

The minutes were approved by RAB members via email on Jan. 31, 2017.

Hill Air Force Base Restoration Advisory Board

Meeting Minutes October 27, 2016

Members Present:	Organization:	Members Present:	Organization:
Loren Allen	Davis County Health Dept.	Tim Lane	Roy Community
Earnest Aycok	Clearfield Community Alternate	TJ Mitchell	Clinton City
Travis Bonsteel	Clinton Community	Brad Nelson	Weber Basin Water
Sandra Bourgeois	Environmental Protection Agency	Ed Sorensen	Roy City
Summer Day	Weber-Morgan Health Dept.	Jan Ukena	South Weber Community
Buck Ekstrom	Clearfield Community	Brian Wesoloski	Riverdale Community
Bambi Gibson	Sunset Community	Darrin Wray	Hill AFB RAB Co-Chair
Clint Holm	Layton Community	Scott Zigich	Davis County School District
Douglas Johnson	Hill AFB Community		
Facilitator:	Organization:		
Tim Sueltenfuss	Galen Driscoll, LLC		
Members Absent:	Organization:	Members Absent:	Organization:
Stephen Jackson	Layton City	Vern Phipps	Clearfield City
Tamara Long	South Weber City	Rich Sirken	Weber State University
Jeff MacFarlane	North Davis Sewer District	Muhammad Slam	Utah Department of Environmental Quality
Joe Maylin	Sunset City	Rick Smith	Davis & Weber Counties Canal Company
Brett Nelson	Central Weber Sewer District		
Other Attendees:	Organization:	Other Attendees:	Organization:
Jarrold Case	AFCEC-Hill	Mark Roginske	AFCEC-Hill
Randy Gates	CH2M	Corey Schwabenlander	CH2M
Dave Harris	AGEISS	Carly Siddoway	AGEISS
Dr. Chuck Holbert	CH2M	Seth Smith	AFCEC
Todd Isakson	CH2M	Shannon Smith	AFCEC-Hill
Mark Loucks	AFCEC-Hill	Sandy Staigerwald	EA Engineering
Carol MacKenzie	AFCEC-Hill	Jason Wilde	AFCEC-Hill
Mike Novak	CH2M		

Handouts Distributed at Meeting:

Pre-RAB Training: Risk Assessments
Updated Hill AFB Basewide Plume Map
Operable Units Site Summary Spreadsheet
Cleanup System Glossary

Agenda Item #1. Welcome

Ms. Jan Ukena, the Hill Air Force Base (Hill AFB) Restoration Advisory Board (RAB) community co-chair, called the meeting to order and welcomed RAB members to the meeting. She said she appreciates RAB members taking time out of their day to come to the meeting.

Agenda Item #2. RAB Business

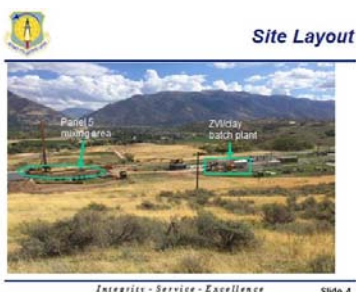
Mr. Tim Sueltenfuss, RAB Facilitator, briefly went through the packet distributed at the meeting. The meeting agenda is attached (Attachment 1).

Action Item List. A current action item list was included in the packet (Attachment 2). Mr. David Harris provided an update on the RAB website (Item 2015-1), saying that the website is on the cusp of being created. He will be meeting with Air Force Public Affairs the following week to begin creating the website and uploading documents. It is anticipated that content will be available on the website by Thanksgiving.

Schedule. A schedule of upcoming RAB meetings and a list of potential future training and tour events were provided to the RAB (Attachment 3). Mr. Sueltenfuss said there was a tour to see the Zero-valent Iron (ZVI) Clay Soil Mixing Treatability Study at Operable Unit 2 (OU2) in mid-October and asked for a RAB member report about the tour.

Ms. Bambi Gibson attended the ZVI Soil Mixing Treatability Study tour. She said the group observed the operation from the hill overlooking the work site at OU2. The group then drove down to the work site during the changing of a drill bit. The group was able to ask questions about the study and drilling of the columns. Ms. Gibson said they got to see the iron granules that are mixed in at a specific ratio and were told how the ratio was tested throughout the process to ensure the proper treatment mixture. She said she appreciated the opportunity to attend.

Agenda Item #3. Status of ZVI Soil Mixing Treatability Study in Operable Unit 2 (South Weber)



Mr. Todd Isakson from CH2M provided a presentation on the Operable Unit 2 (OU2) Soil Mixing Treatability Study currently under way (Attachment 4). Mr. Isakson pointed out the location of OU2 on the north side of the base that extends into a small portion of South Weber City. A map of the OU2 source area was provided on Slide 3. Mr. Isakson said the panels highlighted in orange are used to identify sections of the source area. Panels 1 thru 4 are surrounded by a containment wall (shown by the red dotted line) that prevents migration of undissolved, pooled trichloroethene (TCE) and dissolved contaminants from leaving the source area. It was later discovered that part of the source area (Panel 5) lies outside the containment wall and that is the focus of the ZVI Soil Mixing Treatability Study.

Slide 4 shows a site layout from the hillside looking east. Mr. Isakson said the contractor arrived in mid-September to begin preparing the site. Iron granules are mixed into clay at the batch plant and the mixture is tested for the appropriate ratio prior to being piped to the Panel 5 mixing area.

A picture of the mixing tool was shown on Slide 5. The mixing area has been excavated down about four feet to level off the area and to allow access for the mixing rig. The wood rail ties provide a stable



Mixing tool



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Slide 5

platform for the rig during mixing. The mixing tool is six feet in diameter with teeth to churn the soil as it mixes each column. Injection points in between the teeth deliver the ZVI and clay mixture into the soil column. Initially, the mixing tool was covered with a shroud to collect potential contaminant vapors during drilling to protect workers, but Mr. Isakson said that testing determined the vapor concentrations were not high enough to warrant the use of the shroud. The shroud has since been removed because they can drill faster without it.



Drill rig with shroud



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Slide 6

As the drill rig mixes a new column, flowing mud, called swell, flows out of the drilling area (shown on Slide 6). Mr. Isakson said the swell is managed by pulling it aside with an excavator and is contained within the mixing area. He said that none of the swell leaves the work site.

Mr. Isakson provided a video of the drilling of a column. He said they are between 20 and 25 percent of the way through the total 142 columns that are planned for installation. He said they are a little behind schedule due to a rocky layer that is more difficult to drill

through, but the contractor has committed to completing the columns before the weather gets too cold. To address the rocky areas, the contractor has had to pre-drill with a rock auger to break up the dense rock layer, and then proceed with the column mixing drill bit. The columns are drilled down into the Alpine clay layer, approximately 30-40 feet below the ground surface. Mr. Isakson said if all goes well, it takes about 45 minutes to drill one column.

The soil mixing is expected to take approximately two months and should be completed in November. Once the area is stabilized and the road is reinstalled, they will install performance wells to monitor the treatability study. Mr. Isakson said it is anticipated that the first sample will be collected in six months. He said initial results of the study should be available in about a year and at that time he can give a status update about the ZVI Soil Mixing Treatability Study to the RAB.

Agenda Item #4. Operable Unit 15 (Indoor Air Sampling Program) Plan for the 2016/2017 Sampling Season

Mr. Corey Schwabenlander provided a presentation about the Indoor Air Sampling Program (Operable Unit 15) plan for the upcoming 2016-2017 sampling season (Attachment 5).

The 2016-2017 sampling season will follow the approved sampling plan, called the Basewide Air Sampling and Analysis Plan (BASAP). The long-term passive samplers that were used in the 2015-2016 sampling season will continue to be used, as they were determined to be an effective tool to collect an indoor air sample and account for variability over the course of two weeks to one month. Mr. Schwabenlander said that there will be a couple optimizations (changes) to the program based on findings from the Remedial Investigation (RI) Report that will benefit both the Air Force and participants.

Sampling Areas

Sampling will continue in areas identified in the OU15 RI where vapor intrusion is occurring. The OU15 RI Report states that vapor intrusion is occurring in the following areas:

- Operable Unit 5 (Sunset and Clinton)

- Operable Unit 6 (Riverdale)
- Operable Unit 8 (Layton)
- Operable Unit 12 (Roy)
- Operable Units 1 and 2 (South Weber) – via a preferential pathway (a sewer line that is receiving contaminated groundwater from a base groundwater extraction system)

The OU15 RI Report states that vapor intrusion is NOT occurring in the following areas:

- Operable Unit 9 (Sunset) – Area removed from sampling several years ago when groundwater plume degraded and retracted to Air Force property only
- Operable Unit 10 (Clearfield/Sunset) – Homes in this area was removed from the 2015/2016 sampling program when evidence indicated vapor intrusion has never occurred in this plume area
- Operable Unit 4 (Riverdale/South Weber) – Planned for removal from the 2016/2017 Indoor Air Sampling Program

Target Analytes and Mitigation Action Levels

Mr. Schwabenlander said the compounds that they will be testing for in the upcoming sampling season will be based directly on conclusions from the risk assessment in the OU15 RI Report. He said they will only be testing for the compounds that are causing unacceptable risk at these sites.

In OUs 1, 2, 5, 6, and 12, air samples will only be tested for trichloroethene (TCE). In OU8 (Layton), air samples will be tested for TCE in all locations and 1,2-dichloroethane (1,2-DCA) in select areas only.

Based on the risk-based action levels defined in the OU15 RI Report, the Mitigation Action Levels (MALs) remained the same, or close to the same, as the 2015/2016 program year. The MAL for 1,2-DCA remained the same at 0.27 parts per billion by volume (ppbv) and the MAL for TCE increased slightly from 0.38 ppbv to 0.39 ppbv due to an update in toxicity data. The MAL is the lowest level at which the Air Force would recommend taking action to mitigate the vapors in a home.

Graduating Homes Without Vapor Intrusion

Mr. Schwabenlander reminded the RAB that it was decided last year that data from the long-term passive samplers (used for the first time during the 2015/2016 sampling program) would be used to make decisions about graduating residences from the indoor air sampling program in future years. He said the sampling data collected during the last program year supports the decision to graduate residences that do not have vapor intrusion, which is good news for both the residents and the program.

There are two conservative criteria for graduating residences. If a residence meets either criteria, they will be graduated from the indoor air sampling program. The criteria apply only to residences without a vapor intrusion mitigation system (VIMS); homes with VIMS will continue to be sampled.



Graduating Homes Without VI

□ Criteria #1: Long-term Passive Sample Results

- Long-term passive-diffusion samplers (introduced in 2015-2016) were used to collect samples over periods ranging from 14 to 26 days.
- Sampling will be discontinued at residences where a long-term passive-diffusion sample was collected and target analytes were not detected.



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Slide 10

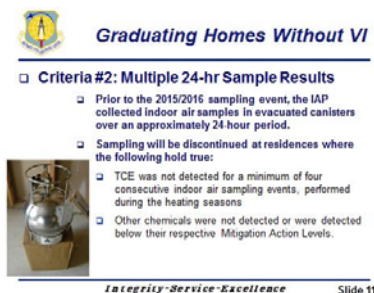
Criteria #1 – Long-term Passive Sampling Results (Slide 10).

Long-term passive samplers were introduced to the indoor air sampling program in the 2015/2016 program. Homes with VIMS were sampled for 14 days and homes without VIMS were sampled for 26 days (plus or minus a day, depending on the pick-up schedule). Mr.

Schwabenlander said homes (without VIMS) that were sampled with a long-term passive sampler with results showing that target analytes were not detected will be graduated from the indoor air sampling program.

Ms. Summer Day asked about the detection limit for the long-term passive samplers, meaning the lowest level to which the laboratory can test the compounds. Mr. Schwabenlander said the detection limit is lower than the SUMMA® canister that was used for 24-hour samples. He said that the longer the passive sampler is in a home, the lower the detection limit and it is well below the MAL.

Criteria #2 – Multiple 24-hour Sample Results (Slides 11 and 12). Prior to the introduction of the long-term passive samplers in the 2015/2016 program, samples were collected in evacuated SUMMA® canisters over a 24-hour period. Mr. Schwabenlander said there were a number of homes with four or more consecutive non-detect samples during the heating season and the Air Force considered graduating those homes, but they were unsure if there was enough data to proceed. It was decided that those homes with four consecutive non-detect samples would be contacted to schedule a sample with the long-term passive sampler, enabling the Air Force to make an informed decision and compare the 24-hour Suma canister results to the new 26-day results.



In the 2015/2016 indoor air sampling program, 130 residences with four or more consecutive non-detect results (with a 24-hour SUMMA® canister) were sampled with a long-term passive sampler. None of the 130 residences had results above the MAL and 118 of them were non-detect for all compounds. The 12 residences that had detections were all below the MALs. Mr. Schwabenlander said these results were good support for using the four non-detect results as graduation criteria and also supported the first criteria of one non-detect sample collected with a long-term passive sampler.

After this determination was made, it was confirmed that sampling will be discontinued at residences where TCE was not detected for a minimum of four consecutive heating season sampling events with the 24-hour SUMMA® canister.

Contacting Participants

Mr. Schwabenlander said that the air sampling contractor will be contacting residences for sampling if they fall into the following categories:

- Residences with existing VIMS
- Residences that had a detection in the 2015/2016 sampling program

Mr. Schwabenlander reminded RAB members that in the past direct mailers were sent to the residences, but participation and response to those mailers plateaued. Rather than continuing with that trend, there will now be a newspaper advertisement published in the Standard Examiner to encourage other residents to participate. Mr. Schwabenlander said they would like to see the response they receive from the newspaper ad and hope to get in to homes that have not been sampled previously. The newspaper ad will run in December to ensure residents have an opportunity to respond and be sampled within the heating season months.

