bass	0 / 3	ND
River carpsucker	2 / 2	0.060
Species Combined	2 / 5	0.036

TDH Risk Calculation Assumptions

- Standard Adult Weight = 70 kg
- Adult Consumption Rate = 30 grams/day
  - Equivalent to approximately one eight-ounce fish meal per week
- Acceptable risk level (ARL)
  - 1 in 10,000 persons equally exposed
- Exposure period = 30 years

TDH

TDH

What is a Hazard Quotient?

- A hazard quotient (HQ) is the ratio of the estimated exposure dose of a contaminant to its RfD or MRL

- Systemic health effects are unlikely from consumption of fish for which the HQ is less than 1.0.

TDH

TDH

What is a Hazard Index?

- A hazard index (HI) is the sum of all hazard quotients (HQ) affecting the same critical organ or having the same critical effect.

- Systemic health effects are unlikely from consumption of fish for which the HI is less than 1.0.

Hazard Quotients for Systemic Health Effects from Consuming Fish from Leon Creek Containing PCBs

Contaminant	Hazard Quotients		
	Site 1	Site 2	Site 3
Chlordane	0.029	0.166	0.017
DDD	ND	0.034	0.002
DDE	0.022	0.193	0.012
DDT	ND	0.014	ND
Total PCBs	0.75	**6.51**	0.771
Hazard Index	**0.8**	**6.9**	**0.8**

Theoretical Lifetime Excess Cancer Risk, 2002

Contaminant	Calculated Cancer Risks		
	Site 1	Site 2	Site 3
Chlordane	1 in 460,224	1 in 80,183	1 in 762,527
DDD	ND	1 in 564,308	1 in 8,101,852
DDE	1 in 615,807	1 in 71,296	1 in 1,160,368
DDT	ND	1 in 1,013,486	ND
Total PCBs	1 in 77,778	**1 in 8,955**	1 in 75,617
Cumulative Cancer Risk	1 in 60, 047	**1 in 7,096**	1 in 64,428

TDH

TDH

Allowable Meals per Month

(Systemic Health Effects)

Sample Site	Hazard Index	Allowable Meals per Month
Site 1	0.8	5.0*
Site 2	**6.9**	**0.6***
Site 3	0.8	5.0*

*one meal = 8 oz serving

TDH

TDH

Allowable Meals per Month

(Cumulative Excess Cancer Risk)

Sample Site	Cumulative Cancer Risk	Allowable meals per month
Site 1	1 in 60,047	24*
Site 2	**1 in 7,096**	**2.9***
Site 3	1 in 64,428	25.9*

***one meal = 8 oz serving**

TDH

TDH

Public Health Implications

1. Consumption of fish from Leon Creek at or near the Kelly Air Force Base golf course **poses a public health hazard** for cancer and systemic health outcomes, due primarily to polychlorinated biphenyls (PCBs) detected in spotted gar and common carp.

TDH

TDH

Public Health Implications

2. Consumption of a diet consisting exclusively of river carpsuckers collected from (Site 3) downstream of KAFB *may pose a public health hazard.*

TDH

TDH

Public Health Actions

- **Fish Consumption Advisory (ADV-26),** advises people not to consume any species of fish from Leon Creek (from the Hwy. 90 bridge downstream to Military drive) because consumption of fish poses an unacceptable risk to public health due to contamination with PCBs.

TDH

TDH

Recommendations

- TDH should collect samples of other species to better characterize the likelihood of adverse health effects.

- TDH should continue to monitor fish from Leon Creek to assess the extent of environmental contamination and monitor contamination trends.

For Information

Texas Department of Health
Seafood Safety Division

512-719-0215
www.tdh.state.tx.us/bfds/ssd

The Agency for Toxic Substances and Disease Registry (ATSDR) Document Review Process

Assessment Completed
Internal Review Process
-Assistant Director for Science
-Agency Directors Office
Comments/ questions are addressed
External Review Process
-Experts (generally from Universities and not affiliated with AF) review the report
-Comment period 60-90 days (ATSDR available to community for comment)
Comments/ questions are addressed and appended to the end of the document
Final Internal Review
-writer, editor, policy reviewed and document released

Issues specific to Kelly:
* South West Workers Union, wrote the director of CDC (Jeff Copeland) and requested that the documents be released in Spanish. Translating a technical document in Spanish, adds to the length of time it takes to release the document. Once translated, it goes through an internal review process to make sure the information in the translation remains true to the original content and message of the report.

* ATSDR had 2 experts review the document, one said the report was fine, the other had a lot of questions that had to be answered.

*Right now ATSDR is still in the external review process. It is due to be released at some point next year.

Air Force
Real Property
Agency/
Division
Central —
Kelly

Environmental
Site Cleanup

Technical Assistance for Public Participation (TAPP)

Kelly Technical Review Subcommittee
December 2003

Air Force Real Property Agency/ Division Central — Kelly

Environmental Site Cleanup

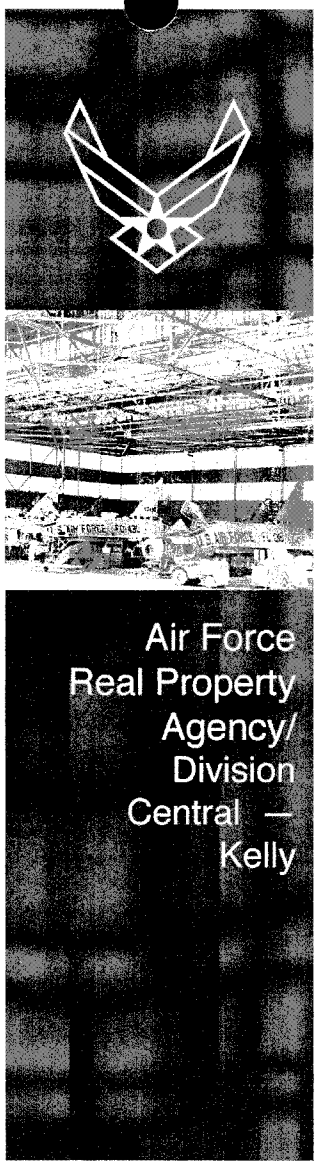
TAPP Overview

- Department of Defense funded program
- Provides independent technical support to community members of Restoration Advisory Boards (RAB)
- Enhances the public's ability to participate in the decision-making process by improving their understanding of overall conditions and activities
- Utilizes small businesses

Environmental
Site Cleanup

Projects that qualify for TAPP funding

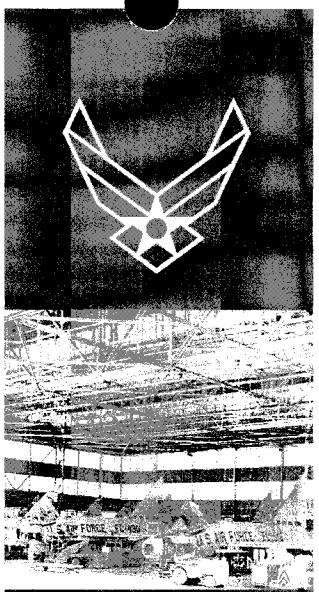
- Reviews of restoration documents
- Reviews of proposed remedial technologies
- Interpretations of health and environmental effects
- Reviews of relative risk evaluations
- Development of certain types of technical training



Environmental
Site Cleanup

Projects that are not eligible for TAPP funding

- Generation of new primary data
- Litigation or underwriting legal actions
- Reopening final DoD decisions
- Political activity or lobbying
- Epidemiological or health studies
- Community Outreach efforts

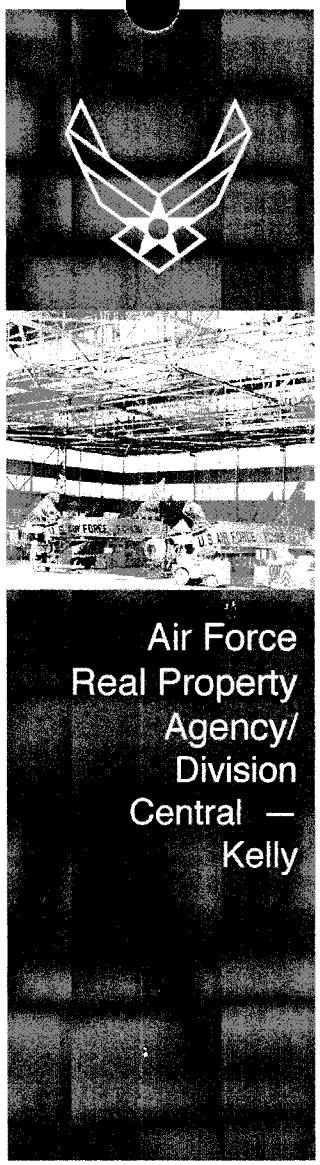


Air Force
Real Property
Agency/
Division
Central —
Kelly

Environmental
Site Cleanup

TAPP funding

- $25,000 per year, or one percent of the total cost of completing environmental restoration at the installation, whichever is less
- $100,000 limit per installation



Air Force Real Property Agency/ Division Central — Kelly

Environmental Site Cleanup

The TAPP Process

Community members of the RAB or TRS

1. Define a project
2. Evaluate other potential sources of assistance
3. Complete the TAPP application
4. Submit the application to the Air Force Real Property Agency site manager for review and approval
5. Complete a satisfaction survey on the contractor's work

Air Force Real Property Agency/ Division Central — Kelly

Environmental Site Cleanup

Kelly RAB TAPP Projects

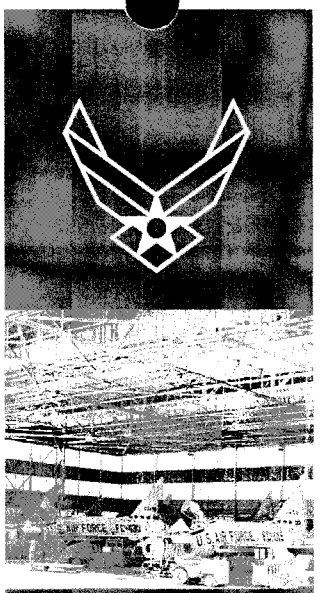
- 1998
  - -*ATSDR Water Report*
    University of Maryland
  - -*97 Basewide Remediation Assessment*
    Clearwater Revival Company
  - -*OU2 Workplan*
    Neathery Environmental
- 1999
  - -*Zone 3 CMS Addendum*
    Clearwater Revival Company
  - -*Remedial Investigation Zone 4 OU2*
    Neathery
  - -*Final Zone 5 CMS*
    Geomatrix

