

**Joint Base Cape Cod Cleanup Team
 Building 1805
 Camp Edwards, MA
 April 12, 2017
 6:00 – 8:00 p.m.**

Meeting Minutes

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Handouts Distributed at Meeting:

1. Draft final of the October 12, 2016 Meeting Minutes
2. Responses to Action Item from the October 12, 2016 Meeting
3. Presentation: Emerging Contaminants Update
4. Presentation: FS-29 Three-step Process to Site Closure
5. Presentation: IAGWSP Update



Agenda Item #1. Introductions, Late-Breaking News, Approval of October 12, 2016 JBCC CT Cleanup Team Meeting Minutes

Ms. Donovan began the meeting and asked the team members to introduce themselves. Ms. Donovan asked if there were any comments on the October, 2016 meeting minutes. No comments were made. Ms. Donovan then reviewed the agenda and the items included in the handout packets.

Agenda Item #2. Emerging Contaminants Update – Ms. Rose Forbes, AFCEC, Mr. Mark Hilyard, CH2M, and Ms. Mary O'Reilly, CH2M

Mr. Mark Hilyard began with a brief overview of what was presented at the October 2016 JBCCCT meeting, and said that sampling updates, major findings and the path forward will be covered in the current presentation. Mr. Hilyard continued that he would give an update on private well outreach and sampling that has been done in the surrounding communities, public water supply well sampling, and the path forward for the emerging contaminants investigation.

Mr. Hilyard began, stating that back in October 2016 he talked about there being two classes of emerging contaminants that are applicable to the JBCC program. The first are perfluorinated compounds which, in addition to being in many household products, are also used in the formula for aqueous film forming foams (AFFF) which is commonly applied to jet fuel releases and fires on base. He continued that 1,4-dioxane is also present on JBCC and is commonly associated with chlorinated solvents.

Back in October an update was given on some of the site inspection activities that had been done to date. Specifically, AFCEC looked for 1,4-dioxane at both the CS-20 and CS-10 plumes. 1,4-dioxane and PFCs were looked for at the LF-1 plume. The flight line area covered numerous areas on the base and where there was recorded use of AFFFs in the past, as likely source areas. Lastly, there is the Ashumet Valley (AV) plume which was investigated for 1,4-dioxane and PFCs because the fire training area is one of the source areas for Ashumet Valley.

Mr. Hilyard referred to Figure 2, CS-20 plume, where one well was determined to have 1,4-dioxane above the GW-1 standard of 0.3 ug/L. That well and a few others are in an interim monitoring program to monitor the decreasing concentrations in the area. He continued that at CS-10, 1,4-dioxane was found in CS-10 particularly the on-base portion of the plume, and that it is going to be added as a COC for the plume; a draft feasibility study is scheduled for submittal early this spring (2017). At LF-1 both PFCs (PFOS/PFOA) and 1,4-dioxane were investigated and were determined to be present. A supplemental Remedial Investigation (RI) is scheduled to be submitted documenting the investigation.

Mr. Phil Goddard asked where specifically in the LF-1 plume the contaminants were located. Mr. Hilyard replied PFCs are in the main body of the plume and the downgradient portions.

Mr. Hilyard continued that there are ten various sites spread throughout the flight line area which were investigated last summer as part of the site inspection (SI). PFCs were determined to be present at nine of those sites. Additional investigation will be necessary at those nine sites and updates will be given as the investigations progresses. There is also private well sampling included

at one of the flight line sites, at the tanker truck rollover, and that will be discussed later in this presentation.

At the Ashumet Valley Plume, both 1,4-dioxane and PFOS/PFOA were detected within the plume footprint and will be added as COCs to the Ashumet Valley plume site. During the initial investigation it was determined that more investigation needs to be done up by the source area, the fire training area, of Ashumet Valley, and the soils will be investigated there. Mr. Hilyard said AFCEC also encountered PFOS/PFOA in Ashumet and Johns Ponds at concentrations greater than some other ponds in the Upper Cape area. These two compounds are present at higher concentrations indicating they are related to the fire training area site. The surface water originating at Ashumet and Johns Ponds, which are kettle hole ponds, infiltrates as groundwater downgradient of the ponds. AFCEC recognizes additional investigation is needed in this area to determine the fate of the contaminants in the surface water from those ponds.

The AV Supplemental RI has been expanded to include source area soil sampling and groundwater investigation downgradient of the ponds, as well as similar investigations within the plume area that are planned for later this year.

The tanker truck rollover site (Figure 2) was then discussed. The base fire department responded to two separate rollover events, one occurring in 1997 in the Otis Rotary off Route 28 and the other in 2000 and the entrance to the base on Connery Avenue. These were fuel tanker trucks that rolled over and leaked fuel and the base responded by spraying AFFF onto those releases to suppress any vapor and prevent an explosion. AFCEC sampled groundwater directly beneath both of these rollover sites and PFCs were detected. In response to those detections, outreach was conducted to the neighborhoods that are downgradient of those rollover sites to identify the presence of any private drinking water wells that may exist in that area of the community. Most of these streets have municipal water except for one street, Valley Farm Road, which has eight homes that are all on private wells in that area and sampling began on those wells back in the summer. As the maps show there are three private wells with PFOS above the health advisory (HA) and those are highlighted in red on Figure 2. Several houses were sampled and results were consistently below the HA. In addition, one house has been uninhabited for the time AFCEC has been doing the investigation and hasn't been sampled yet but outreach is ongoing and AFCEC expects to get a sample from that well this spring when the owners are back in town.

