

**Former Pease Air Force Base (AFB)
Restoration Advisory Board (RAB)**

October 24, 2017

6:30-8:30 p.m.

New Hampshire Department of Environmental Services Building
222 International Drive, Suite 175, Portsmouth, New Hampshire

Meeting Summary

RAB members present: Susan Chamberlin (Portsmouth resident), Ted Connors (Newington resident), Mike Daly (USEPA), Peter Forbes (Air Force and Department of Defense Co-Chair), Brian Goetz (City of Portsmouth), Scott Hilton (NHDES), Peggy Lamson (Newington resident), Christine Miller (Dover resident), Jameson “Jamie” Paine (community member and Community Co-Chair), Gene Schragger (Portsmouth resident), Maria Stowell (Pease Development Authority).

Meeting support staff present: Ona Ferguson (Consensus Building Institute, RAB Facilitator), Linda Geissinger (AFCEC, Public Affairs), Scott Johnston (Sytsma Group, Air Force Public Affairs support contractor), Rob Singer (Amec Foster Wheeler, AFCEC remediation contractor), Michael Self (AFCEC, JBSA), Isabella Szabolcs (Consensus Building Institute).

Others attending: Libby Bowen (Amec Foster Wheeler, AFCEC remediation contractor), Geoff Daly (Niles International), Alayna Davis (Dover resident), Val de la Fuente (AFCEC/CIB), Mitchell J Elder (772 ESS CC Air Force), Edgard G. Flores (772 ESS-AFICA), Melissa Helton (Amec Foster Wheeler), Sarah Holmes (Senator Shaheen’s Office), Brad Juneau (SpecPro Services, AFCEC contractor), Ginny Lombardo (EPA Reg 1), Anni Loughlin (EPA Reg 1), Dennis Malloy (Greenland resident), Jeff McMenemy (Portsmouth Herald Seacoast Online Reporter), Lulu Pickering (Newington resident), Ben Porter (Air Force), Al Pratt (City of Portsmouth), Peter Sandin (NHDES), Dabra Seikenl (Dover resident), Sharon Vriesenga (AFLOA/JACE – Air Force).

Next Meeting: Likely in early 2018.

Action Items:

- Co-chairs & facilitator –
 - Plan the next RAB meeting date and agenda.
 - Conduct membership review and application process for new members.
- Ben Porter – Find out and send the RAB info on what surfactants were used at site 73.
- Air Force staff – respond to public comments.

Welcome, Introductions and RAB Administrative Items

The facilitator welcomed everyone to the Pease Restoration Advisory Board. RAB members approved the July meeting summary as drafted after making a strong request that the Air Force address or answer questions raised at RAB meetings. This topic is addressed below in the public comments section. All RAB meeting materials can be found online at

<http://www.afcec.af.mil/Home/BRAC/Pease>

Current Restoration Activities

Mr. Forbes, Air Force, presented a brief overview of current restoration activities. He said that the Air Force wants to introduce the RAB to some of the technologies that have been employed on the sites since the cleanup program began back in the 1980s, given that the RAB’s task is to

give community input on the whole Pease cleanup program. Mr. Forbes introduced the next presenter, Ben Porter, an engineer and Air Force contractor.

Site 73

Ben Porter, Air Force contractor, presented on the Site 73 clean up. Site 73 is right across the street from the terminal and next to the AMEC Trailer. It is also referred to as former building 234. It was used as a liquid oxygen plant from 1959 to 1978, before it was converted to a water demineralization plant. Cleaning and degreasing operations were conducted in the vicinity of the concrete parking area northwest of the building prior to 1978 that resulted in spills of chlorinated solvents to the ground. Remedial activities have reduced the length of the contaminant plume from ~2,200 ft long to ~150 ft long. There have been three significant remedial activities:

1. Storage tank removal and contaminated soil excavation (1989 to 1991).
2. Passive remediation – In 1999, the Air Force installed a permeable reactive barrier (PRB). A PRB is a wall installed below ground that is permeable and reactive. As contaminated groundwater passes through the PRB, it reacts with the wall and remediates the groundwater. The PRB breaks down the chemicals of concern. In this case for site 73, the wall was made of zerovalent iron to react with the chlorinated solvents. The chemical process used here breaks down the TCE (the site originally had almost all TCE plume with very little PCE). Once the wall is installed, the chlorinated solvents are treated within the wall as the groundwater passes through it. The wall was 150 feet long, 2.5 feet wide and 34 feet deep (where it hit bedrock). For the most part, the data showed that PRB worked very well in reducing the mass of TCE at site 73, even though some residual mass has persisted in the source area.
3. Active remediation – In 2012, the Air Force used an in situ enhanced bioremediation treatment (ISEB) using emulsified vegetable oil (EVO) with anaerobic microbes called SDC-9. ISEB uses both native and introduced microbes to clean up contamination in soil and groundwater. The EVO accelerates microbial growth because it is a food source for this bacteria. When the bacteria release a particular enzyme, this enzyme acts as a catalyst to break high-energy bond and change it with a low energy bond. Bacteria use this change in energy to live and survive. In this case, this enzymatic reaction removes chlorine and replaces it with hydrogen. This process complements the PRB wall installed because it breaks down the chlorinated solvents with a very similar mechanism.

The Air Force injected 1,338 gallons of this solution per injection point at a total of 106 injection points. In total, they injected 140,791 gallons of solution. Data from 2010-2017 show that the ISEB successfully remediated TCE and DCE with only residual vinyl chloride remaining. It's very typical to see high levels of vinyl chloride because it is very hard to break down under these conditions. Except for one location, the rest of the vinyl chlorides are roughly between 3 and 2.1 ppb. As the cleanup goal is 2 ppb, the area has gotten very close to achieving the clean up goals.

In conclusion, the PRB reduced most chlorinated solvents as contamination passed through/near the PRB. The follow-up ISEB process did a good job reducing the remaining chlorinated compounds to below regulatory standards with the exception of vinyl chloride, which remains at low concentrations. The cleanup did cause some arsenic and manganese challenges. The team is now evaluating the slow vinyl chloride degradation rate and options for its remediation.

RAB members asked questions and shared comments, summarized here with answers provided by Mr. Porter unless otherwise indicated:

- Were there polysaccharides in the surfactant? *I'm not sure what surfactants they used. I can look that up and let Mr. Forbes know and he can pass on the information.*
- If this area were to be developed, are there any health and safety concerns? Could the area be redeveloped? *Redevelopers would have to consider the history of the site. (Mr. Forbes answered): There is potential to build on this land.*
- Are the results presented an average or data points at one well? *The samples described in this presentation are from the wells with the highest concentration of TCE and from the one that had the highest concentration of DCE in 1999 and 2010. That was often the same (most impacted) well.*
- Thank you for doing all this work. Is ethene a stable persistent molecule? What is its half-life? Are you making methane? *Ethene is a gas and is not very stable. It will go away. I don't think there are any health or toxicology issues, so on a remediation standpoint, most of the time when you get to ethene because it's a gas it eventually goes away. Regarding methane, there's probably a process that will break that ethene double bond, producing methane, but these are very low numbers and it mostly just goes away.*
- What was liquid oxygen used for? *The Air Force used liquid oxygen to increase engine thrust for take-off.¹ (Mr. Daly answered): The plant historically produced liquid oxygen on-board Air Force aircraft. Early-era jet aircraft engines used by the Air Force relied on the injection of demineralized water during takeoff to increase jet engine thrust.*

Pease Tradeport Groundwater Mitigation Activities

Site 8 Interim Mitigation System Update

Rob Singer, Amec Foster Wheeler, gave an update on the Site 8 Interim Mitigation System and showed photos of Site 8 construction. The extraction wells (pumping wells that will extract water from the ground for treatment) are installed and will be piped to the building once it's constructed. Trenching from the extraction wells to the building is also underway. The building will be enclosed by the first week of December, at which point all the treatment equipment will be brought in. The system will be tested this winter.

Mr. Singer presented photos showing the current status. He showed an extraction well with its tubing and piping, the processes of trenching and drilling, pouring concrete, pipe installation and foundation footing installation.

Airfield Interim Mitigation System Update

Mr. Singer then gave an update on the treatment plant near the Haven well. The Air Force awarded the construction contract on September 29. The Air Force is conducting injection testing in and around the airfield through December to determine how to re-inject the treated (clean) groundwater back into the ground. Due to the soil's gravelly composition, slotted stainless steel pipe is being used. This allows as much water as possible to be injected back into the ground after treatment. The goal is to begin construction in the spring.

¹ It isn't clear from the notes taken at the meeting who offered this answer.