Air Force Real Property Agency/ Division Central — Kelly

Environmental Site Cleanup

Kelly RAB TAPP Projects

- 2000
  - -*Shallow Groundwater Report*
    Geomatrix
  - -*Site S-8 Draft Final CMI*
    Neathery
  - -*Site MP Draft Final*
    Clearwater Revival Company
- 2001
  - -*Zone 4 CMS*
    Geomatrix
  - -*ATSDR Health Assessment*
    University of Maryland

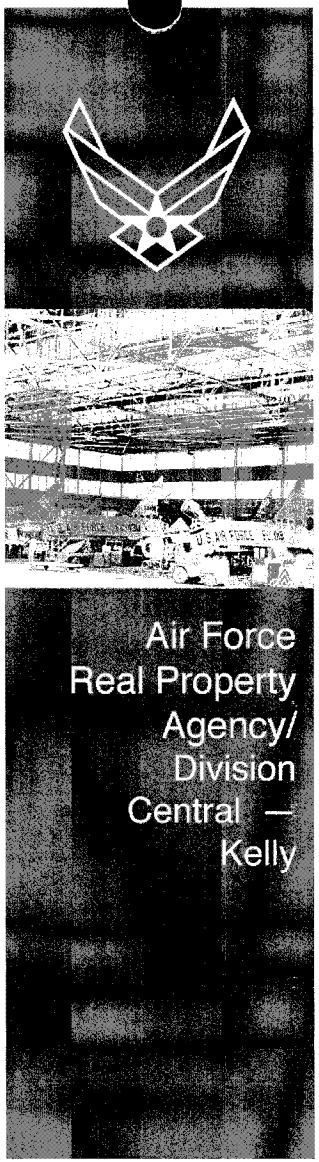


Air Force Real Property Agency/ Division Central — Kelly

Environmental Site Cleanup

Kelly RAB TAPP Projects

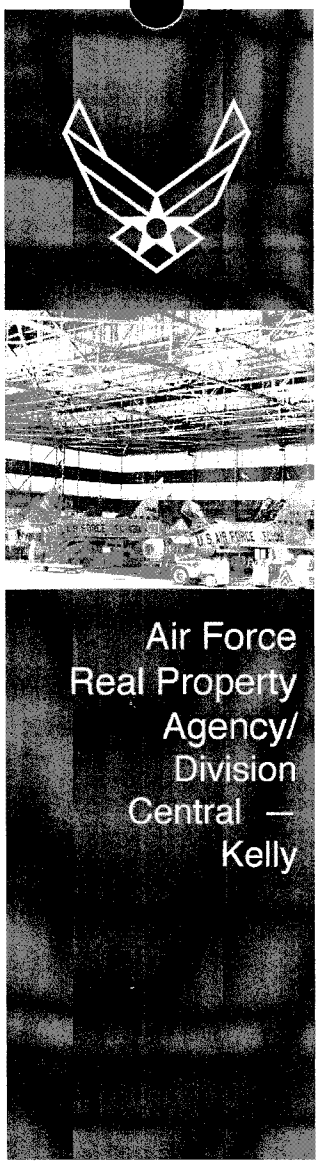
- 2002
  - -*Zone 3 RFI*
    Clearwater Revival Company
- 2003
  - -*ATSDR Air Emissions Study (pending)*
    University of Maryland
  - -*Zone 2/3 CMS (pending)*
    Neathery



Environmental
Site Cleanup

Kelly RAB TAPP Funding Status

- Obligations to date total $91,200
- Remaining funding to date is $8,800



Air Force Real Property Agency/ Division Central — Kelly

Environmental Site Cleanup

Additional funding may be available

- Waivers can be requested for more funding
- Additional funds and/or waivers
  - must be requested through AFRPA
  - Must be tied to a specific project

Internet-Based Training

ITRC develops and delivers training courses via the Internet to reach a geographically dispersed audience of regulators, consultants, and other members of the environmental community. These courses create a unique forum for the exchange of technical and regulatory information because they are based on ITRC guidance documents, which reflect the consensus opinion of ITRC members from states and federal environmental agencies, the private sector, and citizen stakeholders.

The training sessions, lasting two to two and one-half hours, cover technical and regulatory information specific to environmental technologies and innovative approaches. Question-and-answer periods enable participant/instructor interaction. At the end of the presentation, participants are guided to links for related documents and other online resources. Registration for the courses opens 4–6 weeks prior to each course offering. The courses are hosted on USEPA TIO's servers at http://clu-in.org/studio/seminar.cfm#upcoming. Registrants are provided with all information needed to participate. The contact for Internet-based training courses is Mary Yelken, (402) 325-9615, myelken@earthlink.net.

NOTE: **The initial course schedule for 2004 is listed under the courses below, but please check back periodically as more courses and sessions will be added.**

2004 Internet-Based ITRC Training Schedule (as of June 2, in PDF)

ITRC's Technical Exchange Center also supports the exchange of technical information on environmental technologies. Visit the TEC to research information from industry and regulatory experts or to ask questions, read answers, or post your own experiences in message boards for any ITRC technical team.

Click on topic name to jump to that topic:

Advanced PRBs - Advanced Techniques on Installation of Iron-Based Permeable Reactive Barriers and Non-Iron-Based Barrier Treatment Material

Construction techniques for excavation and barrier wall emplacement have improved dramatically, and careful attention to barrier design and construction is critical to long-term performance monitoring. This second ITRC training course on permeable reactive barrier walls responds to requests to provide more detail and describe advances in the science and engineering to design, install, maintain, and monitor reactive barrier systems. The training is designed for state and federal regulators and industry consultants, but this new information will interest site owners and community stakeholders as well.

The curriculum uses case studies describing long-term performance of iron-based systems to train students to design them according to the heterogeneities of the subsurface. The training does not focus on the basic science and engineering of barrier systems but does present up-to-date information from industry and state regulators. The course also describes non-iron barrier systems, the material most commonly used, and the mechanisms encouraging a reduction in contaminant concentrations with in the systems.

Three documents created by ITRC's Permeable Reactive Barriers Team and the Remediation Technologies Development Forum support this course: *Regulatory Guidance for Permeable Barrier Walls Designed to Remediate Chlorinated Solvents* (2nd ed., PBW-1, 1999), *Regulatory Guidance for Permeable Reactive Barriers Designed to Remediate Inorganic and Radionuclide Contamination* (PRB-3, 1999), and *Design Guidance for Application of Permeable Barriers to Remediate Dissolved Chlorinated Solvents* (PBW-2, 2000).

No future classes scheduled at this time.

Course registration opens 4–6 weeks before each session. Dates subject to change. For more information, contact Mary Yelken at myelken@earthlink.net or (402) 325-9615.

TOP

Alternative Landfill Covers - Design, Installation, and Monitoring of Alternative Final Landfill Covers

Solid and hazardous waste landfills are required by federal, state, and/or local regulations to cover waste materials prior to or as part of final closure. These final covers are only one element of landfill systems, which may include a liner or multiple liners, the actual waste material, a cover, run-on and run-off control features, security, groundwater monitoring networks, and settlement monitoring markers. ITRC developed the guidance document *Technical and Regulatory Guidance for Design, Installation and Monitoring of Alternative Final Landfill Covers* (2003, ALT-2) and this associated training course to provide tools and resources when considering the application of alternative final landfill covers. The ITRC guidance and training course focus on a class of landfill final covers ('alternative' covers) as integral parts of an overall landfill system that differ in both design and operational theory from those designs prescribed in RCRA regulations.

Several primary types of alternative landfill covers have been proposed for solid, hazardous, and mixed waste landfills; however, the design is in the science and engineering and should not be categorized or prescriptive. Alternative covers have been constructed and are fully operational at industrial waste, construction debris, municipal solid waste, and hazardous waste landfills. Alternative final covers (AFCs) may be used on bioreactors landfill, conventional landfills, or other types of landfills. Types of AFCs may include, but are not limited to, asphalt covers, concrete covers, capillary barrier covers, and evapotranspiration (ET) covers. This training and associated guidance focus on ET covers and the decisions associated with their successful design, construction, and long-term care. The ITRC Alternative Landfill Technologies team believes that the solid and hazardous waste regulations clearly provide a mechanism to permit, design, construct, and maintain landfills with alternative cover design.

July 13, 2:00 p.m. to 4:15 p.m. EASTERN Time
November 9, 2:00 p.m. to 4:15 p.m. EASTERN Time

Course registration opens 4–6 weeks before each session. Dates subject to change. For more information, contact Mary Yelken at myelken@earthlink.net or (402) 325-9615.

TOP

Constructed Treatment Wetlands

Natural wetlands have been called 'nature's kidneys' because of their ability to remove contaminants from the water flowing through them. Wetlands are perhaps second only to tropical rain forests in biological productivity; plants grow densely and there is a rich microbial community in the sediment and soil in part supported by the plant roots.

Constructed treatment wetlands are manmade wetlands developed specifically to treat contaminants typically in water that flows through them. They are constructed to recreate, to the extent possible, the structure and function of natural wetlands. Like other phytoremediation approaches, treatment wetlands are self-sustaining (though sometimes optimized with minimal energy input), making them a very attractive option for water treatment compared to conventional treatment systems, especially when lifetime costs are compared.

Based on *Technical and Regulatory Guidance Document for Constructed Treatment Wetlands* (WTLND-1, 2003), this course describes the physical, chemical, and biological mechanisms operating in wetlands treatment systems; the contaminants to which they apply; the characteristics of sites suitable to treatment in this fashion; and relevant regulatory issues.

June 15, 2:00 p.m. to 4:15 p.m. EASTERN Time
November 4, 11:00 a.m. to 1:15 p.m. EASTERN Time

Course registration opens 4–6 weeks before each session. Dates subject to change. For more information, contact Mary Yelken at myelken@earthlink.net or (402) 325-9615.

