

**JBCC Cleanup Team Meeting**  
**July 28, 2021**  
**6:00-8:25**  
**Microsoft TEAMS Virtual Meeting**  
**Meeting Summary**

<b><u>Member:</u></b>	<b><u>Organization:</u></b>	<b><u>Telephone:</u></b>	<b><u>E-mail:</u></b>
Daniel DiNardo	Falmouth Resident	508-547-1659	ravensnests1@live.com
Rose Forbes	AFCEC/JBCC	508-968-4670x5613	rose.forbes@us.af.mil
Phil Goddard	Bourne Resident	508-759-3043	Pag456@comcast.net
Ben Gregson	IAGWSP	508-968-5821	benjamin.p.gregson.nfg@mail.mil
Steve Hurley	MassWildlife		Steve.hurley@state.ma.us
Bob Lim	USEPA	617-918-1210	Lim.robert@epa.gov
Ellie Donovan	MassDEP	508-946-2866	ellie.donovan@state.ma.us
Len Pinaud	MassDEP	508-946-2871	leonard.pinaud@state.ma.us
Tim Pasakarnis	Cape Cod Commission		Tim.pasakarnis@capecodcommission.org
Tom Cambareri	Barnstable Resident	508-364-2644	tomcambareri@gmail.com
Michael Cusack	Mashpee Resident	508-274-8848	mike.cusack@comcast.net
Mike Bingham	Falmouth Resident		mpbingham1212@gmail.com
<b><u>Facilitator:</u></b>	<b><u>Organization:</u></b>	<b><u>Telephone:</u></b>	<b><u>E-mail:</u></b>
Douglas Karson	AFCEC/JBCC	508-968-4678	douglas.karson@us.af.mil
<b><u>Attendees:</u></b>	<b><u>Organization:</u></b>	<b><u>Telephone:</u></b>	<b><u>E-mail:</u></b>
Jessica Lockwood	EA		Jlockwood@eaest.com
Charles Holden	Town of Sandwich		cholden@sandwichmass.org
Frank Gasson	Resident		
Sean O'Brien	Barnstable County		sobrien@barnstablecounty.org
Jen DeAngelis	BB&E	508-566-1637	Jennifer.deangelis.ctr@us.af.mil
Jennifer Martin Bouchard	EA		jmartin@eaest.com
Rob Hansen	Resident		
Nicole Wagner	EA		nwagner@eaest.com
Mary O'Reilly	Jacobs		Mary.OReilly@jacobs.com
Elizabeth Kirkpatrick	USCG		
Kimberly Gill	AFCEC/IRP		
Spencer Pogue	Rep. Fernandes office		
Marc Nascarella	MDPH		marc.nascarella@mass.gov
Gerard Martin	MassDEP		gerard.martin@mass.gov
Hazel	Resident		
Mark Forest	Barnstable County		mark.forest@barnstablecounty.org
Alexander McDonough	NG MAARNG		
Elliot Jacobs	MassDEP		elliott.jacobs@mass.gov
Lori Boghdan	IAGWSP	339-202-9360	lori.p.boghdan2.nfg@mail.mil
David Dow	Sierra Club		ddow420@comcast.net
Jane Dolan	USEPA		Dolan.Jane@epa.gov
Ruben Aponte	USEPA		Aponte.Ruben@epa.gov
Pamela Richardson	IAGWSP	339-202-9351	Pamela.j.richardson.nfg@mail.mil
S. Phelan	Resident		
Denis R. LeBlanc	USGS		dleblanc@usgs.gov
Kendall Walker	MassDEP		kendall.walker@mass.gov
Scott Amirault	USCG		
17748362052	No Name Given		
17745216648	No Name Given		
17745216648	No Name Given		
16177772023	No Name Given		
15087898375	No Name Given		
15082748848	No Name Given		

17818002915	No Name Given		
15087898650	Rose Forbes		

### Meeting Presentations:

The presentations were posted on the AFCEC website <https://www.massnationalguard.org/JBCC/afcec.html> and the IAGWSP website <http://jbcc-iagwsp.org/community/impact/presentations/> and can be provided upon request.

---

### Agenda Item #1. Introductions, Late-Breaking News, Approval of 24 March 2021 JBCCCT Cleanup Team Meeting Minutes, Approval of New Members – *Mr. Douglas Karson – AFCEC/IRP*

Mr. Karson asked that those who ask questions or have comments to identify themselves. Mr. Karson asked for comments on minutes from the 24 March 2021 JBCCCT meeting. No comments. Minutes can be finalized.

Mr. Karson announced the sad news that two environmental stewards on Upper Cape Cod have passed away. Virginia Valiela of Falmouth and Linda Zuern of Bourne. Both have served on various town and advisory committees. Each was also a selectperson in their respective towns for many years. Their contributions to Joint Base Cape Cod are greatly appreciated and they will be missed. Mr. Karson noted that a display in honor of Ms. Valiela will be placed by Dexter's Mill Crossing at the southern end of the Coonamessett River in Falmouth in the next two weeks. Mr. Goddard also honored the memory of both women and their commitment to the environment.