Update on PFCs at Pease

The Air Force has completed 123 separate sampling events of public water supply wells and has taken over 830 samples. Data from the municipal supply wells is extremely consistent, and PFC concentrations are very stable. Municipal well sampling data is posted to the City of Portsmouth website. In November, the Air Force will conduct the next sentry monitoring well sampling event. This groundwater sampling event will include collection of samples from 28 monitoring wells in and around the airfield. Data from this event will be compared to previous data to see if PFOS and PFOA plumes are changing and if compounds are migrating toward the southern (municipal) well field. The Air Force is evaluating data from across Pease and in Newington to better understand the PFOS and PFOA impacts and will continue sentry well monitoring, public water supply monitoring, and private well sampling in Newington to develop a better understanding of PFOS and PFOA at Pease.

RAB members asked questions, summarized here, with answers provided by Mr. Singer in italics:

- How much water will be pumped and treated from airfield wells? *The total flow rate at the airfield is 700 gallons per minute (gpm), so near the Haven well we will pump 300-350gpm. We will pump approximately 250 gpm in a series of wells north of the Haven well. All of that will get re-injected into the aquifer after treatment.*
- A member of the public asked the pressure at which the water will be pumped back into the refill wells? *We will be figuring that out during the current testing.*

City of Portsmouth Update

Brian Goetz (City of Portsmouth), gave a brief update on City of Portsmouth drinking water activities. The City began the Demonstration filter project on the Harrison and Smith Wells in September 2016. Their consultant also performed a treatment pilot project (the pilot report is on the city website), and conducted additional preliminary designs and assessment of other municipal treatment systems in June 2017. There was some follow-up piloting that took place with some alternative treatment technologies, resins, that was completed on the Harrison and Smith Wells and they're currently moving on to test the water at the Haven Well through the treatment system at about 1.5-2gpm. The final treatment system design is under way (in the 3rd month of an 8-month process). They hope to begin construction in late 2018. They are also piloting treatment at the Haven Well and are about to begin testing the efficacy of the filter media on Haven well water. The city website (cityofportsmouth.com) is updated monthly with information including the water quality data.

The data from the current Pease Tradeport water system activated carbon treatment demonstration project treating the water in the Haven and Smith wells is available online. As of September, they've sampled 30 times. The water goes through two filters, so testing occurs before the first and at different sample ports on each filter. To date, through the September 21st round, PFOS and PFOA are non-detect through the first filter. However, they are seeing a few shorter chain compounds in the water coming out of the first filter, which was anticipated based on other similar treatment systems. Nothing has passed through the second filter. To date, 151 million gallons of water have gone through those filters. They are discussing with the Air Force potentially swapping the first and second filters because of some pressure building up in the filters. If this occurs, then the first filter will become the second and visa-versa. The City provided a graphic of the potential look of the expanded Grafton Road treatment facility so it has room to hold the four sets of filter pairs and room for aerators to remove radon and other possible volatiles if necessary.

The Air Force has been sampling around the wells since the contamination was first discovered with monthly monitoring at the Smith, Harrison, Portsmouth and Collins wells. Sampling data collected since April 2014 shows very consistent concentrations of PFOS/PFOA, no discernible plume movement and no EPA health advisory exceedance.

In terms of the Haven Well Reactivation, the City intends to develop a comprehensive monitoring plan of PFAS and other key water quality parameters. Since there are so many unknowns, this city wants monitoring parameters in place. Baseline data will be collected before pumping begins so people will be able to track potential changes in water quality once the Haven Well is back in service.

The City of Portsmouth website has a lot of information including the Pease Well monitoring and sampling results and a revised (and more comprehensive) water quality report.

RAB members asked questions, summarized here, with answers provided by Mr. Goetz in italics:

- What did the city learn in their study of how other municipalities are treating PFCs? *First, carbon filtration systems seem to be the system of choice for now. Resins show some promise, but have not been used at a large scale for any length of time. Most municipal websites don't share the level of comprehensive water quality data that is found on Portsmouth's website.*
- Is the city making space in the expanded facility in case other filters are needed for as yet un-identified contaminants? *We have asked that our consultant plan for that contingency but hope not to need it.*

Related Activities – Newington Summer Meeting

Ted Connors (RAB member and Newington Selectman) provided an overview of a public meeting held in September in Newington at the request of Newington residents to address questions about Newington's 40 individual wells and the PFC contamination. Most Newington residents could choose to hook up to the public water system, but some choose to use wells either as supplemental water supply for watering lawns and similar or as their only water source. Mr. Connors appreciated the meeting and said the community still has a lot of questions regarding the upcoming hunting season (could the deer that people hunt and eat be contaminated from their drinking water sources?). The Air Force has hooked four Newington homes that were over the 70 ppt PFC threshold to filtration systems. People at the RAB meeting noted concerns about PFCs contaminating fish and wildlife and asked about exposure pathways for humans. A member of the public suggested that Newington leaders reach out to Bob Friese, the Deputy Commissioner of NHDES and Dr. Benjamin Chan, the state epidemiologist and DHHS representative, who address these problems for private wells.