TOP

In Situ Chemical Oxidation

Using in situ chemical oxidation (ISCO) to remediate grounhdwater contamination involves injecting oxidants directly into the source zone and downgradient plume. ISCO has the potential to treat benzene, toluene, ethylbenzene, and xylenes (BTEX); tetrachloroethylene; trichloroethylene; dichloroethylenes; vinyl chloride; methyl-*tert*-butyl-ether; polyaromatic hydrocarbon compounds; and many other organic contaminants. The oxidants react with contaminants, producing innocuous substances such as carbon dioxide, water, and inorganic chloride.

This training familiarizes participants with ITRC's *ITRC Technical and Regulatory Guidance for Using In-Situ Chemical Oxidation to Remediate Contaminated Soil and Groundwater* (ISCO-1, 2001), including descriptions of various chemical oxidants, regulatory considerations, stakeholder concerns, case studies, and technical references—information to help understand, evaluate, and make informed decisions on ISCO proposals.

July 22, 11:00 a.m. to 1:15 p.m. EASTERN Time
October 7, 11:00 a.m. to 1:15 p.m. EASTERN Time

Course registration opens 4–6 weeks before each session. Dates subject to change. For more information, contact Mary Yelken at myelken@earthlink.net or (402) 325-9615.

TOP

Munitions Response Historical Record Review

The proper collection, analysis, and documentation of a historical records review for a munitions response (MR) provide the basis for the MR site investigation and remediation process. Because the historical review is the first step in evaluating hazards resulting from military activities at project sites, national, state, and local interest has increasingly focused on this review. To evaluate the adequacy of the review performed on a project site, regulators must understand the various processes involved in preparing a historical review because historical evaluations can vary greatly from site to site.

This training introduces state regulators, environmental consultants, site owners, and community stakeholders to *Munitions Response Historical Record Review* (UXO-2, 2003), created by ITRC's Unexploded Ordnance Team to assist reviewers in assessing the adequacy of an MRHRR review of property potentially impacted by the use of military munitions. The course teaches the purpose, content, and terminology of munitions historical research; provides a uniform technical approach and useful tools for reviewing an MRHRR document independent of regulatory framework or authorities; and communicates state regulator expectations to those initiating, planning, and executing an MRHRR document.

June 22, 2:00 p.m. to 4:15 p.m. EASTERN Time
October 19, 2:00 p.m. to 4:15 p.m. EASTERN Time

Course registration opens 4–6 weeks before each session. Dates subject to change. For more information, contact Mary Yelken at myelken@earthlink.net or (402) 325-9615.

TOP

Phytotechnologies

Phytotechnologies use plants to contain, stabilize, sequester, assimilate, reduce, detoxify, degrade, metabolize, and/or mineralize contaminants in soil, groundwater, surface water, or sediments. Phytotechnologies can be applied in situ or ex situ and can address organic compounds such as petroleum hydrocarbons, gas condensates, crude oil, chlorinated compounds, pesticides, and explosive compounds, as well as inorganics including high salinity, heavy metals, metalloids, and radioactive materials.

This training familiarizes participants with ITRC's *Phytotechnologies Technical and Regulatory Guidance* (PHYTO-2, 2001) and the *Phytoremediation Decision Tree* (PHYTO-1, 1999), which enables users to input basic site information and determine through a flowchart whether phytotechnologies are feasible. The course provides technical and regulatory information to help understand, evaluate, and make informed decisions on phytotechnology proposals. Included is a description of the various sciences and engineering practices phytotechnologies require, regulatory considerations and policy issues, stakeholder concerns, case studies, and technical references.

September 14, 2:00 p.m. to 4:15 p.m. EASTERN Time

Course registration opens 4–6 weeks before each session. Dates subject to change. For more information, contact Mary Yelken at myelken@earthlink.net or (402) 325-9615.

Related Link: ITRC Classroom Training

TOP

Radiation Risk Assessment - Radiation Risk Assessment: Updates and Tools

The ITRC Radionuclides Team's *Determining Cleanup Levels at*

Radioactively Contaminated Sites: Case Studies (RAD-2, 2002) examines the factors influencing variations in cleanup level development at various radioactively contaminated sites and underscores the need for training to enhance consistency in radiation risk assessment application. The document also acknowledges the differences between the 'dose approach' used at some sites and EPA's 'risk-based approach.' Since most radioactively contaminated DOE and DOD sites are developing cleanup goals under CERCLA authority, there is a need for training that clarifies the variations between these approaches and elaborates on the methodology used to develop risk-based remediation goals. This training course has been collaboratively developed by the ITRC Radionuclides Team and EPA's Superfund Office to meet these needs. The focus of this training is EPA's new radiation risk assessment tools, which can facilitate better decision making for accelerated cleanups. Course modules have the following specific purposes:

- Regulatory Background and Case Studies: Provide an overview of the regulatory requirements for cleanup of radioactive waste
- Existing Practices in Radiation Risk Assessment: Clarify differences between existing radiation risk assessment practices (dose- and risk-based approaches) and provide updates
- Use of Radiation PRG Calculator: Explain how to use EPA's new risk-based PRG and ARAR dose calculators for radionuclides
- Case Study Application for PRG Calculator: Demonstrate site-specific challenges in application of tools

August 5, 11:00 a.m. to 1:15 p.m. EASTERN Time

Course registration opens 4–6 weeks before each session. Dates subject to change. For more information, contact Mary Yelken at myelken@earthlink.net or (402) 325-9615.

TOP

Small Arms Firing Ranges - Characterization and Remediation of Soils at Closed Small Arms Firing Ranges

Remediation of soils at small arms firing ranges presents unique challenges because contaminants exist both as discrete particles and as sorbed compounds dispersed throughout the soil matrix. The form and distribution of particulate lead varies based on range use, size and impact velocity of the round, soil characteristics, and past range maintenance practices. Removal of the discrete particles during remediation reduces not only total but leachable lead as well. Unfortunately, simple dry screening is seldom suitable to remove lead particles through all size ranges where it is present.

Based on ITRC's *Technical and Regulatory Guidance for Closed Small Arms Firing Range Remediation Technologies* (SMART-1, 2003), this course introduces participants to the various physical (including hydraulic), chemical, and biochemical mechanisms available to treat or stabilize closed small arms firing ranges, after some unique characterization challenges are overcome.

August 24, 2:00 p.m. to 4:15 p.m. EASTERN Time

Course registration opens 4–6 weeks before each session. Dates subject to change. For more information, contact Mary Yelken at myelken@earthlink.net or (402) 325-9615.

Surfactant/Cosolvent Flushing of DNAPLs - Surfactant/Cosolvent Flushing of DNAPL Source Zones

Surfactant/cosolvent flushing involves the injection and subsequent extraction of chemicals to solubilize and/or mobilize dense, nonaqueous-phase liquids (DNAPLs). The chemical flood and the solubilized or mobilized DNAPL are removed through extraction wells, and the liquids are either disposed or treated on site. This is a mature technology in the petroleum-engineering field, supported by decades of research and field tests.

Environmental applications have become more common in recent years. The technology has been shown effective for several DNAPL types, including spent degreasing solvents (TCE and TCA), dry cleaning solvents (PCE), heavy fuel oils, and coal tar/creosote. Lab work has demonstrated applicability to PCB-containing mineral oils. The primary appeal of the technology is its potential to quickly remove a large fraction of the total DNAPL mass. Technical challenges include locating and delineating the DNAPL source zone, estimating the initial DNAPL mass and spatial distribution, characterizing the hydraulic properties of the aquifer, delivering and distributing the injected chemicals to the targeted zone, and designing the optimum chemical formulation for a given DNAPL composition and soil type. Typical concerns include the cost of disposal of the effluent, regulatory permitting for underground injection of tracers or flushing agents, the overall impact of unremoved DNAPL, and the expertise of the personnel involved in site remediation.

This training familiarizes participants with ITRC's *Technical and Regulatory Guidance for Surfactant/Cosolvent Flushing of DNAPL Source Zones* (DNAPL-3, 2003), which provides technical and regulatory information to help people understand, evaluate and make informed decisions regarding potential surfactant/cosolvent flushing projects. Included are a description of the technology, system operation, performance assessment, regulatory considerations, stakeholder concerns, case studies, and technical references.

September 30, 11:00 a.m. to 1:15 p.m. EASTERN Time

Course registration opens 4–6 weeks before each session. Dates subject to change. For more information, contact Mary Yelken at myelken@earthlink.net or (402) 325-9615.

Systematic Approach to In Situ Bioremediation

Several aspects of in situ bioremediation (ISB) are characteristic of all sites, no matter what contaminant is being scrutinized. Many site characteristics used to determine the efficacy of ISB are also similar, even though contaminants and breakdown products differ. Once a site

has been characterized for ISB efficacy and the contaminants of concern and degradation products have been defined, engineered approaches can be designed, pilot-tested, and possibly deployed.

This training presents a decision tree for reviewing, planning, evaluating, and approving in situ bioremediation (ISB) systems in the saturated subsurface. It defines site parameters and appropriate ranges of criteria necessary for characterization, testing, design, and monitoring of ISB technologies. The course is based on ITRC's *Systematic Approach to In Situ Bioremediation: Nitrates, Carbon Tetrachloride, and Perchlorate* (ISB-8, 2002), which describes information needed for any ISB evaluation, provides a flow diagram defining primary decision points, and discusses characteristics used to evaluate monitored natural attenuation or enhanced ISB application as remediation options. It includes examples of how to apply the document, with additional decision trees for nitrate, carbon tetrachloride, and perchlorate.

September 2, 11:00 a.m. to 1:15 p.m. EASTERN Time

Course registration opens 4–6 weeks before each session. Dates subject to change. For more information, contact Mary Yelken at myelken@earthlink.net or (402) 325-9615.

Related Link: ITRC Classroom Training

TOP

Triad Approach - A New Paradigm for Environmental Project Management

This ITRC training course introduces the Triad concept and highlights how this process can increase the effectiveness and quality of environmental investigations. Key terms are defined, and the advantages and disadvantages are discussed. The concepts embodied in the three legs of the Triad approach—systematic project planning, dynamic work strategies, and real-time measurement technologies—are discussed. The Triad approach can be thought of as an initiative to update the environmental restoration process by providing a better union of scientific and societal factors involved in the resolution of contamination issues. It does so by emphasizing better investigation preparation (systematic project planning), greater flexibility in field work (dynamic work strategies), and advocacy of real-time measurement technologies, including field-generated data. The central concept that joins all of these ideas is the need to understand and manage uncertainties that affect decision making.