In response to the PFOS/PFOA detections above the HA, AFCEC started providing bottled water to those residents. In December 2016, AFCEC installed whole house filters at each of those three houses. These filters consist of two canisters that are about 4 feet high. At startup AFCEC collected samples from the influent, midpoint, and effluent and will sample on six month intervals. Plans are that AFCEC will continue to do operations and maintenance on those systems moving forward.

Ashumet Valley plume consists of PCE and TCE. AFCEC started running the treatment system back in 1999 to treat for those COCs. The treated water goes out the plant through an infiltration trench on the Currier Road side and another infiltration trench on the Sandwich Road side. The plant is monitored for COCs to determine when carbon change outs are needed. It is likely that 1,4-dioxane and PFCs were also present in groundwater this whole time, however, AFCEC was not aware of their presence until investigations were initiated a few years ago. 1,4-Dioxane is not

readily treated with granular activated carbon, the treatment technology used here, so it is likely there were concentrations of 1,4-dioxane going out through the treatment plant to these infiltration trenches on a fairly consistent basis.

PFCs on the other hand are treated with carbon and they unfortunately do breakthrough sooner than PCE and TCE do. Carbon change outs were performed very frequently for the first few years of running the plant. But then, as the detections of PCE and TCE decreased in the plume in the past 4 or 5 years, the frequency between carbon change-outs became longer and longer. That probably allowed for short periods where PFCs were breaking through and discharging. 1,4-Dioxane was fairly constant and PFCs were probably released in pulses.

AFCEC did outreach in the area within the solid line initially in the summer of 2015 (referring to Figure 3). When sampling was started at these wells AFCEC expanded the outreach area to include the larger area to identify the private wells. The private wells are located along Currier Road in this part of Falmouth, there are a handful of wells to the northwest of the Sandwich Road trench and none downgradient of that. When talking about the results, Mr. Hilyard zoomed into the area where the majority of wells and majority of detections are.

Mr. Hilyard continued that when AFCEC first started seeing detections in those private wells along Currier Road, even though they were below the preliminary HAs that were in place for PFOS and PFOA at that time, whenever you get a detection in a private well you have to do further investigation and try to mitigate any impacts. In response to those detections, AFCEC stopped discharging treated water to the Currier Road trench, and started diverting all the water to the Sandwich Road trench on the western side of the Ashumet Valley plume. AFCEC then started a quarterly monitoring program for all of those private wells in the area. (Referring to Figure 4) There is a time step progression of 1,4-dioxane in the Currier Road trench area. Starting in July 2015 was the first event, then one in November/December 2015, one in June 2016, and January 2017. The first event started with a handful of wells as AFCEC continued to do outreach and identify wells to include in the program. In July/August, hits of 1,4-dioxane were detected primarily to the south and east of the trench, and that trend somewhat continues. Private wells in this area have been typically ND or BRL for 1,4-dioxane. Concentrations on the area adjacent to the trench have decreased over time. This yellow represents a detection of 1,4-dioxane below the standard at about 0.2 ug/L and over time it has decreased to ND as has some of the wells there. So, now that water is no longer discharging through that trench, native groundwater from upgradient can migrate into the area. 1,4-Dioxane concentrations are all below the GW-1 standard of 0.3 ug/L; detections are primarily in this area between 0.19 and 0.21 ug/L.

Mr. Dan DiNardo asked Mr. Hilyard, “A couple of slides back, when you expanded the outreach area, I noticed on the drawing designation there is a whole area of residential wells that are described as not required for sampling based on nearby groundwater characterization data, can you fill me in on as to why?”

Mr. Hilyard replied referring to the wells that were identified along Austin Booker Road, AFCEC did some direct push vertical profiling of groundwater at three locations along this road to measure the groundwater and 1,4-dioxane was detected but it was at low concentrations and at a depth that was deeper than the private wells in that neighborhood. So with that characterization data in this

area, AFCEC feels that they don't have to monitor those drinking water wells on a regular basis because they are more shallow.

Mr. DiNardo followed up, "On the next slide when you look at over time with the 1,4-dioxane and PFOA and PFOS, the Fresh Pond public well is in the outreach area, do they or has it been tested through the town?"

Mr. Hilyard replied, "The short answer is yes, and I will show the results a little bit later in the presentation."