RAB Membership

Ms. Ferguson discussed the process for reviewing RAB membership that will occur in the next few months. The RAB has 6 appointed members and 8 community members. Ms. Ferguson will reach out to all whose terms are up in early 2018 to ask if they'd like to continue for another two-year term. She described the process for adding new members: (1) she and the co-chairs will release an application form with an application deadline, (2) once applications are received and the co-chairs review them, the applications will be shared with the whole RAB with

recommendations, then (3) the RAB will discuss the applications at the next RAB meeting and make membership decisions.

Old / Remnant Water Request

Mr. Paine raised the old water request from previous meetings. He noted that members of the public and of the RAB have asked previously that the Air Force search for remnant water on the tradeport site to provide information about contamination levels in water from an earlier period. A tank was identified west of New Hampshire Avenue, and Jamie and Andrea Amico had asked if it could be tested. Both Air Force and NHDES said before the meeting that they would not test it because of a variety of concerns, but Mr. Paine asked again why it cannot be tested and said testing the water seemed straightforward. Mr. Paine asked why none of the agencies would test it, given that these agencies are used to handling contaminated water, the water is right nearby, and such data might provide useful information. Mr. Hilton (NHDES), Mike Daly (EPA) and Peter Forbes (Air Force) replied that the Air Force, EPA and NHDES have the same three primary concerns about that particular water:

1. *Data quality* - They have concerns about the data quality of the sample. There are too many questions about what the water in the tank is for it to be useful. The tank held water for fire protection, but: what month and year was it filled? Was it ever emptied completely? Did it have to be refilled? Is water evaporating in the tank (meaning any concentration numbers are changing)? What is the source of the water (it could be one of three wells or a reservoir)? Testing it would provide a PFC concentration number, but it would be very unclear what that number meant.
2. *Purpose of collecting the data* - The information that the sample might provide isn't necessary for the clean up work being done now (which is focused on determining where the contamination is and how to clean it up). It is possible it might be useful to ATSDR in modeling health impacts, and that they would want to sample it. Mr. Hilton is willing to talk with ATSDR if they're interested.
3. *Level of effort* - The sample is difficult to collect. If it were easy to collect, they would do it. If CAP / ATSDR want the data, they would have to hire a contractor. Resources are better spent now working to protect human health and get the environment clean, rather than funding very complicated sampling that will produce unclear results.

Mr. Paine said it doesn't feel very scientific to make assumptions about the water and not test them, and also that there is a need to test it to determine if some cleanup is required before it can be used or emptied. Linda Geissinger (Air Force) asked if anyone had spoken to ATSDR about this. Mr. Hilton noted that Andrea Amico, on the CAP, had raised this question of old water and he had communicated with her and suggested it be brought as a topic to the CAP to decide if ATSDR would want that information for their health modeling. He said he assumed Andrea had passed his thoughts along to other CAP members.

Public Comments

Members of the public had the opportunity to share thoughts with the RAB. Three people shared comments, summarized here.

Geoff Daly

- Given that New Hampshire has hundreds of PFC-contaminated sites (Amherst, NH has 200 PFOA-contaminated wells, Merrimack has over 400), and the public wants to learn

about them, RAB meetings should be better advertised using Facebook, other internet sites, and email lists.

- Please improve the clarity of the drawings on slide presentations and make documents more straightforward for the public to understand. For example, it is hard to understand the EPA website. I had to interact with an EPA official to understand lifetime exposure and bioaccumulation of PFOAs.