The Triad approach relies on technological, scientific, and process advances that offer the potential for improvements in both quality and cost savings. The cost-saving potential is considered to be significant but is only now being documented by case studies. Some case studies are discussed, including the savings of time and money attributed to using the Triad approach. This training explains the relationship of the Triad to previous regulatory guidance and offers a discussion of issues that may affect stakeholders. An example is given of a state's efforts to formally adopt the Triad approach into its existing regulatory program. The training concludes by directing trainees to additional resources for further study. The ITRC guidance document *Technical and Regulatory*

Guidance for the Triad Approach: A New Paradigm for Environmental Project Management (SCM-1, 2003) developed by the ITRC Sampling, Monitoring and Characterization Team, serves as the basis for this training course.

October 12, 2:00 p.m. to 4:15 p.m. EASTERN Time

Course registration opens 4–6 weeks before each session. Dates subject to change. For more information, contact Mary Yelken at myelken@earthlink.net or (402) 325-9615.

TOP

ITRC Internet Training Archives

Archives of previous ITRC Internet training events are available for your convenience. Click the link above, then scroll down to the section for 'Seminars sponsored by the Interstate Technology and Regulatory Council' (look for the ITRC logo). Seminars are available for download in three different formats: Microsoft PowerPoint, full color Adobe Acrobat, and black and white Adobe Acrobat. All formats include the instructors' notes.

For more information, contact Mary Yelken at myelken@earthlink.net or (402) 325-9615.

TOP

EPA-TIO Hosted Internet Training Events

In addition to hosting ITRC Internet training, the EPA Technology Innovation Office hosts a variety of Internet events on environmental topics. Registration Information

TOP

June 2, 2004

ITRC Internet-Based Training Events for 2004 www.itrcweb.org
Environmental technologies and approaches for site characterization and remediation.

ITRC's Internet-based training courses are unique forums for the exchange of technical and regulatory information primarily for environmental technologies and approaches for site characterization, monitoring, and remediation. In conjunction with USEPA's Technology Innovation Program, ITRC develops and delivers training courses via the Internet to reach a geographically dispersed audience of regulators, consultants, and other members of the environmental community. The training sessions last two to two and one-half hours, cover technical and regulatory information specific to environmental technologies and innovative approaches, and are supported by consensus-based ITRC technical and regulatory guidance documents. Course registration opens at www.itrcweb.org (or directly at www.clu-in.org/studio/) four to six weeks prior to the course offering. After registering for the course, participants are provided with the information needed to participate. Question-and-answer periods allow for participant interaction with the instructors. At the end of the presentation, participants are guided to links for related documents and other resources available online. The primary contact for all Internet training courses is Mary Yelken, 402-325-9615 or myelken@earthlink.net.

NOTE: Course dates and times are subject to change. Please check www.itrcweb.org for the latest schedule.

ALL TIMES ARE EASTERN TIME ZONE

#	2004 DATE and TIME (Eastern)	ITRC TRAINING TITLE OR TOPIC	Comments
1	March 18 (Thursday) 11:00 a.m. – 1:15 p.m.	*Munitions Response Historical Record Review (MRHRR)*	
2	March 30 (Tuesday) 2:00 p.m. – 4:15 p.m.	*Constructed Treatment Wetlands*	
3	April 13 (Tuesday) 2:00 p.m. – 4:15 p.m.	*In Situ Chemical Oxidation*	
4	April 15 (Thursday) 11:00 a.m. – 1:15 p.m.	*Characterization and Remediation of Soils at Closed Small Arms Firing Ranges*	
5	April 22 (Thursday) 11:00 a.m. – 1:15 p.m.	*Advanced Techniques on Installation of Iron-Based Permeable Reactive Barriers and Non-Iron-Based Barrier Treatment Material*	
6	April 27 (Tuesday) 2:00 p.m. – 4:15 p.m.	*Surfactant/Cosolvent Flushing of DNAPL Source Zones*	
7	May 4 (Tuesday) 2:00 p.m. – 4:15 p.m.	*Radiation Risk Assessment: Updates and Tools*	
8	May 13 (Thursday) 11:00 a.m. – 1:15 p.m.	*Design, Installation and Monitoring of Alternative Final Landfill Covers*	
9	May 20 (Thursday) 11:00 a.m. – 1:15 p.m.	*Systematic Approach to In Situ Bioremediation in Groundwater: Nitrates, Carbon Tetrachloride & Perchlorate*	
10	June 15 (Tuesday) 2:00 p.m. – 4:15 p.m.	*Constructed Treatment Wetlands*	
11	June 22 (Tuesday) 2:00 p.m. – 4:15 p.m.	*Munitions Response Historical Record Review (MRHRR)*	
12	July 13 (Tuesday) 2:00 p.m. – 4:15 p.m.	*Design, Installation and Monitoring of Alternative Final Landfill Covers*	
13	July 15 (Thursday) 11:00 a.m. – 1:15 p.m.	*Triad Approach: A New Paradigm for Environmental Project Management*	Cancelled

June 2, 2004

#	2004 DATE and TIME (Eastern)	ITRC TRAINING TITLE OR TOPIC	Comments
14	July 22 (Thursday) 11:00 a.m. – 1:15 p.m.	*In Situ Chemical Oxidation*	
15	August 5 (Thursday) 11:00 a.m. – 1:15 p.m.	*Radiation Risk Assessment: Updates and Tools*	
16	August 17 (Tuesday) 2:00 p.m. – 4:00 p.m.	*Strategies for Monitoring the Performance of DNAPL Source Zone Remedies*	Tentative date – Course materials are under development
17	August 24 (Tuesday) 2:00 p.m. – 4:15 p.m.	*Characterization and Remediation of Soils at Closed Small Arms Firing Ranges*	
18	September 2 (Thursday) 11:00 a.m. – 1:15 p.m.	*Systematic Approach to In Situ Bioremediation in Groundwater: Nitrates, Carbon Tetrachloride & Perchlorate*	
19	September 14 (Tuesday) 2:00 p.m. – 4:15 p.m.	*Phytotechnologies*	
20	September 16 (Thursday) 11:00 a.m. – 1:00 p.m.	*Passive Diffusion Bag Samplers for Volatile Organic Compounds in Ground Water*	Tentative – Instructors to be confirmed
21	September 28 (Tuesday) 2:00 p.m. – 4:00 p.m.	*Remediation Process Optimization*	Tentative date – Course materials are under development
22	September 30 (Thursday) 11:00 a.m. – 1:15 p.m.	*Surfactant/Cosolvent Flushing of DNAPL Source Zones*	
23	October 7 (Thursday) 11:00 a.m. – 1:15 p.m.	*In Situ Chemical Oxidation*	
24	October 12 (Tuesday) 2:00 p.m. – 4:00 p.m.	*Triad Approach: A New Paradigm for Environmental Project Management*	Tentative date – Course materials are under development
25	October 19 (Tuesday) 2:00 p.m. – 4:15 p.m.	*Munitions Response Historical Record Review (MRHRR)*	
26	October 21 (Thursday) 11:00 a.m. – 1:15 p.m.	*Strategies for Monitoring the Performance of DNAPL Source Zone Remedies*	Tentative date – Course materials are under development
27	November 4 (Thursday) 11:00 a.m. – 1:15 p.m.	*Constructed Treatment Wetlands*	
28	November 9 (Tuesday) 2:00 p.m. – 4:15 p.m.	*Design, Installation and Monitoring of Alternative Final Landfill Covers*	
29	November 16 (Tuesday) 2:00 p.m. – 4:15 p.m.	*Radiation Site Cleanup: Policies and Requirements*	
30	November 18 (Thursday) 11:00 a.m. – 1:00 p.m.	*Remediation Process Optimization*	Tentative date – Course materials are under development
31	December 2 (Thursday) 11:00 a.m. – 1: 00 p.m.	*Guidance for Using Direct-Push Wells*	Tentative date – Course materials are under development
32	December 7 (Tuesday) 2:00 p.m. – 4: 00 p.m.	*Environmental Management at Operational Outdoor Small Arms Firing Ranges*	Tentative date: – Course materials are under development
33	December 9 (Thursday) 11:00 a.m. – 1: 00 p.m.	*Mitigation Wetlands*	Tentative date – Course materials are under development

Classroom Training

ITRC's nationwide training courses are unique forums for the exchange of technical and regulatory information. Classroom training courses are offered in classroom settings where participants can receive in-person, face-to-face training.

NOTE: **The complete course schedule for 2004 is currently under development. Please check back periodically for up-to-date information.**

Click on topic name to jump to that topic:

MTBE & TBA Remediation | Accelerated ISB of Chlorinated Solvents | Phytotechnologies - Mechanisms and Applications

MTBE & TBA Remediation - (Fall - Pending)
Groundwater contamination from fossil derived fuels is widespread throughout the United States. A wealth of scientific information and conventional technology are available to treat conventional fuel hydrocarbons like benzene, toluene, ethyl benzene, and xylenes (BTEX). Substantially less is known about fuel constituents such as methyl-tert-butyl ether (MTBE) and tert-butyl alcohol (TBA) and other oxygenates which are often added to gasoline to increase octane ratings and to reduce harmful, air polluting combustion by products.

This comprehensive two-day course introduces students to a variety of MTBE

and TBA contaminated groundwater topics including, but not limited to:

1) Chemical, physical and biological characteristics;
2) Available remediation technologies;
3) Technology selection and sequencing and;
4) Processes for successful site assessment and remediation.

The MTBE team has assembled a top-notch group of instructors offering both theoretical and practical information about MTBE and TBA in groundwater. Students can expect to increase their understanding of groundwater related site characterization and remediation issues, especially as it relates to the regulator acceptance and successful application of innovative technology.

All students attending the course will receive a hard bound copy of the official training manual and a CD of valuable reference material. Students who bring a wireless capable (802.11a,b and/or g) laptop equiped with MS Explorer or Netscape Navigator (or pay the $200 multimedia fee to rent a laptop) will be able to participate in 'live' computer modeling sponsored by the U.S. Environmental Protection Agency.

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Accelerated ISB of Chlorinated Solvents

Course Description: The In Situ Bioremediation Team developed this classroom training course in conjunction with the Remediation Technologies Development Forum as a follow-on to the team's successful natural attenuation course. The course focuses on the use of enhancements to the subsurface environment to accelerate the biodegradation of chlorinated solvents and is designed to provide sufficient technical and regulatory information for making informed decisions about the feasibility of enhanced in situ bioremediation projects.