Ms. Day asked if they are worried about having people respond that are not in the sampling areas, as the newspaper goes out to a much larger area. Mr. Schwabenlander said boundaries for the affected areas will be included in the ad to deter those from outside the areas from responding, as well as a website address that will have maps to reference if the resident has questions about the boundaries. He said they expect to receive calls from outside the area and they are currently discussing how to address those calls. Mr. Clint Holm suggested that the website include a place for residents to enter their address to determine if their home is within the sampling area.

Mr. Schwabenlander said there is the possibility of reintroducing direct mailers to the residents in the affected areas, but the mailers would only be sent periodically (every few years). He said they would like to test the newspaper ad first and will decide on frequency from that point.

Ms. Day asked if the 2016/2017 program will only include the 12 residences left over from the last program year. Mr. Schwabenlander said the program will include the approximately 120 residences with VIMS, the residences that had detections of compounds in last year's program, and the residences that respond to the newspaper notice.

Mr. Tim Lane asked how residents will be notified that they are graduating from the program, if they meet the criteria. Mr. Schwabenlander said they will receive one of three letters, depending on which criteria that residence meets: Criteria 1, Criteria 2 or both. The letters will include contact information in case they have follow-on questions. Mr. Loucks said the letter will be sent by the Air Force and will be signed by either himself or Mr. Jarrod Case.

Mr. Schwabenlander said another big part of the outreach to residents in the affected area is through the city councils and mayors. The Air Force has met with all of the city councils, except for Layton (scheduled for Nov. 3), and there will be additional outreach to the cities to encourage those in the affected areas to be sampled. Mr. Loucks encouraged RAB members to work with their constituencies to get the word out about the indoor air program and to refer them back to the Air Force or the website (once up and running). Mr. Loucks said there are a lot of homes that have not been sampled and the Air Force needs the RAB's help in generating some interest in having sampling done.

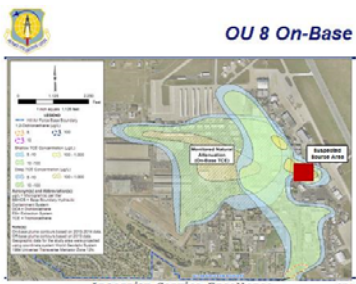
Mr. Sueltenfuss said the indoor air sampling program is a great example of how RABs can provide feedback to the Air Force and affect changes to make the program better for the public. He said this is why RABs are put into place.

Agenda Item #5. Break/Breakout Sessions

RAB members broke into small groups, by community, to meet with AFCEC-Hill project managers to discuss items in more detail and any other issues of concern. Informational material provided during the breakout sessions is attached (Attachment 6).

Agenda Item #6. Operable Unit 8 (On-base) – Status of Soil Vapor Extraction (SVE) Treatability Study

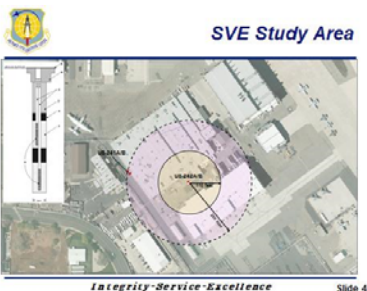
Dr. Holbert provided an update of the on-base Operable Unit 8 (OU8) soil vapor extraction (SVE) treatability study (Attachment 7), including results of the extended SVE testing.



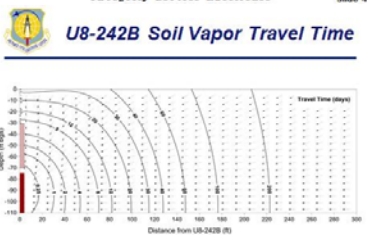
A map of the on-base portion of OU8 was shown on Slide 2. The focus of this study was in the industrial complex on-base with high levels of TCE. Dr. Holbert said that through records research and a shallow soil gas investigation they identified a suspected source area highlighted by the red box, which was the focus of the SVE treatability study.

The study included placing four wells at two locations (U8-241A/B and U8-242A/B), screened at a depth of 30-70 feet below ground surface (bgs) (A wells) and 75-110 feet bgs (B wells). Each well was tested individually for approximately 30-60 days using a trailer-mounted SVE system. The initial study was conducted from July-December 2015. Preliminary results of the initial study showed that U8-242B appeared to be in relatively close proximity

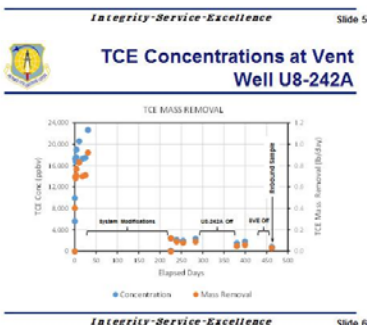
to a TCE source area and approximately 154 pounds of TCE was removed from the suspected source area. These findings lead to the recommendation to extend the SVE test at U8-242A/B for at least six months to evaluate long-term mass removal.



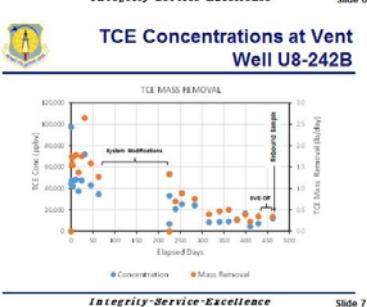
The SVE study area was pictured on Slide 4. An estimated zone of influence, or the distance the SVE system could pull vapors from, was found to be between 140-280 feet. Dr. Holbert said the zone of influence was likely to be closer to the larger estimate (shown by the light pink circle). A diagram illustrating how the two wells at U8-242A/B were nested side-by-side is also included on Slide 8.



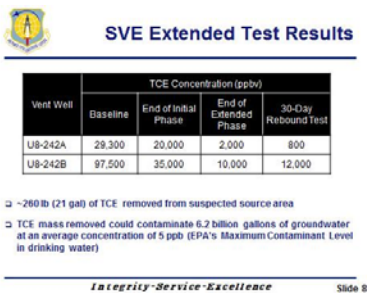
Slide 5 detailed the soil vapor travel time at U8-242B. Dr. Holbert explained that they looked at how long it takes soil vapor to travel within the soil at specific distances from the well. During the initial and extended SVE testing, the highest concentration captured in the well occurred within four hours, indicating a potential source area is very close to this well (U8-242B).



TCE concentrations at vent well U8-242A, the more shallow of the two nested wells (screened at 30-70 feet bgs), were shown on Slide 6. Dr. Holbert noted that this well never came close to capturing the same amount of vapors as was captured during the initial SVE test, most likely because the initial test removed a majority of mass. Prior to beginning the extended testing, the SVE system was modified with a bigger blower, going from a two horsepower blower to an 8.5-horsepower blower. Dr. Holbert said they wanted to see how vent well U8-242B would perform with vent well U8-242A turned off, allowing for a full vacuum on vent well U8-242B. During the shutdown of vent well U8-242A, concentrations did not rebound and even decreased. Dr. Holbert said vent well U8-242B (screened deeper at 75-110 feet bgs) seemed to sweep out vapors and treat the zone associated with vent well U8-242A.



TCE concentrations at vent well U8-242B were shown on Slide 7. Dr. Holbert noted the initial spike in concentrations following the installation of the new blower, but then concentrations seemed to level off. He said the preliminary analysis indicates the bigger blower may pull in clean air when all of the vacuum is applied to U2-242B, but results are not conclusive.



Results of the extended SVE test were shown on Slide 8. During both the initial and extended testing, an estimated 21 gallons of TCE were removed from the suspected source area which could have contaminated approximately 6.2 million gallons of groundwater at the drinking water standard. Dr. Holbert said that there were significant reductions in TCE concentrations during the extended testing, indicating that most of the mass may have been removed during the treatability study.

A 30-day rebound test was conducted at the end of extended testing at U8-242A/B. During the rebound test, the SVE system was turned off and the vapors in the soil were allowed to come back to equilibrium.

After 30 days, the SVE system was turned back on and vapor samples were collected from both U8-242A and U8-242B. The concentrations of TCE in the rebound samples were significantly less than the baseline concentrations. The concentration of TCE in the rebound sample from U8-242B, the deeper of the two nested wells (screened at 75-110 feet bgs), was similar to the concentration observed at the end of the extended test when the SVE system was operating. Dr. Holbert said that these concentrations may be coming from groundwater and not from the soil.


Dr. Holbert said a second rebound test will be conducted after the SVE system is shut down for an additional 60 days. After the shutdown, the SVE system will be turned back on to collect vapor samples. If TCE concentrations are less than 30 percent of the baseline vapor concentration, the system will be shut down and the treatability study will be completed. If TCE concentrations are more than 30 percent of the baseline vapor concentration, the study will be continued until the next scheduled rebound test.

Dr. Holbert said that in addition to these guidelines, an economic threshold was also established to ensure the treatment system was worth the cost and energy to run it. The economic threshold established by CH2M Hill (primarily Doug Downey, who helped write the Air Force's bioventing guidance), is 0.5 pounds of TCE removed from the unsaturated soil per day. Dr. Holbert said if the SVE system is removing less than 0.5 pounds of TCE per day, SVE may not be economical. He said both vent wells were already below this threshold during the last round of sampling (U8-242A was treating approximately 0.1 pounds of TCE and U8-242B was treating approximately 0.3 pounds of TCE). They will take another look at these numbers during the second rebound test that will take place the second week of November.

Mr. Lane asked if an additional rebound test will be conducted at U8-241A/B. Dr. Holbert said that before the SVE system is turned back on, they will take samples at all four vent wells and compare concentrations to the baseline concentrations. Dr. Holbert reminded the RAB that concentrations at U8-241A/B were significantly lower than concentrations at U8-242A/B.

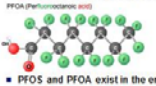
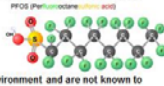
Agenda Item #7. Perfluorinated Compounds (Fire-fighting Foam) – Emerging Issue Across Country

Mr. Loucks provided a presentation on the Air Force's response to perfluorinated compounds (PFCs), an emerging contaminant across the country (Attachment 8). He said PFCs have been in the news recently because some military bases have been found to have PFCs in the drinking water.

 **What are PFOS and PFOA ?**

PFCs are a class of synthetic fluorinated organic chemicals used in many industrial and consumer products, including: nonstick cookware, waterproof fabric, some food packaging, and the firefighting agent Aqueous Film Forming Foam (AFFF).

- Perfluorooctanoic acid (PFOA) and Perfluorooctanesulfonic acid (PFOS) are both PFCs, a type of fluorinated organic compound.

- PFOS and PFOA exist in the environment and are not known to degrade by any natural processes.
- In 1970, the Air Force began using AFFF to extinguish petroleum fires.

Integrity - Service - Excellence Slide 3

PFCs are a class of synthetic fluorinated organic chemicals used in many industrial and consumer products, including nonstick cookware (Teflon), waterproof fabric (Scotch guard) and some food packaging. The atomic structure of the two main types of PFCs that will be discussed in this presentation, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), were shown on Slide 3. The illustrations shows that PFOS and PFOA have eight carbons attached to fluorine and an acid group at the end of the molecule. Mr. Loucks said one of the toughest bonds in nature to break is carbon and fluorine.

PFOS and PFOA are not known to degrade by any natural processes. Another widespread use that is important to the Air Force is in Aqueous Film Forming Foam (AFFF), a firefighting agent. The Air Force began using AFFF to extinguish petroleum fires in 1970 because it works well and fast, and has saved countless lives.

PFOS and PFOA have been classified as emerging contaminants by the Department of Defense (DoD). There are no regulatory standards because the risk to human health is inconclusive and information about them is evolving. In May 2016, the Environmental Protection Agency (EPA) issued lifetime health advisory values for PFOS and PFOA of 70 parts per trillion (ppt) for drinking water. In comparison, TCE is 5 parts per billion or 5,000 ppt. The Air Force had a head start when the health advisory came out; they had already put centralized contracts in place to assess the potential for PFOS and PFOA at Air Force installations. Hill AFB was evaluated in Fall 2015.

Health Effects

Mr. Loucks said there is not much data about the health effects of PFOS and PFOA, but it is an active area of research. The information is constantly changing as more health studies are completed and the Air Force is closely monitoring the changes in the science. The EPA's Office of Water is finalizing updated evaluations of health impacts, and animal studies suggest impacts to the liver and potential developmental effects to fetuses. Studies show that nearly all people have some PFOS or PFOA in their blood due to the widespread use in everyday products. The DoD wants to be protective of human health and the environment and will take conservative steps to ensure protectiveness.

Air Force Response

The Air Force is aware of PFOS and PFOA releases from AFFF and they are working with regulatory agencies to identify contaminated sites. Current efforts are focused on identification and mitigation of those sites. Cleanup efforts will begin once credible health data brings about risk-based regulatory standards.

The Air Force developed a three-step method to address PFOS and PFOA:

- 1) **Identify.** The first step in the process is to investigate base records and review historical use to determine whether or not PFOS and PFOA contamination is probable and where, with the focus on former fire training areas. Mr. Loucks said the Air Force has completed this step at all Air Force installations.

If records indicate contamination is probable, the base bioenvironmental engineer will evaluate the likelihood of drinking water contamination and conduct sampling, if at all likely. The Air Force will also conduct sampling of the soil and water in all areas where contamination is likely.

- 2) **Respond.** When sample results indicate PFOS and PFOA levels exceed the EPA's health advisory in drinking water, the Air Force will take necessary steps to protect the public. Mr. Loucks said that the drinking water tested positive for PFOS and PFOA at Wright-Patterson Air Force Base (Ohio) and Peterson Air Force Base (Colorado). He said the supply wells have been turned off and an alternate source of drinking water has been provided to affected citizens until the Air Force takes the necessary steps to reduce PFOS and PFOA levels.