On July 21, 2021 AFCEC held a public online update meeting for Falmouth and Mashpee residents. A direct notice to over 250 email contacts, paid advertisements, and Facebook postings were done; however, only a handful of residents took advantage of the opportunity. Falmouth Cable TV did record the 1.5 hr. session and plans to air it several times.

Mr. Karson stated that two closure reports are pending for groundwater plumes associated with the Air Force project. They are Chemical Spill-20 and Chemical Spill-23. The Remedial Action Closure Reports for both plumes are due to be finalized in the near future. The sites will be closed since cleanup objectives have been achieved from pump and treat systems that operated at many years out of the base.

Mr. Karson received emails from Mr. Michael Bingham of East Falmouth and Mr. Michael Cusak of Mashpee who applied to join the JBCC Cleanup Team. The emails were sent to team members and recited by Mr. Karson. Both men were granted membership without dispute. Mr. Phil Goddard enthusiastically welcomed both Mr. Bingham and Mr. Cusak to the Team. Mr. Cusak and Mr. Bingham spoke later in the meeting regarding their interest and acceptance onto the team.

Mr. Karson reviewed the agenda and time estimate for the night's meeting.

### Agenda Item #2. Emerging Contaminant Surveillance: A Pilot of Evaluating PFAS at Cape Cod Waterbodies – *Mr. Marc Nascarella – Massachusetts Department of Public Health (MDPH)*

Mr. Nascarella stated that the first pilot was in the area surrounding Joint Base Cape Cod. He described where PFAS comes from and how people are exposed to it. The 6 most extensively produced and studied PFAS chemicals in Massachusetts were listed.

PFAS is regulated by MassDEP under the Federal Safe Drinking Water Act. The Massachusetts Contaminant Level (MCL) was finalized in October 2020 and as a combination cannot exceed 20 ppt. The MA drinking water standard is more stringent than the Federal EPA guideline.

Nearly all people have been exposed to PFAS by food and consumer products. Mr. Nascarella said that knowing that PFAS is ubiquitous in MA and around the country, the MA legislature made investment in the MDPH to fund additional surveillance of emerging contaminants like PFAS. As a result the MDPH began to develop procedures to evaluate drinking water in MA which is regulated by the MDPH. They have also used the money to respond to individual and community concerns on health risks.

The MDPH has sought to measure levels of PFAS in surface water to evaluate risks to swimmers along with levels in freshwater fish for consumption risks. The MDPH is coordinated with Massachusetts Department of Marine Fisheries (DMF) and MassDEP on sampling shellfish for site-related contamination in Bourne. PFAS educational material is also being developed.

Recreational waterbodies that are used for swimming are regulated by the MDPH and the focus of emerging contaminants in MA. A pilot effort has begun on Cape Cod which comprised of sampling 16 waterbody locations. Mr. Nascarella's presented figures of these waterbodies and the number of water and fish samples that were taken. There were over 20 PFAS analytes included in the assessment which included the PFAS6 (PFHpA, PFOA, PFNA, PFDA, PFHxS, and PFOS).

Data is expected to be available this month and recommendations are expected to be issued this summer based on interpretations of surface water data and freshwater fish data. The data will be evaluated using a three step process: if the MassDEP MCL of PFAS in drinking water is exceeded, a "Screening Value" will be used to indicate when unlimited swimming by the most sensitive person would be unsafe. If that is exceeded, then a more detailed "Risk Assessment" will be required.

Using the PFAS concentrations in fish tissue, calculations will be made for a daily amount of PFAS exposure of hypothetical person using reasonable maximum exposure – someone who uses that waterbody for their only source of daily consumption, and average or typical exposure – someone who has weekly or monthly consumption of fish from same waterbody.

Mr. Nascarella provided additional information on his final slide for recreational waterbodies on or near Joint Base Cape Cod.

Mr. David Dow referred to methyl mercury alerts for sensitive populations and asked if the interaction of that with PFAS has been considered in health threats to sensitive populations. Mr. Nascarella replied that each of the waterbodies has existing fish advisories recommendations - many of them relate to concerns about mercury in the waterbody already. This analysis of PFAS won't explore interactive exposure to PFAS and mercury, however, they are evaluated independently. It is possible that fish in a waterbody may be safe based on the level of PFAS, but unsafe based on the level of mercury.

Mr. Cambareri said Mr. Nascarella's initial slide referred to PFAS first being used in the 1950s, but he read AFFF started in 1960s – does anyone have correct history for the toxicology timeline? Mr. Nascarella said there may be a difference between when it started and when it went into widespread use. Mr. Martin agreed that MassDEP did not have anything to add. Mr. Jacobs, MassDEP, added that in technical meetings it was stated that AFFF was in base inventories in late 1960's/early 1970's for Joint Base Cape Cod

A resident, asked how and where will PFAS results be communicated to the public. Mr. Nascarella said prior to sampling MDPH did outreach with the technical agencies in this meeting as well as local health departments. When there is information available to share, it will be shared through those groups as well. It will also be posted along with the Joint Base Cape Cod Recreational Water Body Fact Sheet on the Mass.gov webpage.