To be placed on the mailing list to receive information about additional courses, please e-mail itrc@wpi.biz.

Related Links:

- ITRC Internet-Based ISB Training: Systematic Approach to ISB
- ITRC ISB Guidance Documents

TOP

Phytotechnologies - Mechanisms and Applications

Course Description: The Phytotechnologies training brings regulators to learn, alongside environmental consultants, latest applications of phytotechnologies in remediation and waste management. The curriculum focuses on application and teaches systems design using hands-on team problem solving, case studies, and evening homework. All lecture topics are based on a series of case studies. The instructors, all with abundant field experience, describe advantages of using phytotechnologies plus the technical and regulatory shortcomings of the current understanding. Each day includes a session designed to discuss issues the regulated and regulatory community have experienced or would anticipate in the future. We intend to use the results to reduce or eliminate regulatory issues acting as barriers to safe development of phytotechnologies. If you need more information, contact Steve Rock

(rock.steven@epa.gov, 513-569-7149) or Kris Geller (kris.geller@dep.state.nj.us, 609-633-2318).

Training Schedule:

- June 9 - 10, Middletown, Pennsylvania. Read the brochure. **The class is full and registration is closed.** Please call Melissa Gross at 717-783-9769 if you have any questions regarding the class.

To be placed on the mailing list to receive information about additional courses, please e-mail itrc@wpi.biz.

Related Links:

- ITRC Internet-Based Phytotechnologies Training
- ITRC Phytotechnologies Guidance Documents

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	REPORTS LISTED BELOW WERE TAKEN TO THE TRS MEETING	Date	Status	Adm
	Jun 04			
224B	RCRA Facility Investigation for Zone 2, Site E-1 Page Changes	Jan 2002	Final	Yes
244B	Decision Document for Site E-1 (WP021)	July 2002	Final	Yes
247B	Construction Completion Report CMI, Zone 2 RCRA-Reg Units SD-1 & SA-2	July 2003	Final	Yes
255B	Zone 2 Six Sites Soil Closure Investigation Report Revised Section 11 (Site SD-2)	March 2004	Revised	Yes
346B	Decision Document for Building 360 and Former Building 301	July 2002	Final	Yes
350B	RCRA Facility Investigation for Zone 3 (Volume 1 only w/Comments and Replacement Sheets)	Mar 2004	Final	Yes
351B	Corrective Measures Study for Zones 2 and 3	Apr 2004	Final Draft	Yes
477	Sub-Slab Soil Gas Sampling for Zone 4	Mar 2004	Final	Yes
478	Ecological Risk Assessment Report for Zone 4	Mar 2004	Final	Yes
584A	Corrective Measures Study/Feasibility Study for Zone 5	Dec 2003	Final	Yes
655B	Semiannual Compliance Plan Report for January 2004 (July - December 2003) Parts 1-4	Jan 2004	Final	Yes
661B	Tier 2 / Tier 3 Ecological Risk Assessment	Apr 2004	Final	Yes
	Date:			
	Signature:			

PROJECT NUMBER	PROJECT TITLE	PROJECT DESCRIPTION	ZONE	TYPE FUNDS (BRAC/ERA-AF)	VALIDATED FUNDS	ANTICIPATED RECEIPT OF FUNDS FQ1	FQ2	FQ3	FQ4
MPLS20057038	Corrective Measures Implementation	This project involves capping two landfills (LF011 and LF012) together with the installation of a groundwater collection trench.	1	ERA-AF	Yes			30-Jun	
MBPB20047777	WP021 (E-1), Soil & GW CMI	The scope of the proposed work is to provide for the soil implementation of Alternative 3 in accordance with the Installation Restoration Program (IRP) site WP-021 (E-1) Focused Feasibility Study (FFS). Site E-1 contaminants have impacted on- and off-base soil, on- and off-base groundwater, and Leon Creek surface water.	2	BRAC	Yes	31-Dec			
MBPB20047454	IRP Groundwater CMI - SS037, WP021	The scope of the proposed work is the installation of the Air Force (AF) preferred remedial alternatives in accordance with the Zones 2 and 3 Corrective Measures Study (CMS), Decision Documents (DDs), and Corrective Measures Implementation Work Plan (CMI WP). Zones 2 and 3 were the industrial areas of former Kelly AFB and the numerous Air Force industrial operations in these zones contributed to soil and groundwater contamination.	2,3	BRAC	Yes	31-Dec			
MBPB20047893	Compliance Plan/ GW Monitoring	Comply with the monitoring and reporting requirements of the TCEQ Compliance Plan (CP-50310) and provide a comprehensive groundwater assessment which is essential to the clean-up program at Kelly AFB.	1-5	BRAC/ERA-AF	Yes	31-Dec			
MBPB20047600	IRP Operation and Maintenance	Provide operation and maintenance support for remedial systems.	1-5	BRAC/ERA-AF	Yes	31-Dec			
MBPB20047903	Fate and Transport Modeling	Calibrate basewide model with most recent data; present basewide model with all interim treatment systems in operation; perform zoom models for new alternatives; evaluate existing systems by using capture zone modeling.	1-5	BRAC/ERA-AF	Yes	31-Dec			
MBPB20046896	Range Closures	This project will complete all necessary actions to adequately characterize, assess, and if necessary, conduct effective response actions at Rifle Range OR007 and Small Arms Indoor Firing Range OR008. The purpose of this project is to investigate munitions ranges prior to deed transfer and demonstrate that the Air Force Real Property Agency (AFRPA) has taken all necessary actions required to protect human health and the environment.	2,4	BRAC/ERA-AF	Yes	31-Dec			
MBPB20047995	CMI, SS052	The scope of the proposed work includes the installation of preferred alternatives and final site-closure activities as selected in the corresponding Installation Restoration Program (IRP) Corrective Measures Study (CMS), to be documented in Decision Documents (DDs), and to be designed in the Corrective Measures Implementation Work Plan (CMI WP). Construction activities to be conducted during this project represent the implementation of final remedies for all IRP sites that have contributed to the Zone 4 and 5 commingled groundwater plumes.	4	BRAC	Yes	31-Dec			

EXECUTIVE SUMMARY

Science Applications International Corporation prepared this *Corrective Measures Study Zones 2 and 3, Draft Final* to evaluate and recommended soil and groundwater final remediation alternatives for Zones 2 and 3 sites determined to have chemicals of concern that exceed the Risk Reduction Standard No. 2 criteria. The sites were identified through Resource Conservation and Recovery Act facility investigations for inclusion in this Corrective Measures Study. The following Corrective Measures Study was prepared in accordance with U.S. Environmental Protection Agency Resource Conservation and Recovery Act Corrective Action Plan guidance, as required by the following: 1) the Texas Commission on Environmental Quality, formerly Texas Natural Resource Conservation Commission, Compliance Plan No. 50310, dated 12 June 1998; 2) the U.S.Environmental Protection Agency registration of Kelly AFB as a generator and transporter of hazardous waste (USEPA ID No. TX 2571724333); and 3) the Texas Commission on Environmental Quality registration of the former Kelly Air Force Base as a hazardous and industrial waste management facility (Solid Waste Registration No. 31750).

For soil chemicals of concern, two sites in Zone 2 and twelve sites in Zone 3 were identified for review. The majority of the chemicals of concern were halogenated solvents and metals. The initial step of the evaluation involved the development of soil cleanup levels with the Soil Attenuation Model for the metal chemicals of concern and bis(2-ethylhexyl)phthalate. Comparison of these values with the highest observed concentration for each site contaminant resulted in the total elimination of five sites through demonstration of compliance with the Soil Attenuation Model groundwater protection values and soil/air and ingestion values for industrial sites. All metals and bis(2-ethylhexyl)phthalate were eliminated from consideration. For the remaining seven sites, at least four remediation alternatives were evaluated for each.

For Site E-1, the recommended alternative is excavation of soil in the vadose zone with additional limited soil excavation in the saturated zone, i.e., excavation of saturated zone areas with hazardous concentrations, and continued operation of the existing groundwater interceptor trench. This alternative is desirable because significant source reduction occurs, and operation and maintenance costs are minimized.

For Building 522, the recommended alternative is bioaugmentation and optimized soil vapor extraction. This long-term alternative addresses reduction of the deep source contamination with bioaugmentation. The existing soil vapor extraction system will be optimized to facilitate the removal of the contaminant mass in the vadose zone. This will continue to reduce the source mass and to control migration.

A permeable reactive barrier was previously installed in the area of the former Building 301 to remediate the groundwater. The alternative recommended for this site includes maintenance of the permeable reactive barrier with thermally-enhanced soil vapor extraction (six-phase heating) applied to vadose zone and saturated zone soils. The six-phase heating system will reduce the source mass, allowing for reduced operation and maintenance on the permeable reactive barrier.

Two remediation sites are located near or within Building 360, a tenant-occupied building. Contamination exists under the northwest corner of the building and in the former basement area (former sump location). Because the building is an active industrial facility, minimally intrusive alternatives that will reduce the source mass are recommended. The alternative recommended for the northwest corner is a soil vapor extraction system. Bioaugmentation is recommended for the former basement area.

For the Building 258 area, which has a slurry wall surrounding the source area, the recommended alternative is dense non-aqueous phase liquid extraction combined with groundwater recovery for hydraulic control within the slurry wall. This alternative relies on the current approach of groundwater recovery for hydraulic control and dense non-aqueous phase liquid extraction for source mass removal.

The Building 348 Oil/water Separator Area alternative includes soil vapor extraction for the removal of the organic mass in the soil in the area of the former oil/water separator and passive bailing of the light non-aqueous phase liquid plume for source removal. Passive bailing will be accomplished through installation of mechanical skimming bailers.

For Building 324, soil vapor extraction is the recommended alternative. This will allow removal of the contaminant mass in a cost-effective manner.

The Zones 2 and 3 contaminated groundwater plume is considered a single remediation unit. Remediation alternatives were developed and evaluated using a basewide groundwater model prepared by HydroGeoLogic, Inc. The goal for the considered groundwater remediation alternatives is to prevent migration of contaminants off-base, combined, in part, with operability and cost effectiveness. The selected alternative includes replacement of the CS-2NB groundwater recovery wells with a permeable reactive barrier/slurry wall system along Leon Creek, coupled with chromium bioremediation in high chromium concentration areas of Zone 2.