Mr. Hilyard continued, referring to Figure 5 of the time step progression of PFOS and PFOA in the private wells in the Currier Road neighborhood. In July, AFCEC first started looking for detections but they were all below the standard of 0.07 ug/L. For PFOS and PFOA the way the guidance works is that there is a drinking water health advisory of 0.07 ug/L for PFOS and there is the same standard for PFOA and also for PFOS and PFOA when they are added together. So, if the sum of those two compounds is greater than 0.07 ug/L, that is considered an exceedance. In November/December, about 4-5 months after AFCEC stopped discharging to the trench, the water that was migrating into the area of the private wells began moving south (i.e. downgradient).

In response, AFCEC has been providing bottled water to the residences that have had an HA exceedance. For 4 of these residences AFCEC has installed a filtration system. A couple of people have declined the offer of a filtration system so they are continuing to receive bottled water.

Mr. Leonard Pinaud, MassDEP, corrected an inaccuracy on slide 12 of the GW-1 standard for 1,4-dioxane concentrations as 0.3 ug/L.

Mr. Phil Goddard asked if there was any data available for taking a shower or inhaling the PFCs? Mr. Bob Lim, USEPA, responded asking if Mr. Goddard was asking about PFCs or 1,4-dioxane to which he replied "both". Mr. Lim explained that with 1,4-dioxane and PFCs at a Superfund site there is a general process to calculate a toxicity value, so a number would have to be calculated to get a safe level for showering and right now EPA hasn't looked at that because this work isn't that far yet in the Ashumet Valley groundwater investigation but that could be something that could be in the risk assessment. As of this moment EPA doesn't have one but it could be something they look at through the preliminary investigations of the same type as Ashumet Valley.

Mr. Goddard asked Mr. Lim if he could make an analogy with another compound out there to compare them? Mr. Lim responded that he would have to talk to his EPA toxicologist to get an analogy. He continued that just judging from the health advisory value, it is fairly low compared against other chemicals like PCE and TCE, but he is in no position to say that X would be a safe value for a showering scenario. Last summer EPA looked at the recreational scenario after the Air Force collected surface water samples in Johns Pond and they could go back and look at that in terms of a showering scenario.

Mr. Charles Logiudice stated he was not pleased with the answer and asked if Mr. Lim could answer as soon as possible. He asked Mr. Lim, "Why are you waiting? If you don't know the answer, get the answer. ASAP." Mr. Lim replied with regard to the Ashumet Valley area the Air Force has conducted a remedial investigation and they had to take a step back and develop an expanded conceptual model for this site and the Air Force just submitted to the regulatory agencies a document that is called a Conceptual Site Model in which the Air Force identified data gaps

which they felt needed additional samples, and at the end of April the Air Force is submitting a work plan to collect these samples. Mr. Logiudice interjected “Specifically for showers?”

Mr. Lim replied as part of this work plan, which included a risk assessment, the EPA has provided comments in regards to looking at other exposure scenarios. Mr. Lim said he understands Mr. Loduidice’s desire for finding the answer right away, but, Mr. Lim added, as the figure shows, it is quite a large area, and the Air Force has sampled residences and providing bottled water where PFCs were above the health advisory. Mr. Logiudice interjected “I don’t think they are showering with bottled water, are they?” Mr. Lim replied he was not aware of it, and could not recall if last summer Marc Nascarella of MADPH added information as far as showering.

Ms. Rose Forbes, AFCEC, said there will be a risk assessment done as part of the follow on investigation and that Marc Nascarella of the MassDPH has evaluated certain exposure scenarios like swimming in the ponds, recreating in ponds, showering, cooking, and washing dishes in tap water that might have PFOS and PFOA in it. PFOS, PFOA, and 1,4-dioxane are not volatile and are not going to readily evaporate into the air. There is some question as to whether they adsorbed to the water droplets and can they be inhaled that way. That is something being looked at. It is ok to shower, it is ok to brush your teeth, it is ok to wash your plates, it is ok to recreate in the ponds, and that was for both PFOS/PFOA and 1,4-dioxane. They are working on a fact sheet to update the public on questions and answers.

Mr. Leonard Pinaud added that some folks have whole-house filtration systems which are removing those contaminants, so any inhalation hazard is not an issue. Mr. Pinaud also added that for 1,4-dioxane, the MassDEP standard concentration for the inhalation hazard is about 6000 ug/L so it is very, very high.

Mr. Goddard said what Ms. Forbes said clarified a lot, and the fact sheet should get out as soon as possible. In terms of the issue with the people who are exposed to concentrations above the health advisory, there shouldn’t be any difference in exposure pathways whether it is Ashumet Valley or San Francisco. The people who put out the health advisory should say how they determined that concentration and under what scenarios. That could be added to the fact sheet to clarify facts and keep people at ease. Charcoal filtration, even though some turned it down, could go on the fact sheet as well and would go a long way to alleviate concerns.