### **Agenda Item #3. Emerging Contaminants Update – Ms. Mary O'Reilly, Jacobs**

Ms. O'Reilly summarized the response actions that have taken place for PFAS related to Ashumet Valley (AV) and the Tanker Truck Rollover Sites (TTRS) source areas. Currently 119 private wells have been sampled and three

private wells had PFOS+PFOA concentrations greater than the EPA Lifetime Health Advisory (LHA). Eight public/community water supply wells were sampled by AFCEC and two wells had detections above the LHA. AFCEC installed a wellhead treatment system to remove PFOS/PFOA for the Mashpee Village Public Water supply Well (PWSW). Lakeside Estates in Mashpee (93 units) was connected to the municipal water supply in 2018. Two Mashpee PWSWs have PFAS concentrations above the Massachusetts Maximum Contaminant Level (MMCL) for PFAS6 but are below the LHA, and have been taken offline. One residence is currently receiving bottled water from AFCEC and MassDEP is providing bottled water to additional residences with PFAS concentrations above the MMCL but below the EPA LHA. Thirteen point-of-entry filtration systems have been installed by AFCEC. Four filtration systems were removed once connected to municipal water and six are no longer maintained by AFCEC due to concentrations below the LHA and MMCL, and have been turned over to property owners. A total of 108 connections have been made to municipal water supply.

Ms. O'Reilly gave an overview of the EPA values for PFOS, PFOA and PFBS. She stated that PFOS is the primary contamination associated with aqueous film forming foam (AFFF) at JBCC.

The AV Supplemental Remedial Investigation (RI) is ongoing and includes groundwater, soil, surface water, sediment, private well, PWSW, and treatment system sampling. Groundwater samples were collected at 239 locations with the highest PFOS+PFOA concentration of 130.39 µg/L and PFAS6 concentration of 131.11 µg/L. Additional profile borings are being completed to define the plume extent.

Soil samples were collected 58 locations with the highest PFOS and PFOA concentrations of 630 µg/kg and 240 µg/kg, respectively, in the FTA-1 source area and PFOS and PFOA concentrations ranged up to 30 µg/kg and 0.82 µg/kg, respectively, in the former Sewer Treatment Plant (STP).

Surface water samples at 10 ponds/rivers resulted with the highest PFOS concentrations of 0.2 µg/L and PFOA 0.059 µg/L which were collected from Ashumet Pond. MDPH evaluated these PFAS concentrations and concluded no risk for recreational use of Ashumet and Johns Ponds.

1,4-Dioxane groundwater contamination at AV is very limited and only three locations exceed the risk-based concentration of 0.46 µg/L with the highest concentration of 0.75 µg/L relatively deep in the aquifer. 1,4-Dioxane was not detected in any soil samples.

Ms. O'Reilly presented "hit maps" of AV PFAS detections in groundwater and surface water and a second figure with 1,4-dioxane sampling results. It was noted that the result at 95DP4043 is above the PFAS6 MMCL but the contamination is not related to JBCC based on the different PFAS signature in this sample taken at the water table having very high PFOA and PFHpA concentrations but no PFOS which is not consistent with AV PFAS contamination originating from the FTA-1 area. In addition, the groundwater water flow direction is NE to SW at the water table in this area which provides further evidence that contamination is not related to JBCC. There are private wells downgradient of this boring which MassDEP is sampling and the AF is conducting further investigation with additional direct push sampling in this area per MassDEP's request to provide further confirmation that this contamination is not related to JBCC.

Ms. O'Reilly showed aerial photographs of the Fire Training Area-1 (FTA-1) Source Area from 1997 along with the Former MMR Sewage Treatment Plant (STP) Source Area. The highest groundwater concentration was outside the area of excavation at FTA-1. Although soil at FTA-1 was treated to remove fuel and solvent contamination, the Thermal Treatment Unit (TTU) heated contaminated soil to 350 degrees to treat the fuel and solvents but that temperature is not high enough to treat PFAS – above 1000 degrees Fahrenheit is needed. The soil was returned to the excavated area at the site after going through the TTU with fuel and solvents removed but PFAS contamination was still present in the soil. The soil samples collected from sewer sludge disposal area and filter beds of the former STP Source Area contained much lower concentrations of PFAS.

The TTRS included the completion of 27 groundwater profile borings along soil, surface water, sediment and private well sampling. The groundwater contamination extends from the source area to the shore at Hen Cove. The highest concentrations are detected near the source area with the highest PFOS+PFOA groundwater concentration located

within the Route 28 rotary at 13.22 µg/L. Soil samples were collected from 43 locations with the highest concentrations of PFOS (570 µg/kg) and PFOA (17 µg/kg) at the boring located in median strip on Connery Avenue where the tanker truck overturned.

Surface water samples were collected from 10 freshwater ponds/wetlands, Conservation Pond, Hen Cove, and Red Brook Harbor. The highest concentrations of PFOS (2.8 J µg/L) and PFOA (0.026 µg/L) were in Turtle Pond which is south of Connery Avenue.

The majority of the RI field work has been completed and the Draft RI Report is in preparation. Installation of a TTRS monitoring well network is ongoing and MassDEP is planning to sample shellfish in Hen Cove. A figure of the TTRS was presented with the PFAS6 detections.