If PFOS and PFOA levels are detected but are below the health advisory level, the Air Force will continue to monitor as needed to ensure they are aware if the advisory level is exceeded.

- 3) **Prevent.** The Air Force is taking steps to prevent future AFFF releases.
 - a. The Air Force limits the use of AFFF to emergency responses only. If used, immediate action is taken to ensure it is contained and does not leave the site.
 - b. In July 2015, the Air Force Fire Chief directed all bases to stop testing the foam systems on all fire vehicles unless an environmentally-approved containment system is used. In the past, foam systems were tested almost daily to ensure they would work properly in an emergency. Mr. Loucks said the new fire training area at Hill AFB has a double-lined containment area where the foam system can be tested periodically.

- c. There are plans to replace legacy AFFF with environmentally sound options while still maintaining adequate fire protection. Mr. Loucks said it will take time to replace the AFFF inventory at Hill AFB, but the use of AFFF will eventually stop.

Challenges With PFOS and PFOA

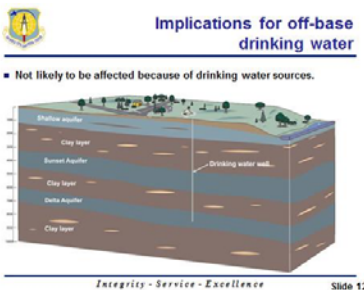
Mr. Loucks reiterated that there are several challenges when dealing with PFOS and PFOA. They do not break down in the environment and are highly soluble and transportable, meaning they do not stick to the soil particles and move with the groundwater. PFCs cannot be removed by air technologies such as SVE because they do not volatilize into the air; however, they do not pose a vapor intrusion issue. Mr. Loucks said the only way to be exposed to PFOS and PFOA is to ingest them, as they do not sorb into the skin.

Many conventional treatment approaches such as air stripping and vapor extraction are not effective for PFOS and PFOA. There is ongoing research to find alternative and more effective treatment technologies. At this time, the most effective method to treat PFOS and PFOA in water is pump-and-treat using activated carbon. Mr. Loucks said pump-and-treat was the only cleanup option for TCE when TCE was an emerging contaminant, so there is hope that research will lead to better cleanup options such as those for TCE today.

At Hill AFB and Surrounding Communities

The Hill AFB drinking water supply has been sampled and PFCs were not detected. Since Hill AFB's drinking water is not affected, Hill AFB is a lower priority. The preliminary assessment conducted in Fall 2015 identified 15 areas of concern recommended for the site investigation phase that will begin in June 2017, including:

- 3 fire training areas
- 5 buildings/hangars (with fire suppression systems)
- 6 emergency response and overflows (plane crash location, etc.)
- 3 fire stations



Mr. Loucks said that off-base drinking water sources are not likely to be affected with PFOS and PFOA because they come from the Delta Aquifer, shown on a diagram on Slide 12. Any groundwater contamination is localized to the shallow aquifer and separated from the drinking water aquifers by additional groundwater aquifers and thick clay layers hundreds of feet thick. Mr. Brad Nelson with the Weber Basin Water Conservancy District said that the cities surrounding Hill AFB test local drinking water regularly and results have come back non-detect for PFOS and PFOA.



Mr. Loucks provided links to several websites with additional information about PFOS and PFOA on Slide 13.

Mr. Doug Johnson asked if Mountain Home Air Force Base in Idaho would also undergo an investigation in June 2017. Mr. Loucks said Mountain Home AFB was actually investigated six weeks prior to the RAB meeting and two drinking water sources were above the EPA's health advisory level, and one below. Mr. Loucks said the conditions are different at Mountain Home AFB than at Hill AFB; the drinking water comes from an aquifer only 300-400 feet below ground surface with layers separated by basalt instead of clay, making the contamination easier to spread.

Mr. Scott Zigich said that AFFF has been used as fire-fighting foam since the 1970s (four decades) and it seems to him that is plenty of time to determine if fire fighters have ailments (cancer or otherwise) from using the foam. Mr. Zigich said he is not seeing the effects of these contaminants if fire fighters who have been using this for all that time have not documented ailments or deaths due to its use. Mr. Loucks said there is not an answer to that specifically without studies being conducted, but the Air Force wants to be protective and conservative until more is known. Mr. Clint Holm said fire fighters are already at risk for other diseases due to exposure to other chemicals, and even had to find ways of cleaning their turnout gear to remove risks from that. Mr. Holm said the PFOS and PFOA are just a compounding factor.

Mr. Bonsteel asked if local civic fire fighters use AFFF. Mr. Loucks said it was likely because it was the predominant firefighting foam on the market, but he was not sure.

Mr. Nelson said it is likely that everyone has been exposed to PFCs in some form, primarily from nonstick cookware. Regardless, a couple years ago the EPA began requiring testing for PFOS and PFOA in drinking water and Weber Basin Water Conservancy District will continue to test for PFOS and PFOA until more is known.

Agenda Item #8. Public Comment Opportunity

Mr. Sueltenfuss asked if there were any members of the public in the audience who would like an opportunity to comment. There were no comments at this time.

Agenda Item #9. Potential Agenda Items for Next Hill AFB RAB Meeting

Potential Agenda Items for the October 27 Hill AFB RAB Meeting

- Operable Unit 15 (Indoor Air Sampling Program) Proposed Plan
- Environmental Protection Agency – Technical Assistance Grant Process
- State of the Program
 - Performance-based Remediation (PBR) Contract Status
- Operable Unit 10 (Clearfield) Treatability Study Results
- Operable Unit 14 (On-base) Removal Action
- Operable Unit 5 (Sunset/Clinton) Treatability Study Update

Agenda Item #10. Adjournment

Meeting adjourned at 8:30 p.m.

Attachments:

1. Agenda
2. Action Item List
3. RAB Schedule
4. Presentation Slides – Operable Unit 2 – Status of ZVI Clay Mixing Treatability Study
5. Presentation Slides – Operable Unit 15 –Plan for 2016/2017 Indoor Air Sampling Season
6. Breakout Materials
7. Presentation Slides – Operable Unit 8 – Status of SVE Treatability Study
8. Presentation Slides – Perfluorinated Compounds (Firefighting Foam) – Emerging Issue Across Country

**Hill AFB
Restoration Advisory Board
Meeting**

6:30 p.m., Oct. 27, 2016

**Sunset City Building (Sunset Room)
200 West 1300 North
Sunset, Utah**

Pre-RAB Meeting Training Session

6 p.m. Risk Assessments Mike Novak, CH2M

RAB Meeting Agenda

6:30 – 6:35 Welcome Jan Ukena, RAB Air Force Co-Chair

6:35 – 6:50 RAB Business Tim Sueltenfuss, RAB Facilitator

- Action Items
 - Action Item List
 - RAB Schedule
 - Zero-valent Iron (ZVI)/Clay Mixing Tour Report – Bambi Gibson

6:50 – 7:05 Status of Zero-valent Iron (ZVI)/Clay Mixing in Operable Unit 2
..... Todd Isakson, CH2M

7:05 – 7:25 Indoor Air Sampling Plan for the 2016/2017 Sampling Season
..... Mark Roginske (AFCEC-Hill) and Corey Schwabenlander (CH2M)

7:25 – 7:55 Break/Breakout Sessions

7:55 – 8:15 Operable Unit 8 (On-base) – Status of Soil Vapor Extraction (SVE) Treatability Study
..... Dr. Chuck Holbert, CH2M

8:15 – 8:35 Perfluorinated Compounds (Fire-fighting foam) – Emerging Issue Across Country
..... Mark Loucks, AFCEC-Hill

8:35 – 8:40 Public Comment Opportunity

8:40 – 8:45 Agenda Items for Jan. 26, 2017 Meeting

8:45 Adjourn

Acronym Definitions

The following acronyms are commonly used in cleanup program reports and documents.

AFB: Air Force Base	MPO: Minimum Performance Objectives
AFCEC: Air Force Civil Engineering Center	MRL: Minimal Risk Level
ARA: Alliance for Risk Assessment	NAS: National Academies of Science
ARARs: Applicable or Relevant and Appropriate Requirements	NIT: North Interceptor Trench
ASTP: Air Stripper Treatment Plant	NDSID: North Davis Sewer Improvement District
ASU: Arizona State University	NPL: National Priorities List
ATSDR: Agency for Toxic Substances and Disease Registry	O&M: Operations and Maintenance
BTEXN: Benzene, Toluene, Ethylbenzene, Xylenes, and Naphtalene	OU: Operable Unit
BRA: Baseline Risk Assessment	OES: Optimized Exit Strategy
CE: Civil Engineering	PA/SI: Preliminary Assessment/Site Inspection
CERCLA: Comprehensive Environmental Response, Compensation and Liability Act	PBR: Performance-Based Remediation
CRP: Community Relations Plan	PCB: Polychlorinated Biphenyls
CWSID: Central Weber Sewer Improvement District	PCE: Perchloroethylene (tetrachloroethene)
DCA: Dichloroethane	PMP: Performance Monitoring Plan
DCE: Dichloroethene	PP: Proposed Plan
DNAPL: Dense Non-aqueous Phase Liquid	PPB: Parts per billion
DOD: Department of Defense	PPBV: Parts per billion by volume
EA: Enhanced Attenuation	PPM: Parts per million
EA: Environmental Assessment	PRB: Permeable Reactive Barrier
EE/CA: Engineering Evaluation/Cost Analysis	QA/QC: Quality Assurance/Quality Control
EPA: Environmental Protection Agency	RAB: Restoration Advisory Board
ERA: Environmental Restoration Account	RCRA: Resource Conservation and Recovery Act
ERD: Enhanced Reductive Dechlorination	RA: Remedial Action
ERP-O: Environmental Restoration Program Optimization	RC: Response Complete
EVO: Emulsified Vegetable Oil	RD: Remedial Design
EUL: Enhanced Use Lease	RfC: Reference Concentration
FFA: Federal Facilities Agreement	RFP: Request for Proposal
FS: Feasibility Study	RI: Remedial Investigation
FY: Fiscal Year	RIP: Remedy in Place
FYR: Five-Year Review	ROD: Record of Decision
GIS: Geographic Information System	RPM: Remedial Project Manager
IRA: Interim Remedial Action	RSL: Regional Screening Level
IRP: Installation Restoration Program	SC: Site Closeout
IST: Installation Support Team	SRS: Source Recovery System
IWTP: Industrial Wastewater Treatment Plant	SVE: Soil Vapor Extraction
LNAPL: Light Non-aqueous Phase Liquid	SVOC: Semi-volatile Organic Compound
LTM: Long-term monitoring	TAG: Technical Assistance Grant
LUST: Leaking Underground Storage Tank	TARS: Tooele Army Rail Shop
MAL: Mitigation Action Level	TCA: Trichloroethane
MCL: Maximum Contaminant Level	TCE: Trichloroethene
MD: Munitions Debris	TPH: Total Petroleum Hydrocarbons
MEC: Munitions and Explosives of Concern	UDEQ: Utah Department of Environmental Quality
MMRP: Military Munitions Response Program	UTTR: Utah Test and Training Range
MRS: Munitions Response Site	VI: Vapor Intrusion
MTBE: Methyl Tertiary Butyl Ether	VOC: Volatile Organic Compound
MNA: Monitored Natural Attenuation	VIMS: Vapor Intrusion Mitigation System
	VRS: Vapor Removal System
	ZVI: Zero-Valent Iron
	µg/L: Micrograms per liter

Hill Air Force Base 2016 RAB Action Items

Item No.	Action Item	Requester	Date Requested	Action Taken	Responsible Party	Target Completion Date	Status
2016-11							
2016-9	Notify RAB once draft Operable Unit 15 Feasibility Study is completed so they can provide input prior to Proposed Plan.	M. Roginske	8/11/2016 RAB Mtg		C. Brown	10/1/2016	In progress
2016-8	Provide monitoring well data for OUs 4 and 12.	T. Lane	8/11/2016 RAB Mtg	8/11/16: Dr. Holbert putting data together 8/31/16: Dr. Holbert provided the data for Mr. Lane and is being reviewed by project managers.	C. Holbert M. Loucks J. Wilde	10/1/2016	In progress
2016-6	Provide updated Operable Unit 12 map to Roy RAB representatives so they can provide to Roy City Mayor and City Manager (follow-up to city council briefing).	T. Lane E. Sorensen	8/11/2016 RAB Mtg		C. Brown	9/15/2016	In progress
2016-2	Ask RAB if they would like to form a work group to review the 2018 Five-year Review.	C. Brown	4/28/2016 RAB Mtg		C. Brown	8/1/2017	In progress
2016-1	Notify RAB when Operable Unit 12 Explanation of Significant Differences (ESD) is available	C. Brown	4/28/2016 RAB Mtg		C. Brown	6/15/2016	In progress
2015-1	Request for information (cleanup site info, RAB schedule, RAB mtg material, etc.) easily accessible from web	Various RAB members	8/27/15 RAB Mtg	1/2016: In progress, working with Hill PA to create link on Hill AFB website 1/28/16: Hill Public Affairs will build the site in Feb. 2016 3/1/16: Air Force is migrating to different format and would require all linked pages (environmental included) to re-load all documents. Decision was made to wait until migration is completed. 6/1/2016: AF migration in next few weeks.	M. Loucks B. Fisher D. Harris	9/1/2016	In progress
2015-9	Post air sampling notice on Hill AFB website	Various RAB members	10/29/2015 RAB Mtg	12/29/2015: Request made to add to webpage being created on Hill AFB website 1/28/2016: Will post once website up and running	B. Fisher	1/28/2016	In progress