Mr. Hilyard moved on to the Ashumet and Johns Ponds Area referring to Figure 6. He said that surface water samples were collected under the recreational beach monitoring program that is done every year, and they indicated that PFCs are present, specifically PFOS and PFOA at concentrations greater than HA in both ponds and fairly uniformly distributed throughout the ponds. Because the groundwater from Ashumet and Johns Ponds migrates back into the shallow groundwater and migrates underneath these neighborhoods AFCEC conducted outreach again to identify any potential private drinking water wells that are downgradient of the ponds. Outreach included the area north of Route 151, which is complete, and is ongoing to the south. To date, 11 private drinking water wells have been identified downgradient of the ponds. 1,4-dioxane is not an issue there, it is just the PFCs that were in the surface water of the ponds. Several of the private wells close to the ponds were above the HA but private wells further away were below the HA. Four of the houses have been hooked up to the filtration systems, two of the homes are seasonal so they haven’t been hooked up yet but AFCEC will reach out to them when they get back in town,

and one property has a well that AFCEC is trying to sample to determine if that well has been impacted. AFCEC will do operations and maintenance of each of the systems installed in the area. Outreach to areas toward the south is still ongoing and will continue with updates as AFCEC gets information.

Mr. Hilyard talked about the public water supply well. In response to the detections from the private wells that are downgradient of the ponds, AFCEC started looking for public water supplies in the area. As part of the AFCEC outreach program, three community water supply wells have been identified. Lakeside Estates has a water well where about 70 current residences get their drinking water supply. The well was sampled in November for the first time and concentrations of PFOS were above the HA. A confirmatory sample was done in January and results were still above the HA. When the first detection was received in November, the owner was contacted and AFCEC started supplying bottled water to each of the 70 residences that are in that community. At the request of MassDEP, AFCEC started looking further at some other community water supply wells or public water supply wells. Similar to Lakeside Estates, which is a privately owned water supply that distributes water, Sea Mist Resorts has a water supply and there are also the more traditional municipal water supply wells such as Mashpee Village, Turner Road, Rock Landing and also Fresh Pond.

Samples from the water supply wells were collected for PFCs in February. The first sample was collected at the Mashpee Village well, and the sum of PFOS and PFOA came back just above the HA at 0.072 ug/L. A resample was done about three weeks later and the sum of the PFOS and PFOA came back just below the HA at 0.064 ug/L; however, the well had been shut down and had only been turned back on for about 30 minutes prior to the well being sampled. Wellfield concentrations are shown on the map (Figure 7) and drop off quite a bit the further away you go from the ponds.

Mr. Hilyard continued that AFCEC collected samples in February but the public municipal wells were also sampled under the EPA UCMR (unregulated contaminant monitoring) program in 2013 and 2014. The wells were tested for PFCs and 1,4-dioxane as part of the UCMR and results were ND.

Mr. Dan DiNardo interjected that typically public wells are a lot deeper than private wells per volume so there could possibly be some in the area but not in that groundwater. Mr. DiNardo asked if in the sampling methods, residential versus public, are they spigot samples? He asked Mr. Hilyard to explain a little bit about what the process is.

Mr. Hilyard responded private residential wells are typically pretty shallow and just a few feet below water table. The wells are run for 10-15 minutes and about 50 gallons of water are purged out which ensures all the stagnant water that might be in the pipelines to the house and the well has all been purged out and a fresh groundwater sample is taken. AFCEC talks to the homeowner ahead of time to determine if they have an outdoor spigot that doesn't pass through a filter and identifies a sampling port at their house that doesn't have any filtration. That is how a residential well sample is taken.

On the day municipal wells were sampled, the wells were all on and running for a while. They have standardized procedure for sampling those wells, so that have dedicated sampling ports usually in the pumphouses that samples can be collected from.

Mr. Michaud asked Mr. Hilyard what would be considered background. Mr. Michaud said he would expect background to be considered zero for this particular figure. He also asked if it would be useful to add groundwater flow with water table contours on Figure 7 to help gauge the direction of groundwater flow. He stated that one of the arrows in the figure looks like a regional flow path.

Mr. Hilyard responded that in an effort to keep the figure somewhat uncluttered they avoided using the groundwater table contour. He referred to arrows on figure and said they give a generalized groundwater flow. He added that one area may be more of a west to east flow as Mr. Michaud mentioned and somewhat of a radial pattern that is being seen, and the pond water is getting deeper as it travels further away from the pond.

Ms. Forbes addressed Mr. Michaud and asked him when he referred to background as zero, what would he consider as background? She asked because these are manmade chemicals, there should be zero natural chemical in the background. She asked if he was including septic systems because there is PFC and 1,4-dioxane associated with household products that are discharged to the groundwater via septic systems.

Mr. Michaud responded that the question is that you wouldn't anticipate seeing these chemicals naturally so he would turn the question around and just pose the question what is in the presentation suggests background, how would AFCEC define background? Ms. Forbes responded that the one place that background was mentioned when Mr. Hilyard was comparing concentrations in Ashumet and Johns Pond and asked Mr. Michaud if that was what he was referring to. Mr. Michaud replied that he was referring to the downfield wells near Rock Landing. Mr. Hilyard responded that the concentrations are extremely low—barely above the detection limit.

Mr. Hilyard continued with wrapping up the discussion on Ashumet and Johns Ponds. The path forward is that AFCEC is going to continue monitoring Valley Farm Road private wells. Further investigation is planned for PFCs at the flight line sites on base as a recommendation of the SI. The well sampling program will continue at Ashumet Valley and outreach will continue in those areas downgradient of Ashumet and Johns Ponds.