The LF-1 Supplemental RI Report was submitted in January 2018. 1,4-Dioxane, PFOS, and PFOA were recommended to be added as Contaminants of Concern (COCs). A supplemental Feasibility Study (FS) is being completed to evaluate remedial alternatives for groundwater for 1,4-dioxane and PFAS. The Risk Based Concentration (RBC) of 0.46 µg/L for 1,4-dioxane and the PFAS6 MMCL of 0.02 µg/L will be considered in the Applicable or Relevant and Appropriate Requirement (ARAR) evaluation for groundwater.

The Expanded Site Investigation (SI) Work Plan for the Flight Line Area was submitted in July 2018 and contains seven Flight Line area sites: Former Fire Department Building 122, Lower 40 Ramp Area – Helicopter Hangar 2816, Former Building 118 – Runway 32, USCG Hangars 3170 and 3172, ANG Motor Pool, FS-1, and Wastewater Treatment Plant (WWTP) infiltration beds. The goals of the Expanded SI are to assess the potential of an ongoing source of PFAS from soil to groundwater, and determine whether PFAS groundwater contamination has migrated off-base potentially impacting drinking water supplies. The field program was completed in December 2020 and the Draft Expanded SI Report was submitted in April 2021.

At the Former Fire Department Building 122 on the Flight Line, AFFF was stored in vehicles and there were also accidental releases during training. The highest PFOS+PFOA groundwater concentration was 35.4 J µg/L in a source area boring and the groundwater contamination extends to the base boundary. Soil samples were collected at three source area borings with the highest PFOS (330 µg/kg) and PFOA (28 µg/kg) detected at FLDP4202. Asphalt samples were collected from two borings and the highest concentrations of PFOS (150 µg/kg) and PFOA (5.1 µg/kg) were detected at FLDP4202. PFOS/PFOA was also present in samples collected from concrete and sediment from inside drains and in water samples from the grease trap and oil/water separator.

AFFF was stored at the Fire Station and outside of Hangar 2816 and accidental releases of AFFF occurred during training at the Lower 40 Ramp Area. The highest PFOS+PFOA groundwater concentration was 1.132 J µg/L in a boring located downgradient of the Lower 40 Ramp Area. Soil samples were collected at nine source area borings with the highest PFOS (70 µg/kg) and PFOA (0.25 µg/kg) concentrations located near the outfall pipe in Drainage Ditch #1. Asphalt samples were collected at two borings and PFAS were not detected.

Former Building 118 was used for time and distance testing that was conducted annually for 10 years and the area was used to flush out hoses containing residual AFFF after responding to emergencies. The highest PFOS+PFOA groundwater concentration was 21.8 µg/L at a source area boring. Two surface water samples were collected from Moody Pond and PFOS was detected at concentrations of 0.12 and 0.13 µg/L and PFOA at 0.04 and 0.036 µg/L. Soil samples were collected from 4 borings and 20 grid cells across the source area resulting with the highest concentrations of PFOS (37 µg/kg) and PFOA (1 J µg/kg) along the western boundary of the source area.

AFFF was stored at USCG Hangars 3170 and 3172 and was released during fire suppression system testing along with other accidental releases. The field program was expanded to include Building 3160 and West Delta Hot Fuel Spot Training Area, just west of the hangars. The highest PFOS+PFOA groundwater concentration was 3.1 µg/L in a boring completed at the source area and the highest PFOS (8 µg/kg) and PFOA (1.4 µg/kg) soil concentrations were at a boring in the source area. Asphalt samples were collected from two borings and no PFAS were detected.

AFFF was used as a response action when JP-4 fuel spilled from a 5,000 gallon refueler truck at the ANG Motor Pool in 1984. The highest PFOS+PFOA groundwater concentration was 2.05 µg/L in a downgradient boring. PFOS+PFOA contamination extends to the base boundary and the CS-10 Sandwich Road extraction fence. The highest PFOS concentration in soil was 410 µg/kg located near the outfall pipe at the eastern end of the trench where the fuel and AFFF were contained ; no PFOA was detected in the soil samples.

The Eastern and Western Aircraft Turnaround areas were used from 1955-1970 to test fuel dump valves on EC-121 Constellation aircraft and there are no known releases of AFFF and a potential source area for PFAS contamination was not identified. The highest PFOS+PFOA groundwater concentration was 3.392 µg/L in a downgradient boring. PFOS and PFOA were not detected in the unnamed surface waterbody west of the FS-1 source area. The highest PFOS and PFOA concentrations in Quashnet River Bog ditches were 0.16 µg/L and 0.038 µg/L for surface water and 2.1 µg/kg and 0.18 J µg/kg for sediment.

Plant samples at the Kittredge Road WWTP in 2015 and 2018 resulted in PFOs+ PFOA concentrations of 0.185 J µg/L to 0.8383 J µg/L in the influent and 0.291 µg/L to 0.786 µg/L in the effluent. Two monitoring wells were sampled during the same timeframe with PFOS+PFOA groundwater concentrations exceeding the LHA, ranging from 0.519 µg/L to 1.1 µg/L respectively. Sanitary sewage samples were collected from 10 manholes and 9 lift stations which resulted in PFOS+PFOA concentrations exceeding the LHA at five manholes ranging up to 8.2 µg/L near Former Building 122 and PFOS+PFOA concentrations at the lift stations ranging up to 0.633 J µg/L. Sources to the WWTP appear to be primarily related to discharge to the sewer lines from the Former Fire Department Building 122 and the current Fire Department.