2016-10	Have EPA risk assessor speak with Mr. Bonsteel to address his question about how the excess lifetime cancer risk (ECLR) and non-cancer risk hazard index (HI) are calculated and determined.	T. Bonsteel	8/11/2016 RAB Mtg	8/16/2016: Mr. Dave Harris provided Mr. Bonsteel with the phone number of the EPA's risk assessor to address his questions about the ECLR and HI.	C. Brown	9/15/2016	Complete
2016-7	Provide following presentations from April 28 RAB meeting to Tim Lane: ■ Operable Unit 5 ■ Five-Year Review Update	T. Lane	4/28/2016 RAB Mtg	8/31/2016: Emailed the requested presentations from the April 28 Hill AFB RAB meeting to Mr. Lane. Also included the approved minutes from the April 28 RAB meeting.	C. Brown	6/15/2016	Complete
2015-5	Provide tour opportunity for RAB members to see bio-remediation injections	B. Gibson D. Johnson E. Sorensen	10/29/2015 RAB Mtg	6/22/2016: OU 9 1100 Area (late July) OU 12 On-base (July) EA/CH2M will look into possible dates 8/1/2016: ERD Injection tour at OU 9 Golf Course	M. Loucks C. Brown	8/1/2016	Complete
2015-7	Provide revised BASAP report to RAB once approved	B. Ekstrom	10/29/2015 RAB Mtg	1/2016: BASAP still in review 6/29/2016: Emailed RAB members link to AFCEC admin record website to access BASAP.	M. Roginske	3/1/2016	Complete
2016-4	Provide link to early environmental policy for Hill AFB.	D. Johnson	6/15/2016 OU Tour	Mark Loucks responded to Mr. Johnson's request and provided the information he requested.	M. Loucks	7/1/2016	Complete
2016-3	Research excavation work taking place along the south side of South Weber Drive near Operable Unit 4 to determine if it is associated with Hill AFB.	T. Long	4/28/2016 RAB Mtg	Jarrod looked into the work taking place in that location and reported back to Mayor Long that the work is not associated with Hill AFB or the environmental work.	C. Brown	5/1/2016	Complete
2015-8	Provide more information about the methodology used to make air sampling determinations (specifically in regards to graduation?)	B. Ekstrom	10/29/2015 RAB Mtg	1/2016 - Decision to graduate residents has been postponed to allow time to collect additional data	M. Roginske C. Schwabenlander	1/1/2016	Postponed
2015-11	Revise RAB Operating Procedures to reflect current status (website & membership)	C. Brown		1/13/2016: Changes have been made and approved internally, sent out to AFCEC PA, facilitator and RAB co-chairs for review 1/21/2016: Postponed to allow time to review and consider other options 3/1/2016: Directed to reopen 4/2016: Emailed revisions to RAB for review prior to vote at 4/28 RAB meeting.	Various	4/28/2016	Complete
2015-2	Provide OU site summary spreadsheet at RAB mtgs	Various RAB members	8/27/15 RAB Mtg & 10/29/2015 RAB Mtg	10/2015: Working to add exposure pathways column 1/28/2016: Provided at Hill AFB RAB Mtg	Various	1/28/2016	Complete

2015-6	Provide confidence interval about air sampling data to Clint Holm.	C. Holm	10/29/2015 RAB Mtg	1/12/2016: In progress - should be completed before RAB meeting 1/22/2016: Mark Roginske emailed Mr. Holm the data that was requested.	M. Roginske C. Schwablander	1/1/2016	Complete
2015-12	Conduct email vote for community member positions expiring end of 2015, according to current RAB OP	C. Brown	10/29/2015 RAB Mtg	12/15/15: Emailed RAB members to vote for community member positions. Vote due by Dec. 20	C. Brown	12/12/2015	Complete
2015-10	Email air sampling fact sheet to RAB members so they are aware of what residents are receiving	Various RAB members	10/29/2015 RAB Mtg	Emailed fact sheet to RAB members.	C. Brown	12/9/2015	Complete

Restoration Advisory Board Calendar

October 2016

RAB Meetings

2017	Thursday, Jan. 26	Sunset City Building
	Thursday, April 27	Sunset City Building
	Thursday, July 27	Sunset City Building
	Thursday, Oct. 26	Sunset City Building

RAB Training

Potential Future Trainings

- Cleanup Technologies – Pre-meeting Training
 - Bio-reactors
- Geology/Hydrogeology

RAB Tours

Potential Future Tours

- Operable Unit 4 Bio-reactors (Fall 2016)

Air Force Civil Engineer Center

Integrity - Service - Excellence



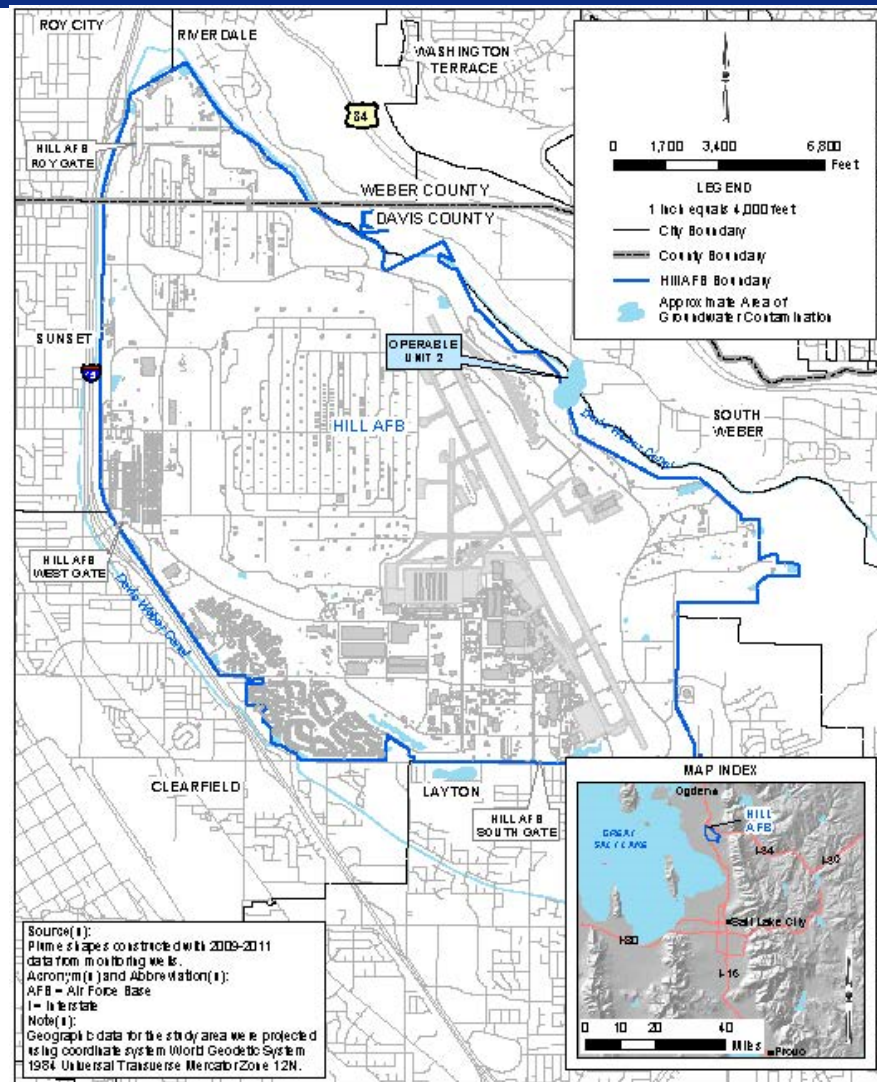
OU 2 Soil Mixing Treatability Study

27 October 2016

Shannon Smith – AFCEC/CZOM Hill Section
Todd Isakson – OU 2 Site Manager, EA Team

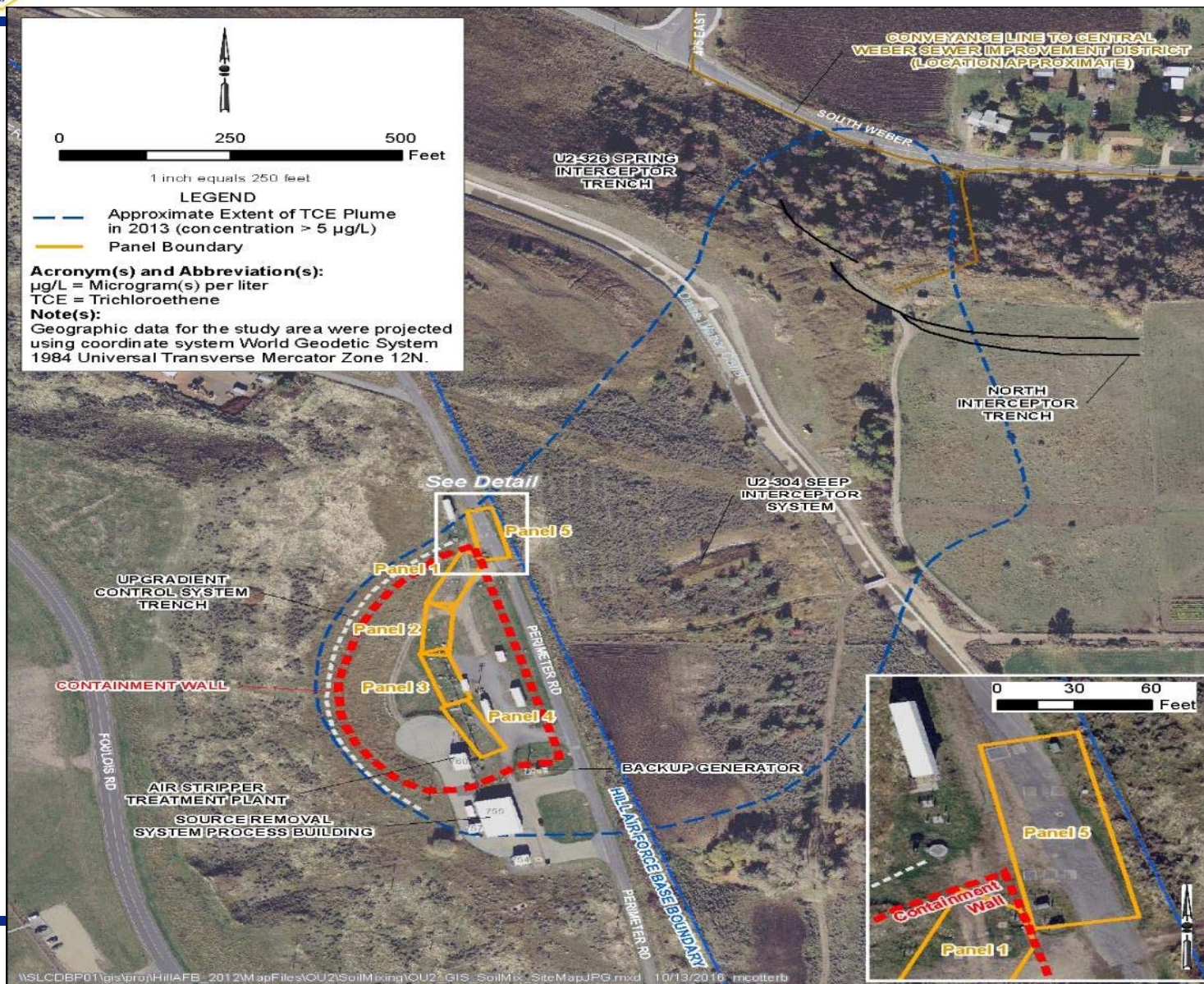


Operable Unit 2 Location





Operable Unit 2 Site Map





Site Layout





Mixing tool





Drill rig with shroud





Schedule for Treatability Study

- ❑ Started soil mixing early October**
- ❑ Work is expected to take ~ 2 months**
- ❑ Monitor for two years; produce Treatability Study Report**
- ❑ After completion of study, concentrations of TCE and other VOCs in groundwater in Panel 5 are expected to be significantly reduced**



Questions?

Air Force Civil Engineer Center

Integrity - Service - Excellence



Operable Unit 15 – 2016-2017 Indoor Air Program Sampling Plan

27 October 2016

**Mark Roginske, P.E. – AFCEC/CZOM Hill Section
Corey Schwabenlander, P.G. – EA Team**



Indoor Air Program Updates

- ❑ 2016-2017 Sampling Event will follow the approved sampling plan (BASAP), with some revisions**
- ❑ Key Optimizations:**
 - ❑ Sampling Areas**
 - ❑ Target Analytes and Mitigation Action Levels**
 - ❑ Criteria for graduating residences without VI**
 - ❑ Contacting participants**



Indoor Air Program Updates

Sampling Areas



Sampling Areas

- ❑ **Sampling will continue in areas identified in the OU 15 RI Report as having significant VI**
- ❑ **OU 15 RI Report:**
 - ❑ **VI is occurring off-Base at OU 1 (S. Weber), OU 2 (S. Weber), OU 5 (Sunset/Clinton), OU 6 (Riverdale), OU 8 (Layton), and OU 12 (Roy)**
 - ❑ **VI is NOT occurring off-Base at OU 4 (Riverdale), OU 9 (Sunset), and OU 10 (Clearfield)**
- ❑ **OU 4 will be removed from the IAP beginning in the 2016-2017 event; OU 9 and OU 10 had been removed previously**



Indoor Air Program Updates

Target Analytes and Mitigation Action Levels



Target Analytes and Mitigation Action Levels

□ Target analytes

- Target analytes based on conclusions of the baseline risk assessment in OU 15 Remedial Investigation (RI) Report**
- Beginning in 2016-2017 sampling event, target analytes will be limited to the compounds causing unacceptable risk in each OU.**
- OUs 1, 2, 5, 6, and 12: TCE only**
- OU 8: TCE (in all locations) and 1,2-DCA (in a select area).**



Long-duration Samples

☐ **Mitigation Action Levels**

- ☐ **Based on the Risk-Based Action Levels defined in the OU 15 RI Report**

Target Analyte	2016-2017 MAL (part per billion by volume)
1,2-DCA	0.27
TCE	0.39



Indoor Air Program Updates

Graduating Homes Without VI



Graduating Homes Without VI

- ❑ Two conservative criteria for graduating residences from the OU 15 IAP.**
 - ❑ The two independent criteria are based on the type of analytical data available at specific residences.**
 - ❑ Both criteria apply only to residences where no vapor intrusion mitigation system (VIMS) is present; homes with VIMSs will continue to be monitored.**



Graduating Homes Without VI

- ☐ **Criteria #1: Long-term Passive Sample Results**
 - ☐ Long-term passive-diffusion samplers (introduced in 2015-2016) were used to collect samples over periods ranging from 14 to 26 days.
 - ☐ Sampling will be discontinued at residences where a long-term passive-diffusion sample was collected and target analytes were not detected.