Alayna Davis:

- The questions being raised by the public at RAB meetings are not being answered and need to be. It's very frustrating as a member of the public and impacted community to come to these meetings, to spend time away from my family who have been personally impacted by these contaminants, to ask questions and then three months later not have a response. If this is because the right person is not present to answer those questions, I respectfully ask that person to answer us in writing or come to the meetings. This problem has gotten worse over time. I've attended these meetings from the beginning, and my questions have been disregarded and excluded from the summaries. For example, in the last seven minutes, roughly 60% of our questions have not been answered. How are impacted people supposed to participate with the RAB if our questions aren't being answered? Are our questions going to be answered? They should be. *(Mr. Goetz answered): At the July RAB meeting, we tried to answer the questions related to the water system as best as we could. (Mr. Forbes answered): Your regular presence here is much appreciated. There have been a lot of questions about emerging contaminants, much of which is either not known or incompletely understood. It can take time to find the information, if it is available at all. The Air Force is committed to answering questions to the best of our ability and letting the public know when we don't know the answers.*
- How can RAB minutes be approved without our questions being answered? *(Ms. Ferguson answered): Committee summaries are approved if they appropriately represent what occurred at the meeting.*
- What information do you have regarding the Pease resin pilot study? Which PFOS chemicals are being tested with resin and what are the results so far? Is the data now available? *(Mr. Goetz answered): The resin pilots at the Harrison and Smith Wells are complete, but data are not yet available from the vendor for the public. We will pilot this resin at the Haven Well, including resin. That pilot should take a couple of months.*
- Re: Mr. Goetz's presentation, which shorter chain PFOS are passing through the first filter? Are any passing through the second filter? Did the Air Force respond about when the change-out of the first filter will occur, and is there a filter change-out schedule? *(Mr. Goetz answered): For the short chain PFCs, all the data is on the city website. The summary is written for the general public. We are also going to make a cheat sheet that is simple to understand. At present, it's non-detect for the second filter, there are no PFOS passing through the second filter. We may propose to switch out the filters in November and will discuss that with the Air Force. The change will cost \$46,000 so requires approval. The switch occurs by reversing the direction of the water. This will give us some good engineering data on what happens in the second filter. Because not all carbon is the same, we do pilots, demonstrations and sample for all 23 compounds (the Air Force also does this same sampling).*

Lulu Pickering

- This is the 3rd RAB meeting that I've come to, and it's not clear how this committee functions. There's a lot of discussion, many presentations, and a lot of questions, yet there are no motions, voting, goals, or commitments to action items. At the August Newington meeting, many concerns and questions were raised including about contamination of farmland and wildlife, but there haven't been answers beyond the broad answers provided at the meeting. I didn't feel like any of the 23 questions I submitted were fully addressed. There's no written record of questions, it's almost like the Air Force can choose what they want to talk about.¹ There are so many things that the community needs help with, yet I don't see the mechanism on how we're going to get it.
- Who is the committee chair? *(Ms. Ferguson answered): The RAB has two co-chairs, Mr. Paine is the community co-chair and Mr. Forbes is the Air Force co-chair.*
- What are the RAB's goals? *(Ms. Ferguson answered): The RAB was formed to give voice to the concerns of the community. It is not a decision-making body. It has publicly-posted operating procedures that explain its function and which I can send to you. The RAB doesn't have authority to make decisions for the cleanup, but it has the power of (a) diverse participation and strong attendance, (b) participants raising important questions on behalf of the community, and (c) relationship-building. (Mr. Paine answered): It's been made clear to us that the RAB is an advisory group only. We provide advice to the Air Force, and they do the clean up. They receive information from us, and what they do with it is up to them. We request action we think is important both at and between meetings, but it's ultimately up to the regulatory agencies and the Air Force, given their capacity and constraints, to decide what work to do and how. An EPA administrative order directs the Air Force to clean up the drinking water. That's why the RAB was reconvened. We provide input about water quality issues and speak to the regulatory agencies, and it's ultimately up to the Air Force under the direction of resource agencies to move forward. So we as a group can raise concerns, questions and comments to the agencies that hopefully trigger them to move in a constructive direction. The standards that guide agency work also differ by state. (Mr. de la Fuente responded): I'm the Branch Chief in charge of executing this work. A few years ago, we held a big public meeting at Portsmouth City Hall which precipitated a lot of the clean-up work happening now. It seems clear we could be communicating more and sooner with residents about what we are doing and why. We've been doing a lot of work for Newington, but could have communicated with Newington residents sooner. RABs are a conduit for community feedback, and their insights and input are very valuable to the Air Force, but not being in a decision-making role can be difficult for RAB members and those participating in the process. I hear your frustration with how the RAB functions.*

¹ Note: Newington town officials hosted the August public meeting and invited the agencies to discuss Newington-specific issues. As this was not a RAB meeting, no RAB meeting summary was produced. Summaries are produced of every RAB meeting and include public comments.