In summary, PFOS/PFOA groundwater concentrations exceed the LHA at all seven Flight Line sites. PFBS was not detected in groundwater or soil at concentrations above the EPA RSLs. There is evidence that PFOS/PFOA contamination in soil is acting as an ongoing source of groundwater contamination at five sites. The migration of PFOS/PFOA groundwater contamination from the source area, to or beyond the base boundary, was confirmed at four sites (no off-base public or private drinking water wells are located in these areas) and the potential for off-base migration exists at two sites. PFAS are not treated at the WWTP and the effluent discharges into the aquifer at the sand infiltration beds where it migrates in groundwater a short distance into the Cape Cod Canal. The primary sources of the PFOS/PFOA contamination to the WWTP will be addressed. The remaining six Flight Line Area sites will proceed to an RI and will be managed collectively as a Flight Line Area Operable Unit.

Ms. O'Reilly reviewed the path forward. The AV Supplemental RI and TTRS RI field programs will continue. Response actions will continue as needed. The Draft FS Report for 1,4-dioxane and PFAS at LF-1 will be submitted and the Flight Line Area Sites Expanded SI Report for PFAS will be finalized. Sampling results and updates will be presented at future technical update and JBCCCT meetings.

Mr. Goddard asked about an issue he said he brought up at the last meeting but said was not addressed. He said the state's PFAS6 is expressed as a limit of 20 nanograms per liter (ng/L) or 20 parts per trillion, but VOCs have MMCLs of µg/L or parts per billion which are commonly used on the project. Mr. Goddard said it is unhelpful, confusing, and potentially misleading (unintentionally). The scientific community uses µg/L, but in one of the presentations just given the standard for groundwater from the state used 20 ng/L and in another presentation µg/L was used which is a thousand parts difference. So if there is a well with 131 and the limit is 20, people assume it isn't that bad, but it is one hundred and thirty thousand parts per trillion. He said that it is better to compare "apples to apples" and that ng/L compared to µg/L is confusing. Mr. Goddard urged regulators to get together as a team and either convert PFAS6 to µg/L or convert results to ng/L.

Mr. Goddard asked what the level is for soils (the RSL). He said that is expressed as parts per billions but we need to be clear of the terms with soil also. He added that PFAS is in the billions and everything else is in the trillions.

Ms. O'Reilly responded that AFCEC used µg/L because that is what legacy plumes were all reported in and as a way to prevent confusion. Mr. Goddard countered by saying AFCEC is not stuck with using any specific unit in a presentation, especially when the state is using ng/L. He added a gentleman just joined the team so he can explain to

his neighbors in simple layman's terms the program, and though it is fine to use  $\mu\text{g/L}$  in reports, when talking to the public it is helpful to explain the right scale.

Ms. Forbes responded to Mr. Goddard that AFCEC has been using  $0.02 \mu\text{g/L}$  for EDB for years. That's equal to  $20 \text{ ng/L}$ . Ms. Forbes said she understands his point on consistency in units, but PFAS is not more sensitive than some of the chemicals AFCEC has been dealing with for years such as EDB.

Mr. Martin, MassDEP, responded that it can be very confusing when you shift from one unit to the next. He continued that they need to make sure in the future if there are multiple presentations, that the same units are used.

Mr. Goddard said he appreciated Mr. Martin's comment and added that maybe a slide in the beginning of each presentation explaining the units would be helpful.

Ms. O'Reilly responded that the EPA screening level for soil is 126 micrograms per kilogram for ingestion, but soil to groundwater screening levels would be much lower. Soil-to-groundwater screening levels for PFOS and PFOA were calculated using the EPA soil-to-groundwater migration model provided in the RSL calculator which calculated a soil-to-groundwater screening level of  $12.7 \mu\text{g/kg}$  for PFOS and for PFOA. The state has proposed lower soil concentrations. AFCEC is doing lysimeter pilot testing to evaluate PFAS concentrations in soil that may constitute a continuing source to groundwater. RSL is an EPA term which stands for Regional Screening Level.

Mr. Goddard said that groundwater can be treated with GAC, but asked if there are any preliminary thoughts on treating the source area soils and where those will go. It is a big challenge and expense for destroying thousands of yards of soil. Mr. Goddard asked what initial thoughts are on how to handle the soils. Ms. O'Reilly responded that those options will be addressed during the feasibility phase but at this point there is still ongoing research on what to do with the PFAS soils. She said that she is aware of the options of incineration, which would require high temperatures, and capping but other technologies are being developed. Mr. Goddard requested that this be an action item.

Mr. Goddard asked for the following Action Item: "I understand the outcome of any site is not determined because we are not finalizing the feasibility studies yet, etc.. but some comment at the next meeting if it were determined you could cap in place, how you would monitor it – would you use clay or a synthetic cap, or incineration, or if it is a large volume would you intend to put it into a modern landfill and what that means – what kind of landfill, subtitle C, D or whatever. I would like to hear some options at the next meeting."