Executive Summary

Introduction

The purpose of this Corrective Measures Study (CMS) is to evaluate final remedial alternatives for on-base and off-base shallow groundwater contamination at former Kelly Air Force Base (AFB) in San Antonio, Texas. This CMS integrates the findings of previous reports addressing interim remedial actions for shallow groundwater in Zone 5 with an evaluation of other remedial alternatives for other Zone 5 areas of concern that have not been previously evaluated. Thus, this document concludes the remedy selection portion of the phased approach to remediation of Zone 5.

Installation History

Established on 7 May 1917, Kelly AFB was the oldest continuously active airfield in the United States Air Force (USAF). The base's primary mission was to support the San Antonio Air Logistics Center (SA-ALC). The SA-ALC was one of the major Air Force Materiel Command organizations providing large-scale logistics support to USAF installations worldwide. The center managed aircraft engines, weapons systems, support equipment, and aerospace fuels. Also, many aircraft were maintained and repaired at Kelly AFB. Kelly AFB also hosted more than 50 tenants representing the USAF, United States Army, Department of Defense (DOD), and other government agencies.

The 1995 Defense Base Realignment and Closure Commission recommended Kelly AFB for realignment and closure. The Commission's recommendations were accepted by the President and submitted to Congress on 13 July 1995. As Congress did not disapprove the recommendations in the time given under the Defense Base Realignment and Closure Act of 1990, the recommendations are required by law to be implemented. Kelly AFB closed on 13 July 2001. The flightline and areas west were realigned to Lackland AFB in 2001 and became the Kelly Annex of Lackland AFB.

Zone 5 Background Information

Zone 5 includes all areas and facilities in the central part of the base and the flight line. It covers an area of about 2,600 acres, which is about 54 percent of Kelly AFB. The northern part of Zone 5 includes a warehouse area constructed in the late 1940s; the Directorate of Nuclear Weapons; a small aircraft maintenance hangar along the east edge of the flight line; the Defense Logistics Agency, which stores materials; and warehouses operated by various tenant organizations. Light industrial facilities, occupy several blocks off base north of Zone 5 and includes warehouses and storage yards. The North Kelly Gardens residential area is located off base to the north. The Jamar Village residential development is located east and north of the northern property line of the base, and north of Billy Mitchell Road.

The southern part of Zone 5 has no buildings but includes most of the flight line.

Historically, this part of Zone 5 has been used for flight line-related activities, including storage and maintenance of aircraft as well as flight operations.

The western part of Zone 5 includes facilities operated by the 149th Texas National Guard, the 433rd C-5 Air Wing of the Air Force Reserve, and a bulk fuel storage facility north of the 149th compound. Other operations include the fire training area. In the 1940s, the Kelly AFB field runway was located along a line parallel to Billy Mitchell Road. During this time, the area north of Billy Mitchell Road was initially an open field and later used for surplus aircraft storage after World War II. The portion of the flight line in the western part of Zone 5 contains most of the original east-west oriented flight line and its associated maintenance area.

Elevations in Zone 5 range from about 638 feet to 696 feet above NGVD. The highest elevations are in the extreme northwest part of Zone 5 where a small ridge extends southeast. The topography gently slopes away from this ridge to the southwest and southeast. The lowest elevations occur in the southern part of Zone 5. A large drainage ditch discharges to Leon Creek along the west side of Zone 5.

The eastern part of Zone 5 includes many of the base administration buildings. Historical aerial photographs show that many of the current administration buildings were constructed prior to World War II. The area north of Billy Mitchell Road was used for agricultural purposes.

Community Involvement

The public comment period for the review of the Final Proposed Plan began on 15 June 2002 and was extended through 3 September 2002. Three public meetings were held during this period. The first two, 15 June 2002 and 18 June 2002 were conducted as information sessions; allowing the Air Force to present a summary of the remedial actions that were proposed for Zone 5. Written comments were taken at these meetings. The third meeting was an information session with three court reporters present to annotate all comments and concerns. During all three meetings, copies of the Final Proposed Plan were available to the public along with fact sheets all proposed remedies and a summary of the proposed plan. Copies were also available at the Administrative Record Repositories for public review during the comment period.

No comments to the Zone 5 proposed remedial action were specified by the public.

Soil Characterization

Contaminants of concern (COCs) for soil in Zone 5 are present only at site SS003 (S-1). They consist of CB and its co-contaminants, 1,2-DCB and 1,4-DCB, TCE, PCE, benzene, and PCBs. The principal Zone 5 source site is SS003 (S-1). An interim action consisting of removal and disposal of contaminated soil at the former sump area and SVE in conjunction with groundwater recovery and treatment at the "smear zone" was implemented in June 2001. This interim action represents the final action at Site S-1.

Groundwater Characterization

The 1999 Final Zone 5 Remedial Investigation (RI) Report constitutes the primary source of environmental data used for this analysis. The RI data have been supplemented by several more recent supplementary characterization efforts.

A total of 35 contaminants of potential concern were identified in Zone 5 groundwater, resulting in the delineation of eleven distinct groundwater contaminant plumes designated A through K. The plumes were grouped by location of contamination, and, for some constituents, the similarity between chemistry. The key contaminants of potential concern in groundwater include trichloroethene (TCE), dichloroethene (DCE), 1,2-DCE, tetrachloroethene (PCE), benzene, chlorobenzene (CB), and arsenic. As shown in Figure 2, the groundwater contaminant plumes and the key contaminants of potential concern present in each are as follows:

- Plume A (TCE)
- Plume B (PCE)
- Plume C (CB and arsenic)
- Plume D (TCE, PCE, and 1,2-DCE)
- Plume F (PCE/TCE)
- Plume H (TCE and total 1,2-DCE)
- Plume J (PCE and TCE)
- Plume K (CB)

The source area1 and the body of Plume B are located offbase and the plume is migrating to the north/northeast, away from Kelly AFB. The plume is not within Zone 5 and is not related to operations at Kelly AFB. However, even though the plume is not related to Kelly AFB activities, a remedial alternative has been selected and presented in this Decision Document.

Remedial Action Objectives

The shallow groundwater both on base and off base poses unacceptable risks. It is unlikely that on base groundwater will ever be withdrawn directly for use as a drinking water supply, but it still poses risks because it is migrating off-base. Based on this, the following are objectives for groundwater remedial actions for Zone 5:

1. Prevent use of both on-base and off-base groundwater containing contaminants in concentrations exceeding MCLs, or where those are not available, Texas groundwater medium-specific concentrations.
2. Reduce or prevent further migration of contaminated groundwater (defined as groundwater with contaminant concentrations that exceed MCLs or, where those are not available, Texas groundwater medium-specific concentrations) from on-base areas to off-base areas.

[1] "Source area" is used throughout this report to indicate an area in the contamination plume in which the groundwater exhibits high contaminant concentrations relative to the rest of the plume. "Source area" is the area within which the source of groundwater contamination probably originated in the past. Unless otherwise indicated, "source area" does not mean that there is presently an active source of contamination.

3. Restore off-base groundwater to MCLs or, where those are not available, to Texas groundwater medium-specific concentrations, within a reasonable time frame.
4. Restore on-base groundwater to MCLs or, where those are not available, to Texas groundwater medium-specific concentrations, within a reasonable time frame.

Preliminary Remediation Goals

Preliminary remediation goals (PRGs) were developed for groundwater to establish acceptable concentrations for each COC under relevant exposure settings. PRGs for groundwater COCs were developed from the 30 TAC 335.568, Appendix II Table of medium-specific concentrations and the TCEQ Compliance Plan for Kelly AFB. For each contaminant, the more stringent value of the two sources constitutes the PRG used in identifying the extent of groundwater to be remediated.

Development of Remedial Action Alternatives

General response actions (GRAs) were selected to satisfy the remedial action objectives and PRGs by either reducing concentrations of hazardous substances or by reducing the likelihood of contact with hazardous substances. They include actions such as treatment, containment, collection, disposal, and institutional controls. Although one response action may meet the goals, a combination of response actions may meet the goals more effectively.

The technology types and process options available for remediation of groundwater were identified and screened for suitability to eliminate those technologies that are clearly not applicable for remediation. Technology types and process options considered are based on professional experience, published sources, computer databases, and other available documentation for the identified GRAs. GRAs that remained following screening were developed into remedial action alternatives.

Remedial Alternatives for Groundwater

The following alternatives for groundwater remediation at Zone 5 were developed:

- Alternative 1 – No Further Action
- Alternative 2 – Monitored Natural Attenuation (All Plumes)
- Alternative 3 – Pump and Treat (C, D, K); Enhanced Bioremediation (A); In situ Reactive Walls (B); Soil Vapor Extraction (C); MNA (F, H, J)
- Alternative 4 – Pump and Treat (A (off-site), C, D); Enhanced Bioremediation (A (source)); In situ Reactive Walls (A, B); Soil Vapor Extraction (C); MNA (K); Perimeter Control (D, F, H, J)
- Alternative 5 – Pump and Treat (C, D); Enhanced Bioremediation (A (source)); In situ Reactive Walls (A, B); Soil Vapor Extraction (C); MNA (F, H, J,K); Perimeter Control (D, H)

- Alternative 6 – Pump and Treat (C); Enhanced Bioremediation (A (source)); In situ Reactive Walls (A, B); Soil Vapor Extraction (C); MNA (D, F, H, J,K); Perimeter Control (D, H)
- Alternative 7 – Pump and Treat (C); Enhanced Bioremediation (A (source), D); In situ Reactive Walls (A, B); Soil Vapor Extraction (C); MNA (F, H, J, K).

Evaluation for Plume B

Based on its review and analysis of the groundwater and soil data collected by former Kelly AFB and its contractors, Mitretek (2000) suggested that the three former Kelly AFB sources examined cannot be the source of the high (>1,000µg/L) PCE concentrations found in off-base Monitor Well SS050MW156. The industrial and commercial operations—potential sources just upgradient (west) of this well—include aircraft engine maintenance and repair, welding, machine shops, and documented use of hazardous substances. These operations have been present since the early 1950s and are the type of operations that have historically used chlorinated solvents. However, this does not preclude roadside disposal by other parties that are not affiliated with this area. Based on widely spaced groundwater samples, Plume B extends for several miles to the east and southeast, where it commingles with chlorinated solvents plumes from Kelly AFB near the east side of East Kelly and a chlorinated solvents plume originating just north of East Kelly.