Currently there are approximately 70 residences receiving bottled water – that is the majority of those residences in the Lakeside Estates system because 11 filtration systems have been installed on other individual private wells that were routinely above the HA. AFCEC is anticipating connecting the Lakeside Estates trailer park to the municipal water that is available in the roadways and, in the meantime, bottled water will be provided. The Ashumet Valley RI/FS is going to be expanded to include source area, soil sampling, and groundwater investigation downgradient of the ponds. Interim monitoring for 1,4-dioxane will continue at CS-20 where there is just one well in that area that had the 1,4-dioxane above the GW1 standard. The Supplemental RI/FS at CS-10 and LF-1 plumes will continue; and, results of sampling, updates, and findings of the RI will be presented at Tech Update Meetings and JBCCCT meetings.

Mr. Goddard referred to Figure 7 and the upper left hand corner at FTA-1, Fire Training Area-1, where they dumped solvents, lit them on fire, and extinguished them with foam. He asked if there is really no downgradient issues with that? That is being picked up on your study?

Mr. Hilyard responded that the RI is covering the entire area including FTA-1. He continued that some groundwater sampling has been done in there and AFCEC knows that there is an impact to

groundwater downgradient of the source area with PFCs and that is probably what is discharging to Ashumet Pond.

Mr. Goddard asked how high the detections in the private wells are. Mr. Hilyard responded that in the Ashumet Valley area of Currier Road the combined PFOS and PFOA concentrations are running about 0.1-0.2 ug/L. Mr. Goddard stated that the concentration levels are good to know in context and would be helpful. He also asked why were there were houses that weren't sampled in January 2017 to which Mr. Hilyard replied that they have been seeing ND/BRL detections for both 1,4-dioxane and PFCs on the north side. Mr. Goddard added that the solution seems to be working switching the infiltration discharge to the effluent – is that a long-term plan – the diversion being sustained long-term? If not, then does that mean the frequency of change outs has to increase? How much more frequently will that have to happen? Mr. Hilyard replied that the feasibility study is going to cover those questions.

Mr. Goddard asked, “What do you do with the carbon that is saturated? Where does it go?” Ms. Forbes answered that currently the system is operating for VOCs because that is what it was originally intended for. The VOCs are measured in the influent and effluent to determine when a carbon exchange is needed. When a carbon exchange is needed the carbon truck comes in, removes the spent carbon and takes it to a carbon recycling facility where the contamination gets thermally desorbed at high temperatures and then goes through catalytic oxidizers. The same process would work for 1,4-dioxane and PFCs. Mr. Goddard suggested adding this information to the fact sheets.

Mr. Goddard asked if the water districts were looking to add charcoal systems at some point. At some point if an area comes up with contamination that is not associated with the base, but if it is within the base or potentially downgradient of the Fresh Pond, would charcoal potentially be added to the water supply well to determine a solution down the road? Ms. Forbes replied that the question has just come up regarding the Mashpee water supply well and as Mr. Hilyard mentioned was sampled at 0.072 ug/L which is over the health advisory but the well is shut down now and AFCEC is talking with management as to what options are available, one of which is carbon filters.

Mr. Goddard asked how many rounds of sampling in a row with results of ND need to be done to remove the system or turn it over to the homeowner after a certain time of ND. Ms. Forbes replied that once the concentrations in the well drop to below the health advisory and along with the body of evidence in the surrounding groundwater, AFCEC will remove the carbon system from the residence. She continued that there are two carbon vessels in series and when the midpoint concentration goes above health advisory, that is when the carbon is exchanged.

Mr. Pinaud referred to Figure 5 and added that MassDEP is concerned that the ponds may be feeding PFCs, PFOS and PFOA, to the area, and the RI will investigate that area. Mr. Pinaud referred to Figure 5 and asked if the residential wells were only sampled once to which Mr. Hilyard replied that many were sampled three times – not every single one, but the neighborhood as a whole, especially along Currier Road, were sampled three times. Mr. Pinaud continued that in Figure 5 the July/August 2015 map shows no red which represents the sum of PFOS and PFOA above the HA and MassDEP is concerned about that and the reasons for that as well.

Mr. DiNardo asked about the fact sheet coming out and would like to have that added as an action item and would like it to include information on HAs for other exposures like ingestion. He reiterated the importance of public outreach.

Mr. Goddard asked if an owner with whole-house filtration system decides to assume responsibility for the system once ND (note clarification about ND vs HA above) results for several sampling rounds, what would be the annual cost to the home owner? Ms. Forbes responded that if there is nothing coming in the influent it won't cost anything unless they want to sample or change out the carbon once a year which could cost approximately \$800.00.

Property owner Don McCarthy stated that he has a whole-house filtration system in his house and when it was put in they did test the water and PFOS and PFOA were non-detect but they did not test for the 1,4-dioxane and I am told the charcoal filtration does not take that out. And, if the AFCEC is going to be sampling every 6 months, he would prefer every 3 months in the interim because his 1,4-dioxane in the last testing was 0.2 ug/L, it was closer to 0.3 ug/L, and he is concerned that it is going to flush out or isn't going to flush out, and would like it to get tested to confirm it isn't going up because if it is going up he is going to go back on bottled water.