In regard to his questions on soils, Ms. Forbes replied that the feasibility study evaluates the alternatives for both source area soils as well as the contamination in the groundwater. Mr. Goddard said he would like to hear about the options in a broad sense.

Mr. Dow commented that after reading Environmental Working Group description of 1,4-dioxane and what the solvent is like and how ubiquitous it was and how NY had a standard of 1 part per billion, that Massachusetts needs to develop its own standard. He continued that since it will likely be as widespread as PFAS, its effects should be evaluated from a variety of exposure pathways both in soil and water.

Ms. Forbes responded that the 1,4-dioxane that AFCEC is addressing is detected in the groundwater and the concentrations are not that high probably because they are associated with the chlorinated solvents which is older contamination that has attenuated. 1,4-Dioxane was used as an inhibitor in the solvents, so it is only present in low concentrations. There isn't 1,4-dioxane in the soil to address, and in the groundwater AFCEC is already looking at alternatives. It has already been established at CS-10 where 1,4-dioxane has been added as a COC and will likely be added to LF-1.

Mr. Cusak asked via Chat, what were PFAS concentrations for the Mashpee PWSWs that were taken offline? What is the status of the Town of Mashpee request for \$8.5 million reimbursement from the Air Force for new filter(s) required for municipal water supply? Ms. Forbes responded that the concentrations of the PFAS6 compounds in the

two Turner Road wells were 0.035 ug/L and 0.023 ug/L (greater than the PFAS6 MMCL of 0.02 ug/L but below the LHA of 0.07 µg/L). Ms. Forbes responded that the Mashpee demand letter has been referred to the AF Litigation Center. As such, we cannot offer any comment at this time.

Mr. Cambareri asked via Chat, what is the depth to groundwater at the two tank sites? Ms. Forbes responded that the depth to groundwater at the TTRS ranges from 10 to 15 ft below ground surface near the source area to <5 ft bgs at Hen Cove.

Mr. Dow added that he participated Environmental Justice webinar with the Mashpee Wampanoag tribe where they were looking at PFAS levels in the hunting and fishing products consumed by the tribe including finfish, shellfish and various animals they hunt in the forest. One of the points made in the webinar is that PFAS are soluble in water and fats and therefore have a different way to bio accumulate than PCBs and mercury so it is likely that shellfish have PFAS contamination, as well as things at the top of the food chain like the recreational fish species that Marc Nascarella talked about. Mr. Dow suggested that the shellfish in Ashumet Pond should be considered as an example of PFAS chemical contamination as they are already contaminated by bacterial toxins.

Mr. Karson replied that shellfish from Hen Cove in Pocasset were going to be analyzed by the MassDEP which Mr. Martin confirmed.

Mr. Winter asked if there is a way for people to have these contaminants measured in their bodies since they already exist in most people. Are there any standards for these contaminants in human tissue? Ms. Forbes and Ms. O'Reilly responded that the Air Force does not have the authority to do that type of sampling but that the STEEP program may be offering that type of sampling as they were looking for people near Barnstable Fire Training Area that may have been impacted by that PFAS contamination in that area which is unrelated to JBCC.

Mr. Cambareri asked if RI work on PFAS evaluated the use of fluorotelomer types of AFFF and distribution of 6:2 FTS (fluorotelomer sulfonic acid)? Ms. O'Reilly responded that the foam used at JBCC is primarily PFOS so the foam used is likely not one of the fluorotelomer types. They do have results for the 8:2 FTS and 6:2 FTS and they are not as high as PFOS.

Mr. Martin, MassDEP, addressed the drive point 95DP4043 to the south of JBCC and Johns and Ashumet Pond which Ms. O'Reilly presented in a figure outside of the base PFAS plume, and said that although there is some indication there might be another source, MassDEP has not completely bought into that at this time. It is further downgradient from the last sampling points. As far as hydraulics, it is near the Quashnet River which could affect where the plume is vertically, and Ms. O'Reilly also mentioned groundwater plumes from the NE to SW but there are little red dots up to the NE that the AF is attributing to their releases. He added that the jury is still out as far as MassDEP is concerned, but MassDEP is moving forward with the sampling of private wells, and along with the drive points that the Air Force is going to put in, will give more information.

Mr. Martin asked why the RI for AV does not include the Flight Line since it extends to the area downgradient of the Flight Line? He added that this will be discussed as they go through the process.

Mr. Dow stated that at the 2020 National Academy of Sciences Technology and Medicine Conference had 2 days on the health effects of PFAS chemicals given by Laurel Schaidler of the Silent Spring Institute and Elsie Sunderland of Harvard's Department of Environmental Health and can be contacted about potential health effects.

**Agenda Item #4. Military Munitions Response Program (MMRP) Update** – Ms. Jennifer Martin-Bouchard, EA Engineering, Science, and Technology, Inc.