Slide 10

GR4

Jarrold wants to talk through 1 and done plan.

Gates, Randy/SLC, 10/12/2016



Graduating Homes Without VI

❑ Criteria #2: Multiple 24-hr Sample Results

- ❑ Prior to the 2015/2016 sampling event, the IAP collected indoor air samples in evacuated canisters over an approximately 24-hour period.

- ❑ Sampling will be discontinued at residences where the following hold true:

- ❑ TCE was not detected for a minimum of four consecutive indoor air sampling events, performed during the heating seasons
- ❑ Other chemicals were not detected or were detected below their respective Mitigation Action Levels.





Graduating Homes Without VI

- ❑ Multiple 24-hr Sample Results (cont.)**
 - ❑ In 2015-2016 event, 130 residences with 4 or more consecutive heating season non-detects were sampled with a long-term passive sampling device.**
 - ❑ None of the 130 long-term samples had results above the MAL.**
 - ❑ 118 of the 130 samples were completely non-detect for all analytes.**
 - ❑ 12 samples had detects of various analytes below the MAL.**



Indoor Air Program Updates

Contacting Participants



Contacting Participants

- ☐ **Residences that are on a periodic monitoring schedule**
 - ☐ **Existing VIMS**
 - ☐ **Detection in 2015-2016 sampling event**
- ☐ **Newspaper Advertisement**
- ☐ **Hill AFB and RAB Outreach to City Council/Mayors**



Questions?

RAB
Breakout Session
Packet

Clearfield & Layton

Operable Unit 8 (Layton)

Hill AFB Project Manager – Shannon Smith, (801) 775-6913

Site Status

- Record of Decision signed in 2005

Since Previous RAB (August 2016 to present)

- Continued soil vapor extraction (SVE) treatability study at on-base trichloroethene (TCE) source area
 - Conducting a “shut-down” test. System is shut-down for 30-days and soil gas samples are collected to determine if concentrations in the soil rebound to pre-treatment levels indicating additional SVE is necessary. If contaminant levels remain low the SVE treatability study will be concluded. If concentrations rebound, SVE will continue and likely become a long-term remedy at the site.
- Initiated additional optimization efforts at the west side Base Boundary Hydraulic Containment System (BBHCS) and off-Base 1,2-dichloroethane (1,2-DCA) extraction system
 - Collecting groundwater data at various intervals in the extraction wells to determine the optimal placement of the pumps to maximize contaminant removal and hydraulic containment

Next Six Months

- Meet with Layton City Council to provide environmental update on Nov. 3 (see details below)
- Conduct groundwater sampling and perform routine operations activities

Operations/Progress Summary

- BBHCS (operating since 1998)
 - East-side system permanently shut down
 - Approximately 867 million gallons of contaminated groundwater extracted
 - An estimated 102 pounds of contaminants removed
- 1,2-DCA extraction system (located in Layton near Vae View Elementary) (operating since 2005)
 - Approximately 591 million gallons of contaminated groundwater extracted
 - An estimated 21 pounds of contaminants removed

Milestone Schedule

<u>Date</u>	<u>Item</u>
Nov. 3 5:30 p.m.	Layton City Council Work Meeting <ul style="list-style-type: none">Air Force update on environmental and indoor air sampling programs in Layton City

Challenges

- None noted at this time

RAB Q&A

- None at this time
- Please notify Barbara Fisher, 75th Air Base Wing Public Affairs, at (801) 775-3652, or the project manager listed above if you have a question that you would like addressed during the breakout session at the next RAB meeting. If you have a question between meetings, please contact Ms. Fisher or the project manager.

Operable Unit 10 (Clearfield/Sunset)

Hill AFB Project Manager – Shannon Smith, (801) 775-6913

Site Status

- Record of Decision signed in 2015
- Remedy in place in 2015

Since Previous RAB (August 2016 to present)

- Continued groundwater sampling and soil gas sampling in treatment areas on-base

Next Six Months

- Monitor progress of full-scale remedy
- Submit annual performance monitoring report that evaluates cleanup status/effectiveness of treatment systems

Operations/Progress Summary

- Full scale remedy implemented in Summer 2015 - 135,600 gallons of carbon substrate injected into groundwater in three areas at the site
 - Injection Locations
 - Tetrachloroethene (PCE) plume on Hill AFB
 - PCE and trichloroethene (TCE) plumes near 800 North and Main Street
 - TCE plume near 600 North and 200 West
 - PCE/TCE concentrations rebounded in some areas and carbon substrate concentrations decreased indicating additional carbon substrate was needed
- Additional 8,700 gallons carbon substrate injected into groundwater in July 2016
 - PCE concentrations in most monitoring wells have decreased by more than 50 percent
 - TCE concentrations are declining

Milestone Schedule

<u>Date</u>	<u>Item</u>
	None at this time

Challenges

- None noted at this time.

RAB Q&A

- None at this time.
- Please notify Barbara Fisher, 75th Air Base Wing Public Affairs, at (801) 775-3652, or the project manager listed above if you have a question that you would like addressed during the breakout session at the next RAB meeting. If you have a question between meetings, please contact Ms. Fisher or the project manager.

Hill AFB

Operable Unit 11 (Hill AFB)

Hill AFB Project Manager – Shannon Smith, (801) 775-6913

Site Status

- Record of Decision signed in 2015

Since Previous RAB (August 2016 to present)

- Continued operation of soil vapor extraction and groundwater extraction systems
- Continued routine groundwater sampling
- Continued removing floating fuel from groundwater monitoring wells in source area

Next Six Months

- Conduct groundwater sampling and perform routine operations and maintenance activities
- Vacuum floating fuel from extraction wells in source area

Operations/Progress Summary

- Groundwater Extraction Systems (began operations in September 2015)
 - Removed more than 2.4 million gallons of contaminated groundwater and 44 pounds of contaminants (methyl tert-butyl ether [MTBE] and trichloroethene [TCE])
 - Average concentrations of 3,800 parts per billion (ppb) of MTBE and 29 ppb of TCE removed from July-Sept 2016
- Source Area
 - Manual bailing from monitoring wells removed 246 gallons of floating fuel since 2000
 - Soil vapor extraction system (operational from 2000-2008) removed approximately 5,200 gallons of fuel
 - Soil vapor extraction system re-started in September 2015, has removed 226 pounds of contaminants through September 2016, most of which was petroleum-related compounds (210 pounds)

Milestone Schedule

<u>Date</u>	<u>Item</u>
Winter 2016/2017	Complete annual performance monitoring report on treatment systems (Remedial Action-Operation Report)

Challenges

- None at this time

RAB Q&A

- None at this time
- Please notify Barbara Fisher, 75th Air Base Wing Public Affairs, at (801) 775-3652, or the project manager listed above if you have a question that you would like addressed during the breakout session at the next RAB meeting. If you have a question between meetings, please contact Ms. Fisher or the project manager.

Operable Unit 14 (Hill AFB)

Hill AFB Project Manager – Jason Wilde (801) 586-1933

Site Status

- Awaiting regulatory approval of munitions burn pit (BP504) Remedial Design/Remedial Action Work Plan
- Remedial Action Completion Report for small arms firing range (SR502) and residue burn areas (DA503) is in progress

Since Previous RAB (August 2016 to present)

- Regulators and Air Force have agreed on language defining Principal Threat Waste (PTW) and how it is to be handled
 - Dispute between the two parties caused a delay in the OU 14 ROD, which has now been resolved
 - PTW is a term used to describe waste that could pose a significant threat to human health and the environment; in this case, it is potential munitions constituents
- Completed remedial actions, site restoration, and revegetation at Sites SR502 and DA503
- Mobilized for field work to perform remedial actions at BP504

Next Six Months

- Submit Remedial Action Completion Report for review to Air Force and regulators for Sites SR502 and DA503
- Attain site closure for Sites SR502 and DA503
- Mobilize for field work to perform remedial actions at Site BP504
- Complete remedial action at Site BP504 and submit Remedial Action Completion Report to Air Force and regulators
- Attain Response Complete for Site BP504

Operations/Progress Summary

- No actions have been taken to date

Milestone Schedule

<u>Date</u>	<u>Item</u>
October 2016	Finalize ROD
October 2016	Complete Remedial Action Work Plan (BP504)
October 2016	Complete Field Work (BP504)
October 2016	Complete Final Remedial Action Completion Report (SR502/DA503)
October 2016	Begin Site Closeout for SR502/DA503
November 2016	Submit Draft Remedial Action Completion Report (BP504)

Challenges

- None at this time

RAB Q&A

- None at this time
- Please notify Barbara Fisher, 75th Air Base Wing Public Affairs, at (801) 775-3652, or the project manager listed above if you have a question that you would like addressed during the breakout session at the next RAB meeting. If you have a question between meetings, please contact Ms. Fisher or the project manager.

Clinton, Sunset & Roy

Operable Unit 5 (Clinton/Sunset)

Hill AFB Project Manager – Jason Wilde (801) 586-1933

Site Status

- Record of Decision signed in 2006

Since Previous RAB (August 2016 to present)

- OU5 Aeration Curtain System in Sunset continues routine operations
- OU5 Groundwater Extraction Trench System in Clinton continues routine operations
- Conducted quarterly Treatability Study Performance Monitoring (September 2016)
- Completed annual performance monitoring report to evaluate status of cleanup and effectiveness of treatment systems in place
- Met with Clinton Mayor and City Council – Sept. 13
 - Briefed progress of cleanup efforts and provided an indoor air sampling program update

Next Six Months

- Conduct quarterly Treatability Study Performance Monitoring (January)
- Perform routine groundwater sampling

Operations/Progress Summary

Aeration Curtain System in Sunset (began operations in 1997)

- Treated 27 million gallons of groundwater and removed approximately 87 pounds of TCE
- Average TCE concentration of groundwater entering the system is 166 parts per billion (ppb) and the average TCE concentration of groundwater exiting the system is 3 ppb, a 95 percent reduction in TCE concentrations

Groundwater Extraction Trench System in Clinton (began operations in 1997)

- Treated 140 million gallons of groundwater and removed about 19 pounds of TCE
- Latest groundwater testing results show that concentrations of TCE downgradient from the system have mostly attenuated to below the drinking water standard of 5 ppb.

Treatability Studies

- Treatability study on-base in Tooele Army Rail Shop plume using Enhanced Reductive Dechlorination (ERD) injections shows a 99 percent reduction in TCE concentrations since January 2015
- Treatability study on-base in Zone 16 plume using ERD injections shows a 96 percent reduction in TCE since July 2015

Milestone Schedule

<u>Date</u>	<u>Item</u>
Spring 2017	Anticipated completion of ERD treatability study

RAB Q&A

- None at this time
- Please notify Barbara Fisher, 75th Air Base Wing Public Affairs, at (801) 775-3652, or the project manager listed above if you have a question that you would like addressed during the breakout session at the next RAB meeting. If you have a question between meetings, please contact Ms. Fisher or the project manager.

Operable Unit 9 (Sunset/Hill AFB)

Hill AFB Project Manager – Shannon Smith, (801) 775-6913

Site Status

- Record of Decision signed in September 2015

Since Previous RAB (August 2016 to present)

- Monitored progress of recently installed cleanup actions
- Completed documentation for removal action at Pond 1 Area (stormwater retention pond near Hill AFB South Gate)
- Prepared 1100 Area Treatability Study Summary Report
- Prepared documentation for site closeout for on-base 800/900 Area (Remedial Action Completion Report)

Next Six Months

- Continue monitoring progress of remedial actions
- Complete routine groundwater sampling

Operations/Progress Summary

- On-base 1100 Area Enhanced Reductive Dechlorination (ERD) injection system
 - Average of 58 percent reduction in trichloroethene (TCE) concentrations
 - Increase in cis-1,2-dichloroethene concentrations (a breakdown product of TCE)
- Base Golf Course Area Bioreactor
 - Comprised of a bark and mulch mixture that provides a carbon source to enhance natural breakdown processes
 - Groundwater pumped from beneath source area and sprinkled into bark and mulch mixture for treatment
 - Combined TCE and tetrachloroethene (PCE) concentrations reduced by 60 percent
 - Increase in total organic carbon (an indicator of favorable treatment conditions)

Milestone Schedule

<u>Date</u>	<u>Item</u>
Winter 2016	Abandon monitoring wells at the 800/900 Area for site closeout

Challenges

- None at this time

RAB Q&A

- None at this time
- Please notify Barbara Fisher, 75th Air Base Wing Public Affairs, at (801) 775-3652, or the project manager listed above if you have a question that you would like addressed during the breakout session at the next RAB meeting. If you have a question between meetings, please contact Ms. Fisher or the project manager.