Ms. Forbes referred to Figure 4 in her response and said that looking at all of the sampling results since July 2015 the results are either green or yellow which means they are non-detect for 1,4-dioxane or below the GW-1 standard of 0.3 ug/L. There has not been one exceedance of 1,4-dioxane in the area and there will be continued sampling on a semi-annual frequency so Mr. McCarthy will get his water sampled every six months. She continued that when looking at the body of evidence, nothing has exceeded the GW-1 for 1,4-dioxane and AFCEC doesn't expect it will especially since AFCEC is no longer discharging water to the Currier Road trench.

Mr. Goddard asked since 1,4-dioxane is more difficult to treat, are there updates on the technology for long term remediation of it? He said that it would prove beneficial for others, not just JBCC.

Mr. James Hocking, Currier Road property owner, stated that he just got a notice the day before for this meeting and wanted to know when the date of the meeting was placed on the agenda and why he was just told the day before at noon time. And, he said, this wasn't the first time it has happened. He asked if it is unreasonable to expect notice of these meetings the day they get scheduled or go on the calendar. Mr. Douglas Karson, AFCEC, responded by apologizing and said that he should have been notified more in advance but was unable to due to unforeseen circumstances, but will give him more notice in the future.

Mr. Hocking repeated his question as to when the meeting was placed on the agenda. Ms. Ellie Donovan, MassDEP, replied that his point is well taken and that in the future they will make sure it doesn't happen again. Mr. Karson added that they do send out a notice about a week before the meeting, and he will add Mr. Hocking and Mr. McCarthy and anybody else to that list and will include an agenda and minutes from the previous meeting and asked Mr. Hocking if that would be acceptable to him. Mr. Hocking replied, "It is acceptable if I get a timely notice." Ms. Donovan added that in the past it was a standard meeting every other month but now that they are meeting infrequently they should revisit it because they know a month ahead of time and will let people know then.

Mr. Hocking asked about showering, ingesting and breathing the water and stated that apparently there has been a movement to check the science on that but it has been stalled whatever reason. He asked if Ashumet is the only plume in the United States that is generated by a military base or if it is not, is there a sharing of information? He continued that maybe this science is already there somewhere, maybe further down the road, to be shared. He asked if Ashumet was the only plume in the country. He continued that he didn't need an answer for that but to open the door to find out.

Mr. Lim responded the regulatory agencies are sharing information. An example he gave was Pease Air Force Base which has a similar situation with PFCs being addressed. Mr. Lim assured Mr. Hocking that information is being shared.

Mr. Hocking stated that he lived at 65 Currier Road and that two of his neighbors to the north have filtration systems and a neighbor to the right is receiving bottled water, so it put him in the frame of mind to go back and do some math. He said his PFOA and PFOS increased by 500% from June 2016 to September 2016 and between September 2016 and January 2017 it increased another 800%. Mr. Hocking said that he is "the next guy". Mr. Hocking continued that when he sent a message to see if he could get sampling of his water done sooner, because he is certain his level is of detection is in excess 0.09 ug/L, so he is certain it is above the advisory but "I got no sympathy". He said the answer was the next test we will let you know. He continued, "That's a complaint".

Mr. Karson responded that the Air Force negotiated testing with the regulatory agencies, EPA and DEP, to come up with a sampling schedule that made sense with what was going on and decided on quarterly sampling. Mr. Karson expressed he is sympathetic to Mr. Hocking and other residents. Mr. Karson said to keep in mind this is primarily a drinking water issue, PFCs, 1,4-dioxane, and his results so far are considered safe based on the health advisory levels and groundwater standard. If your well water from samples which will be taken this month are above either of those limits, he will be offered bottled water or filtration just like others have. Mr. Karson continued that this is not an acute risk, it is a lifetime exposure of drinking two liters of water a day above the standard for seventy years the chances of cancer are close to one in a million. Addressing Mr. Hocking directly, he continued, of course you aren't going to be happy about the one in a million, but you were tested three months ago, are going to be tested this month, and it may be that you are above the acceptable standards, but keep in mind it is not an acute risk, it is a chronic risk, and you will certainly be afforded the same opportunities as others in the three towns we are talking about.

Mr. Hocking responded to the life-time exposure comment and said there are other factors that come into play. First of all, he said, there is no science dating back since 1999. We don't know what the levels were in this groundwater before they started treating it. By the time it was treated it was at .07 ug/L but it could have been higher and it could have filtered down, but there is also a risk for someone who has an immune deficiency disease. Mr. Hocking said, "I do. I have an immune deficiency disease. I have been living on Currier Road since 1981. So, I don't know anything about the life-time exposure, that to me doesn't matter. What matters to me is that I have been there for thirty years, and I want clean water. I want to drink clean water whether it comes from the town or whether it comes from the ground. But, I want clean drinking water."