Ms. Bouchard began her presentation with the background of MMRP at JBCC and said more detailed information on sites will be given at future meetings. AFCEC has been conducting investigation and remediation at 10 munitions response areas (MRAs) including two which are closed. As a result of military training, MMRP sites may contain munitions and explosives of concern (MEC), discarded military munitions (DMM), and/or munitions constituents (MC). The MMRP follows the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP). JBCC's Federal Facility Agreement applies to the sites but does not apply to operational ranges, operating storage/manufacturing facilities, or to permitted treatment and disposal facilities. Ms. Bouchard reviewed the MMRP process and showed a figure of the MMRP sites.

The current status of MMRP sites was presented. The Skeet Range is in RI for lead and is in regulatory review with an FS in progress. The Otis Gun Club is in RI/FS and AFCEC is contracting for a Supplemental RI. The Ordnance Area 1 is in an Expanded Comprehensive Site Evaluation (CSE) Phase II Investigation with the field investigation completed and the Supplemental CSE Phase II Report in progress with the goal of site closure. The Old Grenade Courts is in an Expanded CSE Phase II Investigation and AFCEC is contracting for additional investigation with the goal of site closure. The Mock Village Record of Decision and the Old K Range Draft FS are under Regulatory review. The Former Ammunition Supply Point (FASP) – East and FASP - West paths forward is being determined with regulators as EPA rescinded No Further Action (NFA). The Otis Target Butt and Former Otis Bomb Storage Magazines sites are closed.

#### **Agenda Item #5. Plume Book and Community Involvement Plan Updates – Mr. Douglas Karson, AFCEC**

Mr. Karson stated that the Plume Book has been through revisions and he will be addressing MassDEP comments. He said it should be ready to be finalized soon and will be posted to website and distributed to stakeholders and information repositories.

Mr. Karson presented a questionnaire/survey that was sent out as part of the Community Involvement Plan (CIP) Update. The last CIP was done in 2010. Agencies contributed to the questions on the survey, and it is available for anyone interested in filling one out with due date of August 20th. Email or call/text Mr. Karson to receive the form. Once all of the surveys are submitted the input will be reviewed with agencies and the CIP will be updated accordingly. The CIP will go out for public comment after regulatory review.

Mr. Goddard commented that he agreed with MassDEP's comment that the technical jargon needs to be less technical and the explanation more layman-oriented. He added that the units of measure used, especially for PFAS, should be checked for consistency. Mr. Karson replied that he would amend the Plume Book if needed.

#### **Agenda Item #6. IAGWSP Plume Overview – Mr. Ben Gregson, IAGWSP**

Mr. Gregson explained tonight's presentation is an update on the cleanup progress of the Impact Area Groundwater Study Program (IAGWSP) plumes over time. He noted that the program has been conducting cleanup for quite some time and that the original Administrative Order is almost 25 years old, with treatment systems in place starting in 2004.

Mr. Gregson displayed a list of cleanup sites: Demolition Area 1 (Demo 1), Central Impact Area (CIA), J-1 Range Northern, J-1 Range Southern, J-2 Range Northern, J-2 Range Eastern, J-3 Range, L Range, and Demolition Area 2 (Demo 2). He showed a figure with IAGWSP and IRP plumes with the maximum concentrations and changes in plume boundaries over time.

A figure showed the current plume boundary depictions and Mr. Gregson noted that the IRP plumes shrunk considerably over time based on their treatment. He pointed out that the IAGWSP Southeast Ranges plumes have shrunk, as well as the Demo 1 plume. He pointed out that the CIA plume is the larger plume to the north, which just began treatment a few years ago so that is why the cleanup is not as far along as the others. Mr. Gregson then showed a figure with the IAGWSP treatment systems explaining there are 14 operable units/sites. There are 12 groundwater

plumes and the primary contaminants of concern are the explosive, RDX and the propellant, perchlorate. Seventeen treatment systems have been constructed for 7 groundwater plumes. The other groundwater plumes are under “monitored natural attenuation.” To date, the IAGWSP has treated approximately 16 billion gallons of groundwater, treating about 4 million gallons of groundwater each day.

Mr. Gregson explained that his presentation would show a series of “then and now” figures to show how the plume boundaries have changed over time at each site. He first displayed a plume comparison figure for Demo 1. He explained that there are two “before” pictures because the investigation of the extent of contamination at Demo 1 was in two phases. Historically, the maximum RDX contamination at Demo 1 was 370 parts per billion (ppb). That's the highest level of RDX that has ever been detected anywhere to date. The maximum perchlorate concentration was 500 ppb, which is fairly high compared to other sites. Treatment started on this plume in 2004 and a second base boundary system was installed in 2010. The final treatment system was installed off base in 2016.

The current Demo 1 plume depictions were shown and Mr. Gregson noted that the extent of RDX and perchlorate, in particular, decreased considerably. The historic vs. current maximum concentrations in the plumes were shown. It is clear from the figures that not only are the leading edges of the plumes decreasing, but also the volume/mass of contaminants has decreased, as well (as expressed by maximum concentrations detected). The historic maximum RDX concentration was close to 400 ppb and now the maximum concentration is ~1.5 ppb. The perchlorate is down to ~22 ppb, which is dramatically below the maximum concentration of ~ 500 ppb.