Operable Unit 12 (Roy)

Hill AFB Project Manager – Jason Wilde (801) 586-1933

Site Status

- Record of Decision (ROD) signed in 2005

Since Previous RAB (August 2016 to present)

- Continued routine groundwater sampling
- Continued routine operation and maintenance of two treatment systems
- Continued performance monitoring of Source Area Treatability Study activities
 - Additional groundwater sampling conducted to monitor the second injection of carbon substrate in August 2016
 - Soil vapor extraction (SVE) system sampling discontinued following result of the 90-day shutdown test where no significant rebound of contaminant concentrations were observed
- Received regulatory approval of updated Explanation of Significant Differences (ESD)
 - Removes Permeable Reactive Barrier (PRB) treatment as a requirement under the ROD agreement between the Air Force, Environmental Protection Agency and Utah Department of Environmental Quality
 - ESD becomes final when signed by all agencies

Next Six Months

- Source Area Treatability Study
 - Monitor carbon substrate injection to treat high concentration areas of trichloroethene (TCE)
 - Continue operation and maintenance of SVE systems through 2016
- Base Boundary Hydraulic Containment System
 - Evaluate and implement system optimizations to reduce power and operations costs

Operations/Progress Summary

- Base Boundary Hydraulic Containment System (began operations in 2003)
 - Extracted more than 128 million gallons of contaminated groundwater
 - Removed 51 pounds of contaminants from groundwater
- Treatability Studies (source area Enhanced Reductive Dechlorination [ERD] and SVE)
 - 50,000 gallons of a carbon substrate injected into source area
 - TCE concentrations averaged a 80 percent decrease
 - SVE systems operated continually for nine months and TCE concentrations were reduced by more than 80 percent
 - Results of the 90-day shutdown test indicate additional SVE operation is not warranted to meet project objectives.

Milestone Schedule

<u>Date</u>	<u>Item</u>
Fall 2015 – Fall 2017	Continue source area treatability study field activities
Fall 2016	<ul style="list-style-type: none">Finalize ESD for PRB to be made available for public reviewPublish public notice in newspaper summarizing changes between ESD and ROD

Challenges

- None at this time

RAB Q&A

- None at this time.
- Please notify Barbara Fisher, 75th Air Base Wing Public Affairs, (801) 775-3652 or the project manager listed above if you have a question that you would like addressed during the breakout session at the next RAB meeting. If you have a question between meetings, please contact Ms. Fisher or the project manager.

Riverdale & South Weber

Operable Unit 1 (South Weber)

Hill AFB Project Manager – Brit Grunewald, (719) 556-8060

Site Status

- Record of Decision signed in 1998

Since Previous RAB (August 2016 to present)

- Modifications made to on-base OU-1 Groundwater Extraction System to reduce operations and maintenance costs
 - Construction complete
 - Beginning system testing
- OU-1 Hot Spot Treatment to reduce high-concentration areas of contamination in non-source area plume on base
 - Continue performance monitoring of treatment system

Next Six Months

- Continue operations and maintenance and routine monitoring of treatment systems
- Continue treatment of high-concentration areas in plume and monitor performance
- Continue groundwater extraction system modification testing and operation

Operations/Progress Summary

- On-base OU-1 Groundwater Extraction System (2001 – 2016)
 - System has extracted more than 260 million gallons of contaminated groundwater
 - System has removed 160 pounds of cis-1,2-dichloroethene (cis-1,2-DCE) and 1,250 pounds of other chemicals from groundwater
 - System has removed 19,200 gallons of light non-aqueous phase liquid (LNAPL), or undissolved pure contaminants that are lighter than water
- OU-1 Hot Spot Treatment
 - Treatability study activities have reduced cis-1,2-DCE concentrations by more than 50 percent

Milestone Schedule

<u>Date</u>	<u>Item</u>
	<ul style="list-style-type: none">None at this time

Challenges

- Changes in access to off-base private property. Hill AFB had limited access to properties along the steep hillside north and east of the source area to conduct the 2016 seeps and spring survey. This did not impact operations or maintenance of the extraction trench system.

RAB Q&A

- None at this time
- Please notify Barbara Fisher, 75th Air Base Wing Public Affairs, (801) 775-3652 or the project manager listed above if you have a question that you would like addressed during the breakout session at the next RAB meeting. If you have a question between meetings, please contact Ms. Fisher or the project manager.

Operable Unit 2 (South Weber)

Hill AFB Project Manager – Shannon Smith, (801) 775-6913

Site Status

- Record of Decision signed in 1996

Since Previous RAB (August 2016 to present)

- Enhanced Reductive Dechlorination (ERD) treatability study under way to address non-source area
 - Goal is to determine if this technology will reduce the overall remedial timeframe
- Zero-valent iron (ZVI) and clay soil mixing treatability study under way to address source area
 - Using a large auger, a mix of ZVI and clay is added to the soil in large vertical columns
 - ZVI has no atomic charge and is ideal for breaking down TCE
 - Clay is added to the columns to ensure the ZVI stays put
 - Anticipating installing a total of 142 columns by the end of November
 - Goal is to determine if this technology is effective source treatment
- Routine operation and maintenance of all treatment systems

Next Six Months

- Monitor effects of ZVI / clay soil mixing treatability study on source zone concentrations and downgradient
- Monitoring effects of ERD treatability study
- Conduct groundwater sampling and perform routine operations and maintenance activities

Operations/Progress Summary

- On-Base: Source Recovery System (began operations in 1993)
 - An estimated 44,483 gallons of DNAPL (dense non-aqueous phase liquid, or undissolved contaminants heavier than water) has been removed since operations began
 - An estimated 38 million gallons of contaminated groundwater has been treated
 - An estimated 33,000 pounds of contaminants removed from groundwater
- Off-Base: North Interceptor Trench (began operation in 1997)
 - Total of 201 million gallons of contaminated groundwater extracted so far
 - An estimated 112 pounds of contaminants removed

Milestone Schedule

<u>Date</u>	<u>Item</u>
Fall 2016	Implement ZVI/clay soil mixing treatability study

Challenges

- None at this time

RAB Q&A

- None at this time
- Please notify Barbara Fisher, 75th Air Base Wing Public Affairs, (801) 775-3652, or the project manager listed above if you have a question that you would like addressed during the breakout session at the next RAB meeting. If you have a question between meetings, please contact Ms. Fisher or the project manager.

Operable Unit 4 (South Weber/Riverdale)

Interim Hill AFB Project Manager – Mark Loucks, (801) 777-6299

Site Status

- Record of Decision signed in 1994

Since Previous RAB (August 2016 to present)

- Routine operation and maintenance of the Operable Unit (OU) 4 Horizontal Drain Upgrade System
- Submitted ROD Amendment for regulatory review
- Submitted Remedial Design/Remedial Action Work Plan for regulatory review
- Began installation of Enhanced Reductive Dechlorination (ERD) biobarriers and biomulch remedial system

Next Six Months

- Complete annual performance monitoring report to evaluate cleanup status/effectiveness of treatment systems
- Perform routine groundwater sampling
- Complete installation of ERD biobarriers and biomulch remedial system
- Begin installation of landfill cap extension (eastern portion of landfill)

Operations/Progress Summary

Groundwater Extraction System on base (began operations in 1993)

- Extracted more than 38 million gallons of contaminated groundwater since beginning operations
- System has removed 228 pounds of contaminants from groundwater since 1993
- Average contaminant concentration 60 parts per billion during the past quarter (July-Sept 2016)

Milestone Schedule

<u>Date</u>	<u>Item</u>
Fall 2016	<ul style="list-style-type: none">• Complete Record of Decision (ROD) Amendment• Publish public notice on availability of ROD Amendment

Challenges

- None at this time

RAB Q&A

- None at this time
- Please notify Barbara Fisher, 75th Air Base Wing Public Affairs, at (801) 775-3652, or the project manager listed above if you have a question that you would like addressed during the breakout session at the next RAB meeting. If you have a question between meetings, please contact Ms. Fisher or the project manager.

Operable Unit 6 (Riverdale)

Hill AFB Project Manager – Carol MacKenzie, (801) 775-2559

Site Status

- Record of Decision signed in 1997
- Explanation of Significant Difference (ESD) signed in 2013 (allows discharge of contaminated groundwater to the North Davis Sewer District)

Since Previous RAB (August 2016 to present)

- Continued routine operations of OU6 Groundwater Containment System

Next Six Months

- Continue operation of the on-base and off-base groundwater treatment systems
- Perform routine system monitoring

Operations/Progress Summary

- Off-Base Groundwater Extraction Systems in Riverdale (began operations in 1996)
 - Extracted more than 164.8 million gallons of contaminated groundwater and removed 24.7 pounds of TCE
 - Average contaminant concentration 7 parts per billion (ppb) during the past quarter (July–Sept 2016)
- On-Base Groundwater Extraction Systems (began operations in 1996)
 - Extracted more than 276 million gallons of contaminated groundwater and removed 80.1 pounds of TCE
 - Average contaminant concentration of 16 ppb during the past quarter (July-Sept 2016)
- Cooley's Garage Spring
 - TCE concentrations remain below drinking water standard of 5 ppb

Milestone Schedule

<u>Date</u>	<u>Item</u>
Winter 2016/2017	Prepare Annual Remedial Action-Operations Report

Challenges

- None at this time

RAB Q&A

- None at this time
- Please notify Barbara Fisher, 75th Air Base Wing Public Affairs, at (801) 775-3652, or the project manager listed above if you have a question that you would like addressed during the breakout session at the next RAB meeting. If you have a question between meetings, please contact Ms. Fisher or the project manager.

Air Force Civil Engineer Center

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Operable Unit 8

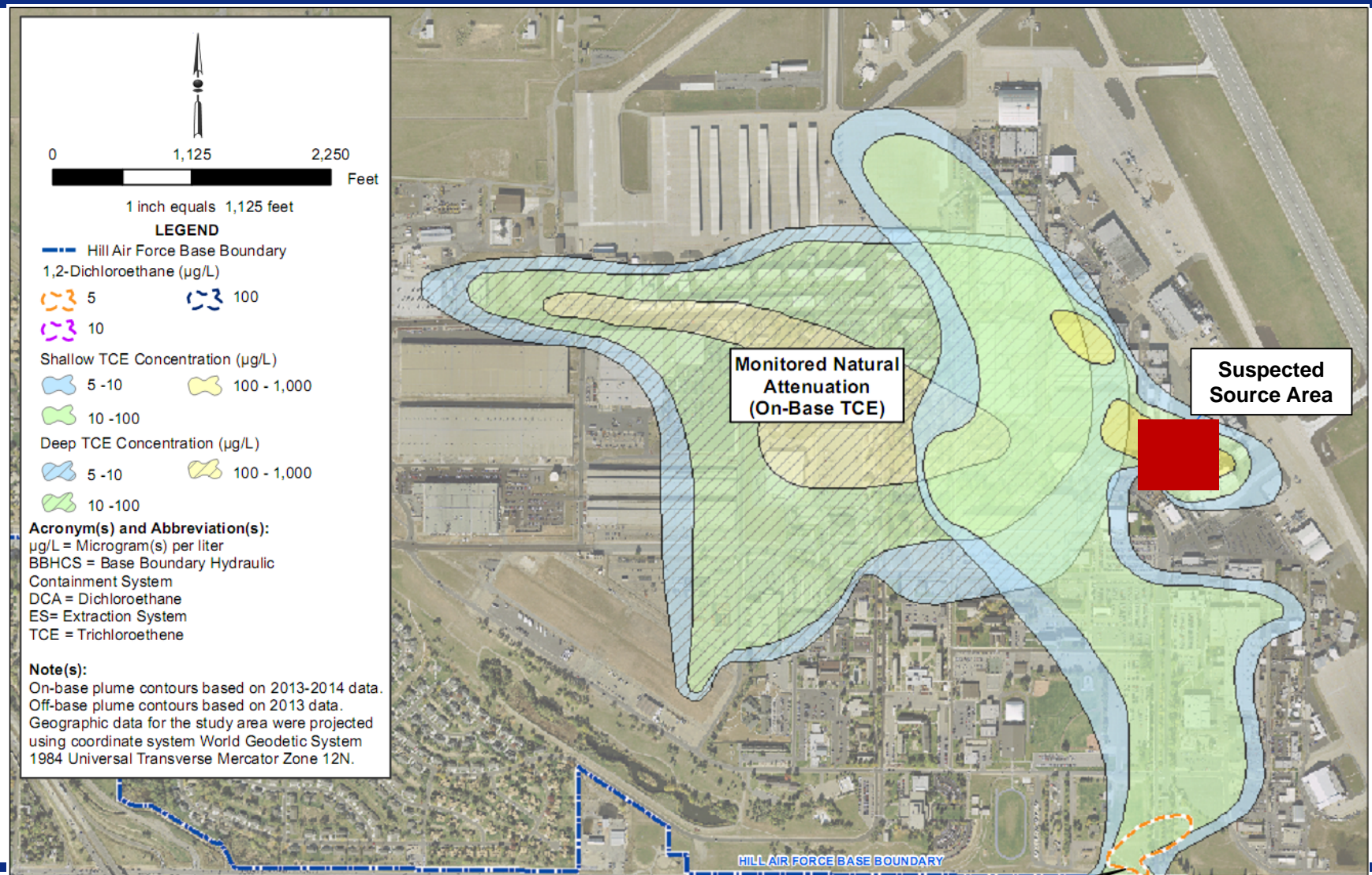
Status of Soil Vapor Extraction Treatability Study

27 October 2016

Shannon Smith – AFCEC/CZOM Hill Section
Charles Holbert, Ph.D – Technical Advisor, EA Team