Mr. Pinaud invited Mr. Hocking to the table to show him where his home was located on the map. Mr. Pinaud asked if the next sample would be in April to which Mr. Hilyard responded “yes”. Mr. Hocking said then it is 45 days before the results get back so it will be the summer before somebody tells him his water has failed. Mr. Karson responded that if your results are in exceedance you will be notified immediately which is 20-22 days after we collect the sample. Otherwise, if there is no exceedance, you will receive written results between 30-40 days.

Mr. Goddard suggested that the regulators and Air Force talk about special circumstances, stating “If there are folks that are at high risk categories to which these conditions are exasperated due to those relative of the health advisories which I presume are for an average person and if you know of these extenuating circumstances, could there be a lower advisory for these circumstances?”

Agenda Item #3. FS-29 Three-Step Process to Site Closure – Mr. Jason Dalrymple, CH2

Mr. Jason Dalrymple began the presentation saying that AFCEC is completing site closure requirements for the first time at a Joint Base Cape Cod groundwater plume. The three-step process is in all records of decision (RODs). The three-step process is used to demonstrate that the remedial action objectives (RAOs) in the RODs have been met. The RODs provided the basic framework for the three-step process, but the details were not defined, so AFCEC prepared a detailed three-step process work plan for FS-29 and provided it to regulators for review in July 2016 and got comments from EPA in August and MassDEP comments are pending.

Mr. Dalrymple explained that the FS-29 contaminants of concern are EDB which has a MMCL of 0.02 ug/L and carbon tetrachloride (CCI4) which has an MCL of 5 ug/L. FS-29 is one of the 4 southwest plumes located off base in Falmouth near the southwest corner of the Joint Base. The remedial design for the southwest plume was to capture the groundwater by extraction wells in each plume and treat it at a centrally located treatment plant. The FS-29 plume consisted of 2 extraction wells and 2 reinjection wells that began operation in September of 2006 at 525 gpm. That ran for about 4 years and the active treatment stopped in September 2010 when the COC results were below the standard. Monitoring since then indicates that EDB is below the standards of the MMCL, and there have been sporadic detections of CCI4 at concentrations above the MCL into 2014. In 2015 and 2016, EDB was not detected and CCI4 concentrations were below the MCL.

Mr. Dalrymple referred to the figures to show where the four plumes were located and that you can no longer see the FS-29 or CS-20 plumes but you can still see CS-4 and CS-21. The 2007 figure is after the system started up. In 2010 the concentrations had decreased below the MCL. By 2010 the remnants of the FS-29 plume had naturally attenuated and by 2015-2016 there was no plume to define.

The overview of Three-Step Process starts with Step 1 and is intended to demonstrate that the plume standards have been met. The work plan proposed to use the triennial monitoring network (Figure 4) with three annual sampling events. The network collected from every three years was the 21 well network which is larger and more comprehensive and gave a better idea of what is going on where the plume and where it used to be. The 21 wells were sampled in three annual

events and Step 1 was considered complete when the average COC concentrations for EDB and CCL4 are below the standards at each individual monitoring well.

Once that is proven and a report is generated and the regulatory agencies approve that, we move on Step 2. Step 2 is to complete a residual risk assessment, if deemed necessary, which considers human health and ecological exposure. Instances where a residual risk assessment may be necessary is at sites where new contaminants have been discovered since the original risk assessment was done, which is not the case with FS-29; or, at sites with multiple COCs would need a cumulative risk evaluation done. At this point there are two PFCs but one has not been detected in the last two rounds so we will see where the results are for the third round. Another instance where we may need a risk assessment is where there is a calculated risk-based concentration as a cleanup goal rather than an MCL or MMCL, and if that is the case you may require a reassessment of exposure assumptions and toxicity information. As an example, CS-19 has a risk-based concentration so that will be something we will have to look at.

Once that assessment is done, a report is developed for regulatory review, and once that is done we move on to Step 3 which is to complete the MassDEP requirement to assess feasibility of approaching or achieving background conditions.

The current status for the FS-29 three-step process is that two Step 1 sample rounds have been completed in 2015 and 2016 and all of the COC concentrations were below their applicable standards so far. A third and potentially final sampling round is scheduled for May 2017. If the average COC concentrations remain below applicable groundwater standards, Step 1 will be complete. We will develop the report for regulatory review and once that is approved we will move on to Step 2. If everything goes well we have put together a general schedule which isn't set in stone but we have Step 2 completed in the summer of 2018. Step 3 is expected to be completed by spring 2019. Once Step 3 is done, a Remedial Action Completion Report is developed and expected to be completed by 2020 when regulatory agencies approve that, the agencies will consider the site closed. At that point AFCEC will abandon or transfer the ownership of remaining infrastructure and monitoring wells, and the Air Force will consider the site closed when no further cleanup funds are spent.

Mr. DiNardo asked obviously there is at least three years between submittal of report and approval, so once you reach the point of submitting the report, is there any additional testing of those wells at all to see if there is any change? Mr. Dalrymple replied that once we collect those three samples, that is it. We have been sampling since 1994 so we have a long history of declining concentrations.