Mr. Gregson then showed the CIA plumes, which have the most recent system installations. Two extraction wells and treatment systems were installed in 2013 and a third was installed in 2016. Each one of these treatment systems is pumping at 250 gallons per minute (gpm) for a total of 750 gpm. The maximum RDX concentration ever detected in the CIA is 44 ppb. The maximum perchlorate concentration detected in the CIA is 11 ppb. The plume reduction from the treatment systems was depicted on a figure with the most progress from the extraction wells at Frank Perkins Road. On Burgoyne Road, there has been a drop in the concentration of the plume although not as dramatic as Demo 1. Currently the RDX maximum concentration is ~9 ppb, which is down from 44 ppb and the maximum concentration for perchlorate is down to ~3.6 ppb. The systems have treated about 2.5 billion gallons of water to date.

The comparison slides for the J Ranges were shown next. The J-1 North plume has both perchlorate and RDX migrating from a source area at the center of the J-1 Range, off to the north. The historic maximum concentration is 88 ppb for RDX and 78 ppb for perchlorate. A 250 gpm treatment system with two extraction wells put in place in 2013. A figure showed the plume boundaries were shrinking. The current maximum RDX concentration is 29 ppb and current maximum perchlorate concentration is 19 ppb. Almost a billion gallons of water have been treated to date.

The next plume discussed was J-1 South, which is at the southeastern part of the base. The first remedial action on this plume began as an interim measure in 2007, followed by another extraction well in 2012. The maximum historic concentration for RDX was 130 ppb. This plume does not have any perchlorate in it. Currently, just the off base extraction well is running to contain that portion of the plume. The next figure shows that the levels of contaminants off base are decreasing and the maximum detection has dropped way off - currently down at ~1.7 ppb for the RDX. The system has treated 672 million gallons of water to date.

The J-2 North figures were shown. This is another one of the southeast ranges plumes that is migrating from J-2 Range in a northerly direction. This plume caused high level concern because the Cape Cod Regional Water Supply Cooperative wells are downgradient of this plume and it was important to get treatment in place as soon as possible. Three extraction wells were installed in 2006. The final Decision Document (DD) was issued in 2013, and the system layout remained about the same. The historic maximum concentration for RDX is 16 ppb. The historic maximum perchlorate concentration is 198 ppb. Mr. Gregson stated that the treatment has done a good job of breaking up the plume, particularly perchlorate into small lobes that are just upgradient of the extraction wells. There has been a significant decrease in maximum concentrations with perchlorate currently down to ~31 ppb and RDX down to ~4 ppb.

Mr. Gregson moved on to the J-2 East plume. A Rapid Response Action was also done for this plume and treatment system extraction wells were installed in 2008. The maximum historic concentration of RDX was 18 ppb and the maximum historic concentration for perchlorate was 88 ppb. The treatment systems broke up the plume in the central lobe but there are still some relatively high concentrations of perchlorate and RDX remaining. The current maximum concentrations for this plume have not dropped as much as some of the other plumes. RDX is currently at 8.8 ppb for the maximum and perchlorate is at 60 ppb.

The J-3 Range plume figures were shown next. As the southernmost range, the J-3 Range plume migrates to the south towards Snake Pond. The maximum historic RDX concentration is 38 ppb and the maximum historic perchlorate concentration is 770 ppb. That is the highest maximum perchlorate detection for the entire program. This was another high priority site, which called for a Rapid Response Action treatment system consisting of 3 extraction wells installed in 2006. The final DD was issued in 2015. A fourth extraction well was added to the system to try to accelerate the cleanup further. Mr. Gregson noted that there was pretty good success in breaking up the plume, both in decreasing the aerial extent and also in decreasing concentrations considerably. The current maximum RDX concentration is 2.5 ppb and current maximum perchlorate concentration is 3.1 ppb.

Mr. Gregson stated that the next plumes to be presented are undergoing monitored natural attenuation. The L Range plume is at the southeast corner of the base. The historic maximum RDX concentration is 10 ppb. A current plume figure shows the plume has migrated off the base boundary a little bit and concentrations have gone down to ~2.4 ppb RDX. Perchlorate has always been relatively low in this plume.

Demo 2 is a site similar to Demo 1, where explosives were used for training and munitions demolition. The DD was signed in 2010. This plume is undergoing monitored natural attenuation. The historic maximum RDX concentration is 7 ppb. The current maximum concentration is ~1.5 ppb. Mr. Gregson stated that the plume is close to reaching the cleanup level of 0.6 ppb.

Mr. Gregson then gave a quick update on the IAGWSP PFAS sampling at the J-3 Range as follow up to some detections from last year. A figure was shown with wells that had sampling detections that exceeded the MassDEP PFAS standards that were mentioned earlier in IRP presentation. Wells with the highest PFAS concentrations are located within and east of the Demolition Area (MW- 163S, MW-193S) and in the vicinity of the former melt/pour building (MW-181S, MW- 197M2, MW-143M2). Mr. Gregson stated that all four J-3 extraction wells will be sampled, individually, while pumping at their respective design rates, concurrent with the quarterly PFAS system influent and effluent sampling of the J-3 Range treatment system.

There were no questions for Mr. Gregson.

The next meeting date is to be determined. Meeting was adjourned