OU 8 On-Base



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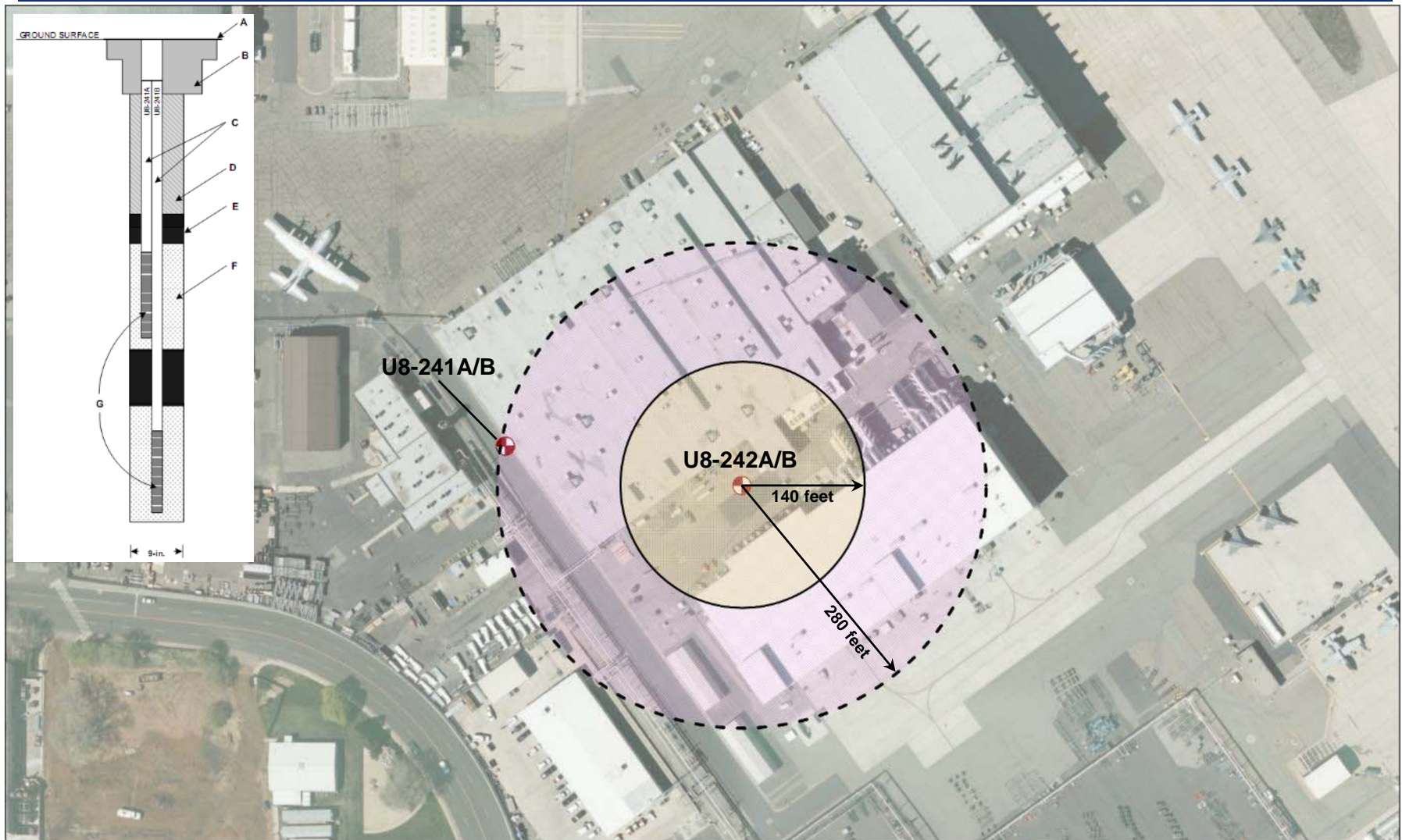


SVE Treatability Study

- ❑ **Suspected source area was focus of treatability study using soil vapor extraction (SVE)**
- ❑ **Four wells, two locations (U8-241A/B, U8-242A/B) screened from 30 – 70 and 75 – 110 feet bgs**
- ❑ **Each well tested individually for ~30 – 60 days using a trailer-mounted SVE system starting in June 2015**
- ❑ **Preliminary results of study were:**
 - ❑ **U8-242B appears to be in relatively close proximity to a TCE vadose zone source**
 - ❑ **~154 lb (13 gal) of TCE removed from suspected source area**
- ❑ **Recommendation made to extend test at U8-242A/B for at least 6 months to evaluate long-term mass removal**



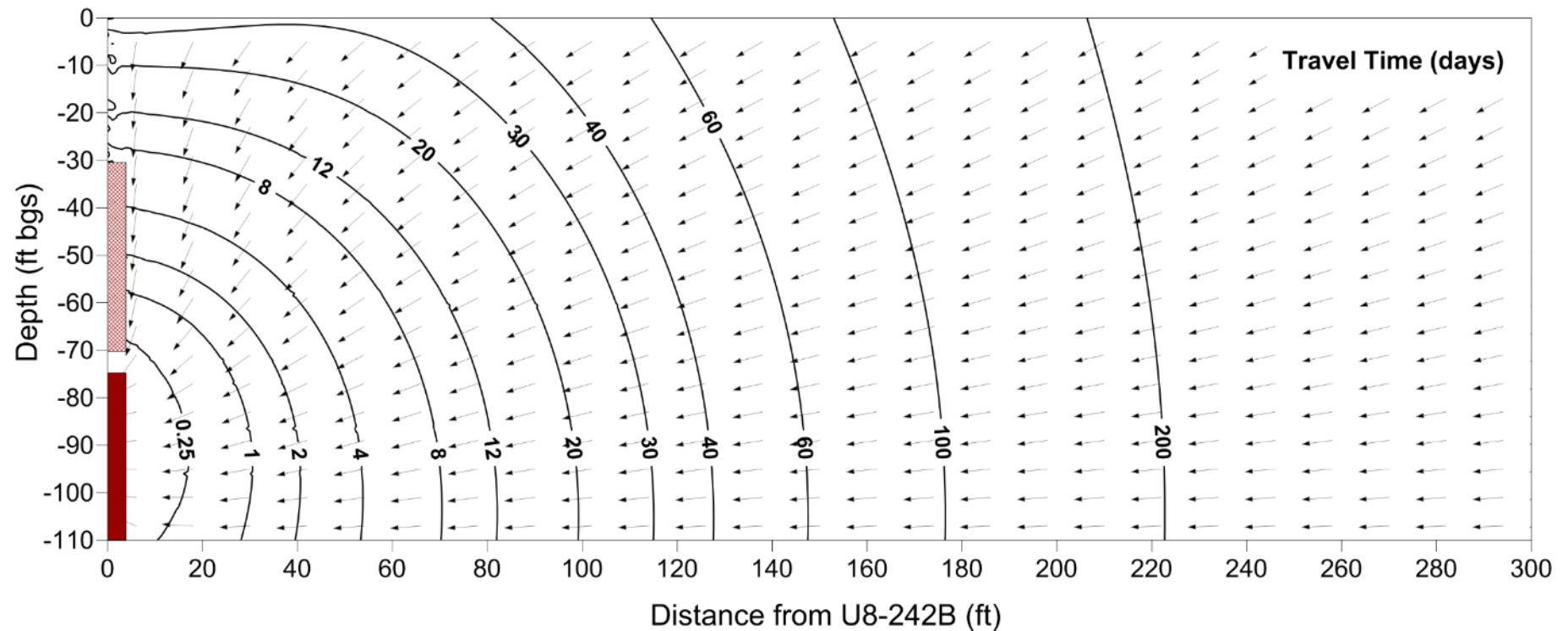
SVE Study Area



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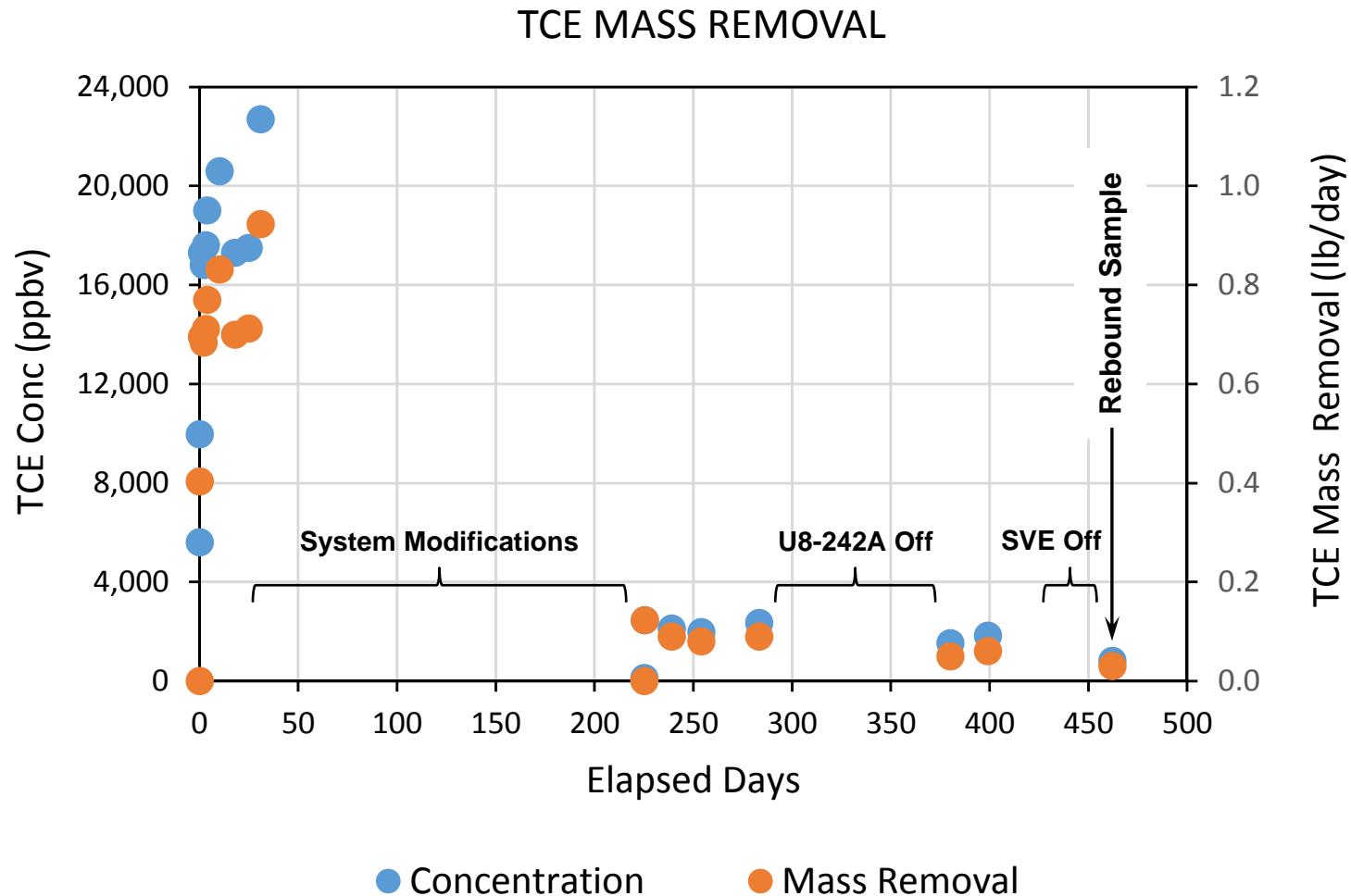


U8-242B Soil Vapor Travel Time



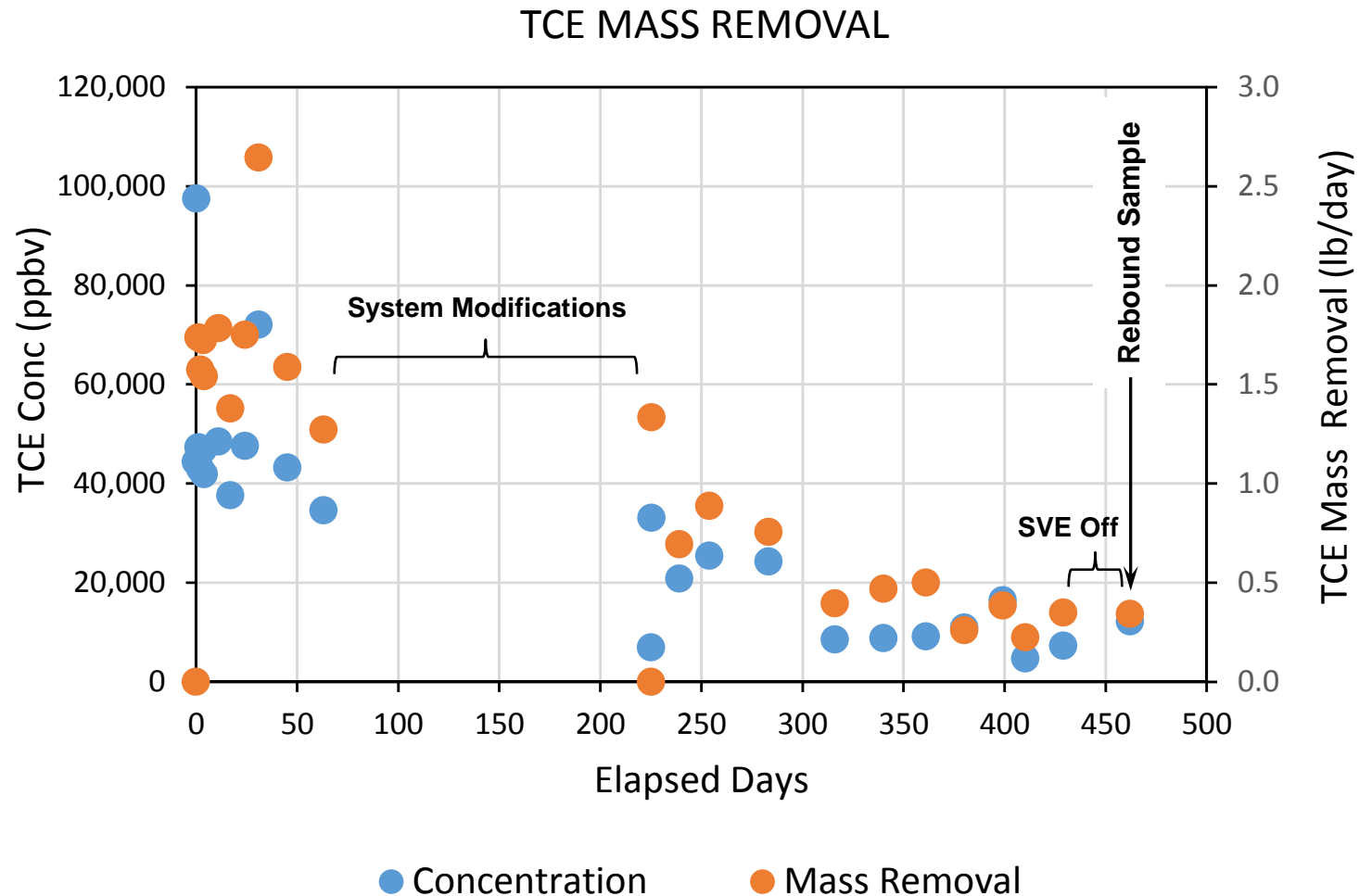


TCE Concentrations at Vent Well U8-242A





TCE Concentrations at Vent Well U8-242B





SVE Extended Test Results

Vent Well	TCE Concentration (ppbv)			
	Baseline	End of Initial Phase	End of Extended Phase	30-Day Rebound Test
U8-242A	29,300	20,000	2,000	800
U8-242B	97,500	35,000	10,000	12,000