Mr. Goddard referred to the last bullet in presentation about AFCEC abandoning the ownership. He stated he understands and it makes perfect sense that the Air Force wants to close it and move on, but suggest that regulators with the Air Force and army have a protocol in place now where these systems get to the point where they are at that stage that there is a thought out process with what to do with those wells that we spent millions of dollars of tax payer money so that ownership is transferred to the state of Massachusetts or the Reserve so that if you ever have to go out there for whatever reason, you have access to a well that is already ready to go but with a concrete barrier or lock on it. He stated, I would hate to see concrete put in there then having to drill all over again if we have to go out there down the road. Is it feasible? Can there be a protocol in place so that ten or fifteen years down the road from now or once the base goes away at some point?"

Agenda Item #4. Presentation: IAGWSP Update – Ben Gregson IAGWSP

Mr. Gregson said that he would be providing a brief update of ongoing and upcoming IAGWSP projects. He displayed a map and pointed out the areas that he would be discussing during the presentation: the Central Impact Area (CIA), J-1 Range and Training Areas.

Mr. Gregson explained that in the CIA, teams are currently working on several projects. First, the unexploded ordnance (UXO) source work continues with the collection of cued metalmapper data in Phase II Area 3. Mr. Gregson displayed a map of the area and pointed out the various locations where UXO removals have occurred and showed the current area of work and explained that these locations are focused around several of the CIA mortar targets.

He explained that CIA groundwater investigations are also ongoing. He noted that two additional groundwater monitoring wells were recently installed to track the northeastern lobe of the RDX plume and displayed a map of the plume and pointed out the well locations at the Impact Area boundary. He stated that there wasn't much contamination seen in the samples from these wells and that when the plume was re-drawn, the new depiction would reflect that by shifting the plume boundary back.

Mr. Gregson stated that over the course of the investigations in the CIA, for every munition item that is pulled out of the ground, the team also excavates many tons of scrap metal. The scrap metal that has been collected over the years is being drummed up so that it can be recycled.

Lastly for the CIA, Mr. Gregson explained that for the last few years, UXO has been detonated using the buried explosion module which is essentially a large pile of sand. He noted that IAGWSP has collected samples of the sand in the pile and has determined that it is time to change the sand which contractors will be doing this spring.

Mr. Gregson continued with the J-1 Range noting that IAGWSP has been working in both the northern and southern plume areas. In the northern area, two monitoring wells have recently been installed to track potential contamination downgradient north of Wood Road. He noted that the contaminant of concern in this area is perchlorate. On the southern end of the J-1 Range, a drivepoint rig is being used because it is shallow enough to allow use of this type of rig, looking for RDX. Maps of both the northern and southern plume were displayed and Mr. Gregson pointed out the well locations and described the different groundwater flow directions in these areas.

Mr. Gregson continued by explaining that the final groundwater well drilling activity at this time is being completed at the GA/GB Range. He noted that the GA/GB Range is an old Small Arms Range and that as part of the Decision Document for the Small Arms Ranges, there was a requirement for some groundwater monitoring at GA/GB. He noted that while there were some existing wells on the western edge of the range, a new water table well location was more appropriate and that the well will be analyzed for metals commonly seen at Small Arms Ranges.

Mr. Gregson finished by discussing the upcoming Decision Document for the Training Areas. He noted that IAGWSP is currently working with the regulatory agencies to finalize the investigation report, draft a remedy selection plan and then hold a public comment period on the proposed remedy. He said that the team hoped to do that this summer.

Mr. DiNardo asked about the metal mapping data and if it had continued to improve in accuracy. Mr. Gregson replied that metalmapper was working very well and noted that in grids dug for quality assurance/quality control where 100% of all targets are excavated to see what, if anything, has been left behind, no items were missed.

Mr. Goddard asked if CIA plume would attenuate before any contaminants reached the base boundary. Mr. Gregson said that they would and reminded the team that there is an active groundwater treatment system addressing the plume and pointed out the newest extraction well.

Mr. Goddard asked about the Training Areas and if these areas were just being looked at because of bivouac activities. Mr. Gregson explained that there were a variety of activities at these locations including training with smokes and pyrotechnics and that these areas were ones that were known about when the program started, but were primarily lower priority areas.

Agenda Item #8. Final Discussions, Adjourn

Ms. Donovan asked if there were any additional comments to finish the meeting. Mr. Cusack, a resident of Mashpee noted that he came to the meeting to learn more about the emerging contaminant issue near his property adjacent to Johns Pond. He explained that he is considering building a home on the property and is concerned about how the emerging contaminants in the area might affect his property. Mr. Cusack said he'd like to talk with someone so he could get a summary of the history of investigations in layman's terms so that he can better understand the conditions in the area. Ms. Donovan said that she and Mr. Karson would be happy to sit down and talk with him about the specifics and agreed to talk after the meeting to set up a time to meet.

Ms. Donovan stated that the next meeting date has not been set. A notification will be sent to the team when the meeting is scheduled. The meeting was adjourned.