Based on comments from the regulatory community, the Air Force will implement a remedy to fully address the groundwater plume to which the Air Force has contributed while containing sources of contamination off of former Kelly AFB, specifically the area north of Kelly AFB around 34th Street. However, the remedy does not clean the source that is likely located on private property, nor does the Air Force believe it is their responsibility to do so.

NEPA Considerations

NEPA normally considers the environmental impacts of an action, such as impacts to environmental media, cultural resources, the ecosystem, and threatened and endangered species, as well as the cumulative impacts and any potential issues related to environmental justice. As indicated below, none of the alternatives would be expected to have significant environmental impacts:

- Kelly AFB is located in an attainment area for all pollutants with established national and state air quality standards (per the Air Quality Control Region 13 of the Air Quality Division of the TCEQ); none of the alternatives are anticipated to generate air emissions sufficient to jeopardize the federal attainment status of the region.
- There are no known or suspected archaeological sites on Kelly AFB, and none of the alternatives would impact any structures, buildings, or objects eligible for listing on the National Register of Historic Places, and subject to the National Historic Preservation Act (36 CFR part 800).
- Due to the urban development in the project area, there is very little natural habitat to support wildlife. Therefore, none of the alternatives would have a significant impact on

sensitive, protected, threatened or endangered species. Zone 5 is also located outside of the 100-year flood plain; and there are no wetlands in or around the proposed project site.

- Because the construction activity related to these alternatives is extremely small and in an already industrialized area, and because no effects to cultural or ecological resources are anticipated, no significant cumulative impacts are anticipated from any of the remedial action alternatives.

None of the alternatives would increase Kelly AFB's draw from the Edwards Aquifer, and, therefore, would not impact the threatened and endangered species associated with this sole source aquifer. NEPA requirements for public involvement are similar to those for remedial actions, and thus are covered under the standard IRP public comment process.

Summary of the Selected Alternative

This section presents alternatives recommended for final action to address groundwater contamination in Zone 5.

The following sections discuss the selected remediation approach for each plume.

Plume A – On- and Off-base TCE

On the basis of the detailed analysis of alternatives, in-situ bioremediation of groundwater at the Plume A source area with PRB along the base perimeter, is the selected remedy for Plume A. This remedy should effectively reduce the overall risk to human health and the environment from the source and is lowest in cost to implement. This remedy would comply with the ARARs, and there are no NEPA-related issues.

Plume B – Off-base PCE

On the basis of the detailed analysis of alternatives presented, an in-situ permeable reactive barrier downgradient of the suspected source, is the selected alternative for Plume B. This alternative should effectively reduce the overall risk to human health and the environment. The alternative would comply with the ARARs and there are no NEPA-related issues.

Plume C – Chlorobenzene and Arsenic

An interim remediation measure (groundwater extraction and treatment) is ongoing. An additional interim measure was recently performed and included excavation of contaminated soil in the sump area and dual-phase groundwater and vapor extraction within the groundwater plume area. The interim groundwater treatment system is having a positive effect on plume reduction and continued operation of this system is recommended.

Plume D – 1600 Area – TCE, PCE, and DCE Plume

Plume D is a combination of at two smaller contaminant plumes that do not necessarily have the same source. These plumes are located in an area slated for transfer to civilian control, and as such require remediation to restore the groundwater to MCLs or MSCs within a reasonable timeframe.

The recommended alternative for Plume D is to install enhanced bioremediation systems

at source areas. Modeling indicates that the alternative will effectively control migration from source areas.

Plume F – Low Concentration PCE/TCE

Plume F is a combination of at two smaller contaminant plumes that do not necessarily have the same source. The maximum concentration of contaminants is not significantly above MCLs, and modeling indicates that monitored natural attenuation will adequately reduce contamination levels within a reasonable timeframe (approximately 15 to 20 years).

Plume H – Central Runway – TCE, DCE

Plume H is in a part of Zone 5 that will be reassigned to Lackland AFB and therefore will remain under Air Force control. Modeling results indicate that without further source loading, TCE concentrations should decline below MCLs before reaching the base boundary. Contaminant concentrations are relatively low and monitored natural attenuation should adequately reduce contamination levels within about 7 years.

Plume J – KY028 (1100 Area) – PCE, TCE

Plume J is migrating southwest. Contaminant concentrations are low enough that MNA will adequately reduce levels of contamination for Plume J.

Plume K – West – Chlorobenzene

Plume K is in a part of Zone 5 that will be reassigned to Lackland AFB and therefore will remain under Air Force control. A study of monitored natural attenuation at Site SS003 (S-1) indicated that CB is degrading under aerobic aquifer conditions which exist at the perimeter of Plume C. Based on results of the cited study results, CB concentrations in Plume K should also decline below MCLs within a reasonable timeframe before reaching the base boundary. Therefore, monitored natural attenuation will adequately reduce the levels of contamination for Plume K.

Executive Summary

In general, data from the *2003 Basewide Sampling Event* at the former Kelly Air Force Base (AFB) indicate that most plumes associated with known source areas are being addressed by interim recovery systems, which are preventing additional offsite migration. The wells that have historically had the highest concentrations of constituents have generally shown a decrease in constituent levels over time. Overall, since 1995 the extent of off-base plumes has generally decreased as a result of on-base remedial activity. The lateral extent of the tetrachloroethene (PCE), trichloroethene (TCE), and total 1, 2-dichloroethene (DCE) plumes has been fully defined off base to the southeast of Zone 3, and off base east and southeast of Zone 4.

The percentage of volatile organic compound (VOC) detections remained generally the same from 1999 to 2003. Overall, the basewide distribution of chlorinated hydrocarbons has remained generally the same, but decreases in magnitude have occurred in the vicinity of source areas and areas downgradient of most operating recovery systems. Decreases in concentrations are particularly evident around recovery systems along Leon Creek in Zone 2, where concentrations in many wells between Leon Creek and operating recovery systems have been reduced. Dramatic reductions in chlorinated hydrocarbon concentrations have been achieved in the WP022 (E-3) source area. A marked decrease in concentrations continues downgradient of Site SS040 (MP), and is attributed to the recent installation of a slurry wall and upgrades to the recovery system operating at the site. Additional decreases in concentrations and extent are beginning to be seen in areas downgradient of the horizontal extraction systems in operation at the former East Kelly.

Statistically derived representative concentrations for groundwater data collected at the former Kelly AFB were evaluated to determine whether the corrective action programs have achieved the Groundwater Protection Standards (GWPS).

Executive Summary

In 1995, the independent Base Realignment and Closure (BRAC) Commission voted to close the SA-ALC at Kelly AFB and realign parts of Kelly AFB with nearby Lackland AFB. This realignment will ultimately include transferring the flightline, various tenant organizations, and selected properties to adjacent Lackland AFB and redeveloping, through privatization and commercialization, a large part of the former Kelly AFB property.

The Air Force initiated a task to perform ecological risk assessments (ERAs) of Installation Restoration Program (IRP), BRAC, and related sites at the former Kelly AFB that were being considered for closure, realignment, or redevelopment. The primary requirements for closure are found in the rules and regulations of the Texas Commission on Environmental Quality (TCEQ). The sites at the former base are being closed under the Risk Reduction Standards (RRSs). The RRSs require site closure to be protective of human and ecological exposure and the TCEQ has established guidance for conducting ERAs that applies to the RRSs and other regulations.

The TCEQ's guidance on ERA presents a three-tiered process that proceeds from relatively simple to more complex. The first tier of the ERA process identified 30 IRP sites at the former Kelly AFB for which further investigation was warranted (CH2M HILL, 1999). This further investigation includes conducting either a screening-level Tier 2 ERA or site-specific Tier 3 ERA for those sites. Initially, only a screening-level Tier 2 ERA was submitted to TCEQ (CH2M HILL, 2001). Review comments were received from TCEQ and the Natural Resource Trustees of the State of Texas in April 2002, and from the U.S. Environmental Protection Agency (EPA) in December 2001. Based on those review comments and subsequent meetings with the agencies, the Tier 2 ERA was revised and a site-specific Tier 3 ERA was also conducted. This report documents both the Tier 2 and Tier 3 ERA for those 30 IRP sites.

This report consists of tthree volumes:

I. Introductory material, Tier 2 and 3 ERA, and References

II. Element Tables

III. Appendices

The purpose of this Tier 2/Tier 3 ERA is to scientifically eliminate chemicals of concern (COCs) that do not pose a risk to ecological organisms, and to develop clean up levels called protective concentration levels (PCLs) for those COCs that may pose an unacceptable risk. To accomplish this, a Tier 2 ERA was conducted using chemical concentration data from various investigations, within the 30 IRP sites, the Leon Creek Compliance Monitoring Plan (CMP) data, and data from the base-wide sampling program. A conceptual ecological exposure model was developed and included the identification of complete exposure pathways for groups of ecological organisms (guilds) to waste materials and affected soils. Representative organisms were selected to represent each unique guild at the various sites. In the Tier 2 ERA, risks were modeled to the representative organisms using the chemical concentration data. The initial results indicated that there was a potential risk to

omnivorous feeding birds at eleven of the IRP sites due to elevated concentrations of cadmium in soil. There were no risks indicated to other terrestrial wildlife. Additionally, in Leon Creek, potential risks to amphibians, benthic organisms, and fish and other aquatic organisms were identified. These risks were based upon elevated sediment concentrations of multiple chemicals (metals, polycyclic aromatic hydrocarbons [PAHs], polychlorinated biphenyls [PCBs], organochlorine pesticides, and several other organic compounds) and elevated concentrations of modeled groundwater concentrations at the groundwater-surface water interface. No risks were found for upper trophic wildlife feeding in and along Leon Creek (mink, kingfishers, raccoons, and other piscivorous and omnivorous wildlife).