- ❑ ~260 lb (21 gal) of TCE removed from suspected source area
- ❑ TCE mass removed could contaminate 6.2 billion gallons of groundwater at an average concentration of 5 ppb (EPA's Maximum Contaminant Level in drinking water)



Path Forward

- ❑ **Conduct second rebound test where system will be shut down for an additional 60 days after which the system will be turned back on to collect vapor samples:**
 - ❑ If TCE concentration in rebound sample is $\leq 30\%$ of the baseline vapor concentration, the system will be shut down.
 - ❑ If TCE concentration in rebound sample is $> 30\%$ of the baseline vapor concentration, SVE will be continued until the next scheduled rebound test.
- ❑ **Prepare final report that will include data analysis, conclusions, and additional recommendations**



Questions?

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***Air Force response
to Perfluorinated
Compounds (PFCs)
PFOS and PFOA***

Hill AFB

Mark Loucks AFCEC/CZOM

RAB meeting 27 Oct 2016



Overview

- **What are PFCs (PFOS and PFOA)?**
 - Background
- **Air Force response**
 - Identify: Preliminary Assessment (PA) / Site Inspection (SI)
 - Respond
 - Prevent
- **Challenges PFCs pose**
- **Base-specific info**
- **More Information**
- **Questions?**

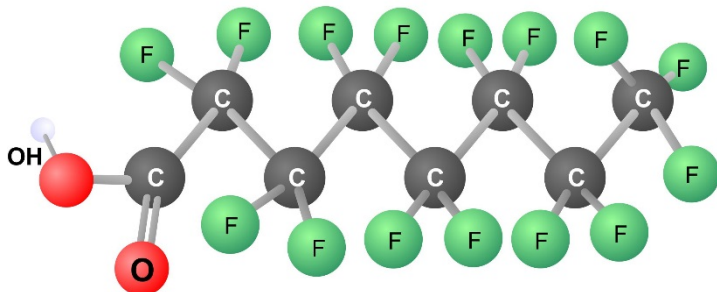


What are *PFOS* and *PFOA* ?

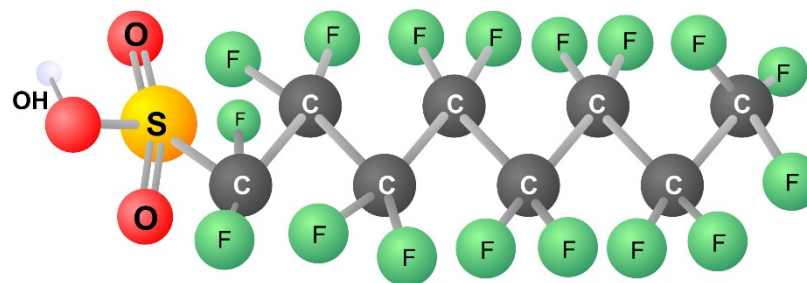
PFCs are a class of synthetic fluorinated organic chemicals used in many industrial and consumer products, including: nonstick cookware, waterproof fabric, some food packaging, and the firefighting agent Aqueous Film Forming Foam (AFFF).

- **Perfluorooctanoic acid (PFOA)** and **Perfluorooctanesulfonic acid (PFOS)** are both PFCs, a type of fluorinated organic compound.

PFOA (Perfluorooctanoic acid)



PFOS (Perfluorooctanesulfonic acid)



- PFOS and PFOA exist in the environment and are not known to degrade by any natural processes.
- In 1970, the Air Force began using AFFF to extinguish petroleum fires.



What are *PFOS and PFOA* ?

Emerging Contaminant

- **PFOS and PFOA are classified as emerging contaminants by the Department of Defense.**
 - **The risk to human health is inconclusive and regulatory standards are evolving.**
- **In May 2016, the EPA issued lifetime health advisory values for PFOS and PFOA of 70 parts per trillion. TCE is 5 ppb or 5000 parts per trillion.**
- **When the health advisory came out; Air Force had a head start**
 - **Centralized contracts to assess PFOS and PFOA potential at AF installations**
 - **Team evaluated Hill AFB in the Fall of 2015**



What are *PFOS and PFOA* ?

Health Effects

Health impacts from PFOS and PFOA exposure are an active area of research.

- **The information is constantly changing as more health studies are completed.**
- **Air Force to closely monitor changes in the science.**
- **ATSDR health consult in Decatur, Ala., produced inconsistent and inconclusive results. ATSDR to update Toxicological Profile for PFOS and PFOA**
- **The EPA Office of Water finalizing updated evaluations of health impacts.**
 - **Animal studies suggest impacts on liver and potential development effects.**
 - **Results are inconclusive as to its effects on humans.**
- **Studies show that nearly all people have some PFOS and PFOA in their blood, regardless of age.**



Air Force Response

- Air Force is aware of PFOS and PFOA releases from AFFF
- Working with regulatory agencies to identify contaminated sites
- Current efforts focused on identification and mitigation
- Cleanup efforts will begin when credible health data brings about risk-based regulatory standards.

The Air Force developed a three-step method of PFOS and PFOA release identification and confirmation, delineation, and mitigation to address possible PFC releases.

- 1.) Identify
- 2.) Respond
- 3.) Prevent



Air Force response

Identify

1.) Identify:

- Investigate base records and review historical use to
 - Determine whether PFOS and PFOA contamination is probable and where it would be found
 - Focus on former Fire Training Areas (FTAs)
 - Complete - All AF installations have been looked at

- If records indicate contamination is probable,
 - Have base bioenvironmental engineer evaluate likelihood of water source contamination and sample if at all likely
 - Air Force conduct sampling of environmental media (soil, water, and sediment) in all areas identified in the preliminary assessment



Air Force Response

Respond

2.) Respond:

- **When sample results indicate PFOS and PFOA levels exceed the health advisory**
 - **Air Force takes necessary steps to reduce PFOS and PFOA levels**
 - **Take contaminated wells out of service**
 - **Install remedial systems as needed**
 - **When needed, provides an alternate drinking source.**
- **When PFOS and PFOA are detected but below the health advisory level**
 - **Air Force will conduct additional monitoring as needed to track level changes and alert the Air Force if further action is needed**



Air Force Response

Prevent

3.) Prevent:

- The Air Force taking steps to prevent future AFFF releases
 - Prevent future firefighting foam releases, the Air Force limits use to emergency responses only and, in those situations, immediate action is taken to ensure containment.
 - In July 2015, the Air Force Fire Chief directed all bases to stop testing the foam systems on all fire vehicles unless an environmentally-approved containment system is in place.
 - The Air Force plans to replace legacy AFFF with environmentally sound options, while still maintaining adequate fire protection for critical assets and infrastructure.



Challenges with PFOS and PFOA

- They do not break down in the environment
- Highly soluble and transportable - don't hang up in soils and move w/ the groundwater
- They are non-volatile, can't be removed by air technologies
 - Not a vapor intrusion issue

What does this mean?

- Many conventional treatment approaches, such as direct oxidation, air stripping and vapor extraction, are not effective for PFOS and PFOA
 - Research for alternative/more effective remediation technologies is on-going
 - The most effective method currently available to treat PFOS and PFOA in water is pump-and-treat using granular activated carbon.



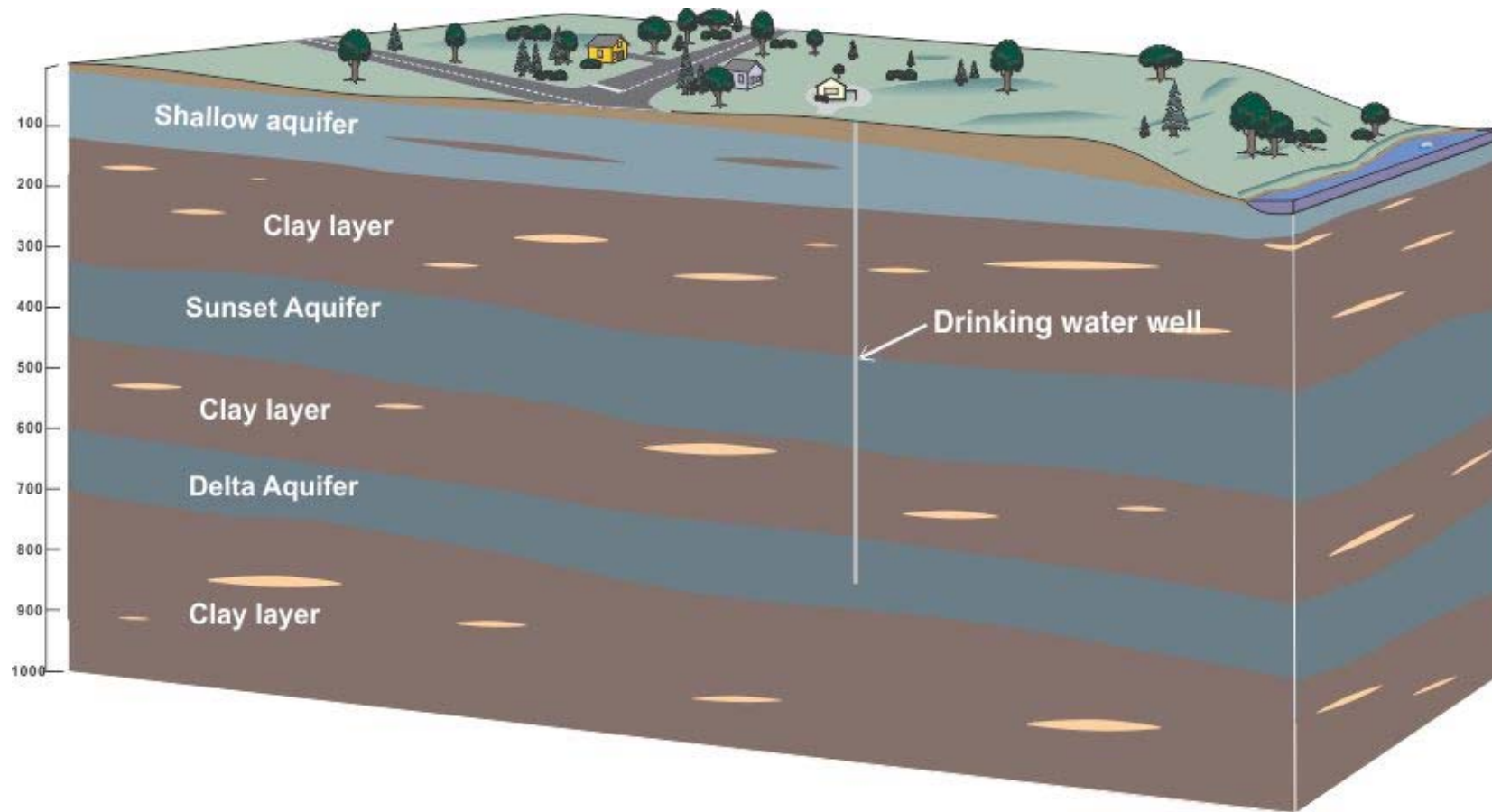
What is going on at Hill AFB?

- Base supplied by wells completed in Delta Aquifer
- Hill AFB drinking water supply has been sampled
 - No PFCs detected in drinking water supply
 - Because drinking water not affected Hill AFB is a lower priority
- Preliminary assessment conducted Fall 2015
 - 17 Areas of Concern recommended for investigation phase
 - 3 Fire Training Areas
 - 5 Buildings/Hangers
 - 6 Emergency responses and other overflows
 - 3 Fire Stations
- Site Investigations scheduled to start in June 2017.



Implications for off-base drinking water

- Not likely to be affected because of drinking water sources.



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More information

For more information on PFCs, visit:

Air Force Civil Engineer Center

www.afcec.af.mil/

Environmental Protection Agency

www.epa.gov/

Agency for Toxic Substances and Disease Registry

www.atsdr.cdc.gov/

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Questions?

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