According to the guidance, Tier 2 ERA risks must be addressed through remedial actions or investigated further in a Tier 3 site-specific ERA. Addressing Tier 2 ERA risk through remedial action entails developing PCLs and conducting remediation activities to lower environmental media concentrations below PCLs, eliminating ecological exposure pathways, or documenting that remedial activities for other purposes (e.g., human health risk assessment) result in environmental media concentrations below PCLs. PCLs based on screening level data are developed from non-site-specific toxicological information. Thus, resulting Tier 2 PCLs can be conservative, especially compared to site-specific PCLs. Because the Air Force already had access to a broad series of the site-specific data required for a Tier 3 ERA through the CMP, the Air Force chose to conduct further investigation in a Tier 3 site-specific ERA.

In the Tier 3 site-specific ERA, only those guilds for which risk was identified in Tier 2 were investigated. Furthermore, the investigation was also focused only on those chemicals identified as posing risk in the Tier 2 ERA.

For the risk to the omnivorous birds, the Tier 3 ERA primarily consisted of reducing the uncertainties of the assumptions associated with the model used to quantify the risk in Tier 2 ERA. These uncertainties included estimates of the chemical concentrations of the tissue of prey items of the omnivorous birds, invertebrates and plants. Terrestrial invertebrates from within the eleven IRP sites were collected and analyzed for cadmium. Risks to omnivorous birds from cadmium were recalculated using the site-specific tissue data in the modeled diet of the western meadowlark. Both NOAEL-based and LOAEL-based Tier 3 HQs were below 1, suggesting that there is no risk to the omnivorous bird feeding guild. Based on these findings, cadmium was eliminated as a contaminant of concern for the omnivorous bird feeding guild at the former Kelly AFB.

For the risks to frogs, benthic organisms, and fish, the Tier 3 ERA consisted of a weight-of-evidence analysis using the CMP data and other site-specific toxicity tests. Each group of organisms was investigated independently using multiple lines of evidence. Using a quantitative weight-of-evidence approach recommended by TCEQ (Menzie et al., 1996), each line of evidence was assigned a numeric weight based upon a standard set of attributes with scaled values. The individual lines of evidence were also evaluated considering the relationship to each other, the assigned weight, the response given (either demonstrated harm or did not demonstrate harm), and the magnitude of the response (degree to which the response was demonstrated). To conduct the weight-of-evidence analysis, several data sources were incorporated with the Tier 2 data to generate multiple lines of evidence. For benthic organisms and fish, the majority of the data used was from the CMP. Lines of evidence included:

- Growth and survival toxicity testing (bioassays) of four different species
- Fish and benthic community surveys
- Habitat quality assessments, and
- Fish tissue residue analysis

For amphibians, the Air Force collected samples that were analyzed for growth effects, malformations, and reduced survival to frogs. Frog and reptile tissue data from the Leon Creek Phase II investigation (EA Engineering, 1992) were also evaluated as another line of evidence.

The results of the Tier 3 weight-of-evidence suggests that there is no risk to amphibians, benthic organisms, or fish that is attributable to past or existing conditions at the former Kelly AFB. Species surveys of fish and benthic organisms are below requirements at some sampling stations in Leon Creek. However, the weight-of-evidence suggests that the natural setting of Leon Creek itself, as evidenced by habitat quality analysis and a significant lack of tree cover leading to a potential heat stress in the summer appear to be more likely causes of reduced species counts than on-site contamination. Furthermore, the species counts themselves do not suggest that the ecological communities are at risk.

While the weight-of-evidence concluded that there was no risk to aquatic organisms, there is one potential risk that may exist. Groundwater concentrations at 17 of 24,128 wells are demonstrating increasing trends for specific individual chemicals. Results of bioassays and the overall weight of evidence demonstrates that past and current conditions are not currently detrimental to ecological communities. The increasing trends observed in the concentrations of some groundwater COCs in 17 of the monitoring wells could, but will not necessarily, lead to increased exposures and potential risks in the future. Tier 3 PCLs for these COCs were not calculated because past and current conditions are acceptable and because modeled future concentrations compared to screening values alone are not sufficient evidence to warrant PCL calculation without consideration of results of the ongoing Compliance Monitoring Program Tier 3-level sampling.

Fourteen of the 17 chemical-well combinations with increasing trends are already addressed due to the following:

- Nine of these chemical-well combinations are within the capture zones of active groundwater recovery systems at IRP sites D-2, D-4, or E-1;
- Several of the chemical-well combinations will be addressed by remedies proposed in the Corrective Measures Study for Zone 1; and
- Seven of the chemical-well combinations with increasing trends include manganese concentrations and measurements of oxidation reduction potential and dissolved oxygen in these wells are significantly lower than the measurements for Leon Creek, which indicates that the manganese will precipitate upon becoming oxidized and discharging to the creek.

There are 3 remaining chemical-well combinations (barium at wells SS043MW003, SS043MW011, and SS043MW012) at IRP site CS-3 that do not include manganese, that are not part of active groundwater recovery systems, and that are not addressed by a proposed remedial action in the Zone 1 Corrective Measures Study. Each of the 3 wells is included in the existing CMP and, as such, will continue to be monitored and evaluated. If any one of the conditions described below is met, that chemical-well combination will no longer be

considered a potential future risk. Once one of the conditions is met by all three wells, there will no longer be potential ecological risks associated with IRP site CS-3. The conditions are:

1) IRP site CS-3 is proposed for regulatory closure, chemical-and-well-specific Tier 3 PCLs are developed, and measured concentrations do not exceed the PCLs;

2) Measured groundwater concentrations over the last 8 sampling events for a given chemical-well combination demonstrate a decreasing trend in concentration using a Mann Kendall test, **and** results of the Leon Creek Compliance Monitoring Program continue to demonstrate an overall lack of toxicity to aquatic resources in Leon Creek; and

3) The complete exposure pathway from groundwater at all three wells is eliminated by remedial or other actions.

The final status of each IRP site at the conclusion of the Tier 3 ERA is shown in **Exhibit ES-1**. All COCs evaluated in soil, sediment, and surface water were eliminated from further evaluation with a conclusion that there is no risk to the assessment endpoints with complete exposure pathways to those media. No further action is recommended to investigate potential chemical contamination from the former Kelly AFB as a contributor to ecological risks on land or in Leon Creek. All of the IRP sites with complete exposure pathways to Leon Creek, except for IRP site CS-3 which contains the 3 groundwater wells with increasing trends, can be closed without the need to meet any ecological risk-based PCLs. The three chemical-well combinations in groundwater remain as potential future risks. The risk management recommendation for these chemical-well combinations is to continue monitoring these compounds in groundwater until conditions are met that demonstrate that potential future ecological risks no longer exist.

EXHIBIT ES-1
Risk Management Conclusions Following the Tier 3 ERA
Former Kelly AFB

Site Name	Groundwater to Surface Water	Stormwater Runoff to Surface Water	Direct Contact with Surface Soil	Volatilization from Surface Soil	IRP Site Summary
D-1	Tier 3 WOE No Risk	Tier 2 No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	No remaining COCs
D-2	No Further Action	Tier 2 No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	No remaining COCs
1100 Area	Tier 3 WOE No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	No remaining COCs
D-3	Tier 3 WOE No Risk	Tier 2 No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	No remaining COCs
D-4	Tier 3 WOE No Risk	Tier 2 No Risk	Tier 3 No Risk	Pathway eliminated in Tier 1	No remaining COCs
D-5	Tier 3 WOE No Risk	Tier 2 No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	No remaining COCs
D-6	Tier 3 WOE No Risk	Tier 2 No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	No remaining COCs
D-7	Tier 3 WOE No Risk	Tier 2 No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	No remaining COCs
D-8	Tier 3 WOE No Risk	Tier 2 No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	No remaining COCs
D-9	No Further Action	Tier 2 No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	No remaining COC
SA-1	No Wells	Tier 2 No Risk	Pathway eliminated in	Pathway eliminated in	No remaining COCs

EXHIBIT ES-1
Risk Management Conclusions Following the Tier 3 ERA
Former Kelly AFB

Site Name	Groundwater to Surface Water	Stormwater Runoff to Surface Water	Direct Contact with Surface Soil	Volatilization from Surface Soil	IRP Site Summary
			Tier 1	Tier 1	
CS-3	**Potential future risk to fish and benthic invertebrates from barium**	Tier 2 No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	**Continued monitoring of Wells SS043MW003, SS043MW011, and SS043MW012**
IWTP	Tier 3 WOE No Risk	Tier 2 No Risk	Tier 3 No Risk	Pathway eliminated in Tier 1	No remaining COCs
EPCF	Tier 3 WOE No Risk	Tier 2 No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	No remaining COCs
E-1	No Further Action	Tier 2 No Risk	Tier 3 No Risk	Exposure negligible	No remaining COCs
E-3	Tier 3 WOE No Risk	Pathway eliminated in Tier 1	Tier 3 No Risk	Exposure negligible	No remaining COCs
S-9	No Further Action	Tier 2 No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	No remaining COCs
SA-2	Tier 3 WOE No Risk	Tier 2 No Risk	Site Capped	Pathway eliminated in Tier 1	No remaining COCs
SD-1	Site Closed	Site Closed	Site Closed	Pathway eliminated in Tier 1	No remaining COCs
SD-2	Tier 3 WOE No Risk	Pathway eliminated in Tier 1	Tier 3 No Risk	Pathway eliminated in Tier 1	No remaining COCs
FC-2	Tier 3 WOE No Risk	Tier 2 No Risk	Tier 3 No Risk	Exposure negligible	No remaining COCs
OT-1	Pathway eliminated in Tier 1	Tier 2 No Risk	Tier 3 No Risk	Pathway eliminated in Tier 1	No remaining COCs
S-3	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	Tier 3 No Risk	Exposure negligible	No remaining COCs
CS-2	Tier 3 WOE No Risk	Tier 2 No Risk	Tier 3 No Risk	Exposure negligible	No remaining COCs
S4-A	Tier 3 WOE No Risk	Pathway eliminated in Tier 1	Tier 3 No Risk	Exposure negligible	No remaining COCs
SA-4	Tier 3 WOE No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	No remaining COCs
SA-3	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	Tier 3 No Risk	Exposure negligible	No remaining COCs
Bldg 522	Tier 3 WOE No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	No remaining COCs
149th Area	Tier 3 WOE No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	No remaining COCs
IWCS/300 Area	Tier 3 WOE No Risk	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	Pathway eliminated in Tier 1	No remaining COCs

Note:

Closure of IRP Site SD-1 was approved as indicated by letter from TCEQ (2003).

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ADMINISTRATIVE RECORD

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